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

January 18, 2024

Stephanie Bertoux
San Antonio Basin GSA
P.O. Box 196
Solvang, CA 93464
admin@sanantoniobasingsa.org

RE: San Antonio Creek Valley Basin - 2022 Groundwater Sustainability Plan

Dear Stephania Bertoux,

The Department of Water Resources (Department) has evaluated the groundwater sustainability plan (GSP or Plan) submitted for the San Antonio Creek Valley Basin 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 San Antonio Basin 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 San Antonion Basin GSP no later than January 21, 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 San Antonio Creek Valley Basin Groundwater Sustainability Plan

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

STATEMENT OF FINDINGS REGARDING THE APPROVAL OF THE SAN ANTONIO CREEK VALLEY BASIN 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 San Antonio Basin Groundwater Sustainable Agency (GSA or Agency) for the San Antonio Creek Valley Basin (Basin No. 3-014).

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 Basin. (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 Basin 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 Basin 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 Basin (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 Basin. 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 and goal to maintain groundwater levels in the Basin at levels within 25 feet of the fall 2018 levels appears to be a reasonable approach that will help avoid a significant and unreasonable depletion and is 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 Basin is being managed sustainably in accordance with SGMA. (23 CCR § 355.4(b)(1).)

2. The Plan demonstrates a reasonable understanding of where data gaps exist and demonstrates a commitment to eliminate those data gaps. For example, expanding the monitoring network to improve basin characterization, updating the integrated hydrologic model with new collected data, and increasing understanding of surface water and groundwater interaction, with respect to interconnected surface water depletion, groundwater dependent ecosystems, and the water budget. Filling these known data gaps, and others described in the Plan, should lead to refinement of the GSA's monitoring networks and sustainable management criteria and help inform and guide future adaptive management strategies. (23 CCR § 355.4(b)(2).)

3. The projects and management actions proposed are designed to help achieve the sustainable management goals in the Basin and avoid undesirable results. Projects and management actions are largely focused on expanding the monitoring network, groundwater demand reduction and supply augmentation. The projects and management actions are reasonable and commensurate with the level of understanding of the Basin setting. The projects and management actions described in the Plan provide a feasible approach to achieving the Basin'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 Basin were considered in developing the sustainable management criteria and how those interests, including domestic wells, 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 capable of preventing undesirable results and ensuring that the Basin is operated 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. The Plan includes an analysis of potential impacts to adjacent basins related to the established minimum thresholds for each sustainability indicator. The Plan does not anticipate any impacts to adjacent basins resulting from the minimum thresholds defined in the Plan. (23 CCR § 355.4(b)(7).)

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

9. 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 Basin. 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, 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. 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. Basin groundwater levels and other SGMA sustainability indicators are unlikely to substantially deteriorate while the GSA implements the Department's recommended corrective actions. State intervention is not necessary at this time to ensure that local agencies manage groundwater in a sustainable manner. (Water Code § 10720.10(h).)

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 San Antonio Creek Valley Basin 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 21, 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: January 18, 2024

Exhibit A: Groundwater Sustainability Plan Assessment Staff Report – San Antonio Creek Valley Basin

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

Groundwater Basin Name:	San Antonio Creek Valley Basin (No. 3-014)
Submitting Agency:	San Antonio Basin Groundwater Sustainability Agency
Submittal Type:	Initial GSP Submission
Submittal Date:	January 21, 2022
Recommendation:	Approved
Date:	January 18, 2024

The San Antonio Basin Groundwater Sustainability Agency (GSA or Agency) submitted the San Antonio Creek Valley Groundwater Basin Groundwater Sustainability Plan (GSP or Plan) for the San Antonio Creek Valley Basin (Basin) 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 Basin 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 Basin 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 Basin.[3] Department staff will continue to monitor and evaluate the Basin'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 San Antonio Creek Valley Groundwater Basin GSP. The GSA has identified areas for improvement of its Plan (e.g., addressing data gaps related to the hydrogeological conceptual model and the water budget, updating the data management system, and refining projects and management actions). 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. Further assessing the potential impact of established minimum thresholds for chronic lowering of groundwater levels on supply wells, including domestic wells.
2. 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.
3. Adding information related to the data and reporting standards.
4. Expanding the land subsidence monitoring network to provide sufficient coverage of the Subbasin.

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 San Antonio Creek Valley Basin.[5] To achieve the sustainability goal for the basin, 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 GSA.[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 basin, 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 21, 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 Basin. 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 January 31, 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 San Antonio Creek Valley Basin and the jurisdictional boundary of the submitting GSA fully contains the Basin.[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 Basin 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 San Antonio Basin Groundwater Sustainability Agency (SABGSA) was formed in 2017 via a Joint Exercise of Powers Agreement (JPA) between the Cachuma Resource Conservation District (CRCD) and the Los Alamos Community Services District (LACSD).

[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/87.
[33] Water Code § 10727(b); 23 CCR § 355.4(a)(3).
[34] San Antonio Creek Valley GSP, Section 2.2.1, pp. 58-59.
[35] 23 CCR § 354.6 *et seq*.
[36] 23 CCR § 354.8 *et seq*.
[37] 23 CCR § 354.6(e).

In 2020, The San Antonio Basin Water District (SABWD) was formed as a California Water District and met the JPA requirements to substitute membership of CRCD with SABWD membership in the SABGSA. The SABWD was formed to sustainably manage, protect, and enhance groundwater resources and preserve the productivity of agricultural lands within its service area. The LACSD was formed in 1956 to provide water treatment and distribution services, and subsequently expanded to maintain water, wastewater, and recreational facilities in the unincorporated community of Los Alamos. The GSP states "the SABGSA is not an exclusive agency," however, then states it has the legal authority to implement the GSP with no authority needed from any other GSA or agency, but no other GSAs or agencies are identified. Department staff note the agency is listed in the SGMA Portal as an exclusive GSA so it is unclear why the GSP includes this language. Department staff encourage the GSA to provide additional context about the exclusivity of the GSA in future updates to the Plan to resolve the confusion.

The SABGSA is governed by an eight-member Board of Directors. Seven directors are appointed from the CRCD with a specific director appointed representing various agricultural crop types common to the Basin.[38] One director is appointed from the LACSD.

The Basin encompasses 123 square miles in western Santa Barbara County, near the intersection of the Coastal Ranges and Transverse Ranges. The Basin is long and narrow in shape, approximately 30 miles long and 7 miles wide. The Basin is bounded by the Casmalia Hills and Solomon Hills to the north and the Purisima Hills, Burton Mesa and adjoining Santa Ynez River Valley Basin to the south.[39] A map showing the location of the Basin and adjacent basins is presented as Figure 1 below.

[38] San Antonio Creek Valley GSP, Appendix A, pp. 476-477.
[39] San Antonio Creek Valley GSP, Executive Summary, p. 23; Section 1.2, p. 52; Figure 2-1, p. 57; Section 3.1.1, p. 82; Section 3.1.2.1, p. 91.

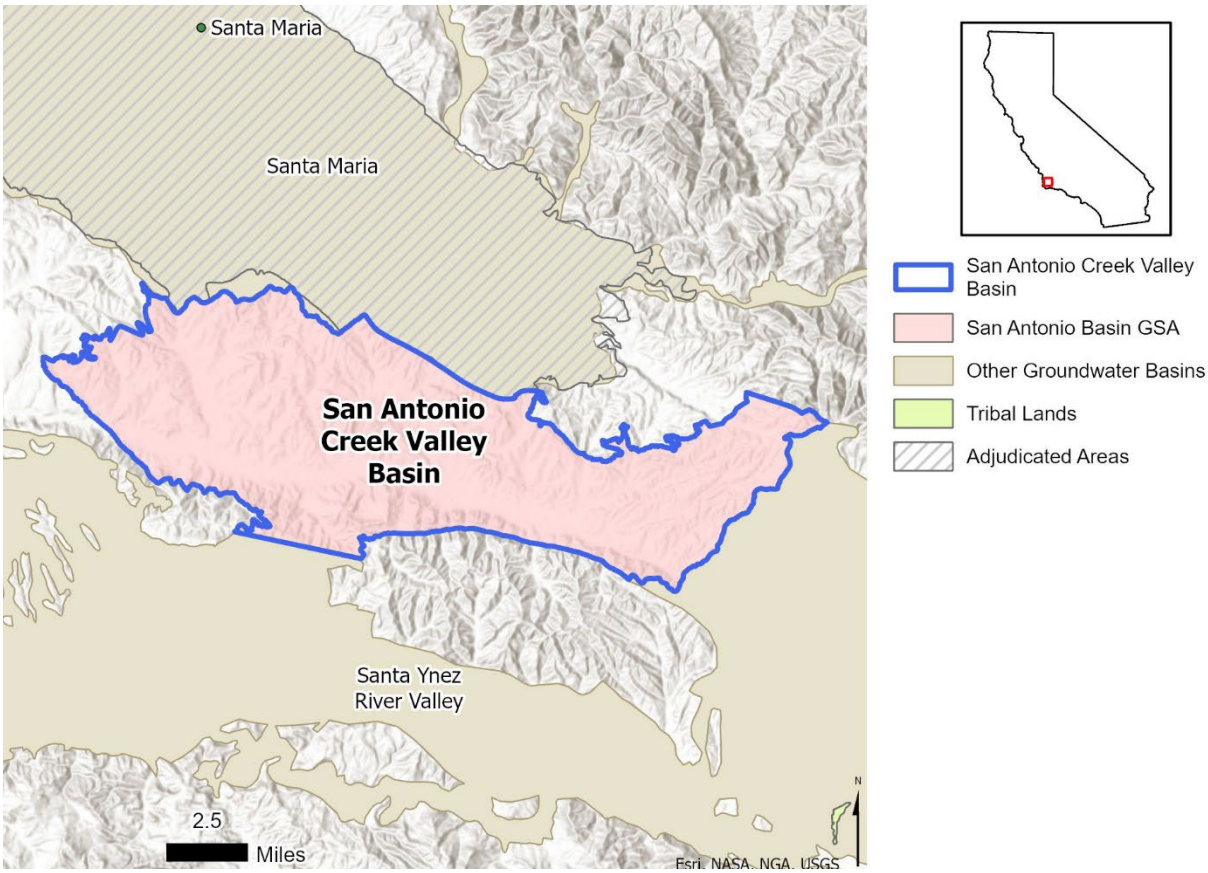

Figure 1: San Antonio Creek Valley Location Map.

The dominant land use in the Basin is agricultural use, with approximately 16% of the agriculture land used for cultivation. Less than one percent of the Basin has residential, commercial, and recreational land uses which are attributed to the community of Los Alamos. Additionally, there are several oil and gas fields present in the Basin, however, the percentage of Basin land use occupied by these fields is not quantified. There are no Disadvantaged Communities (DACs) or tribal lands in the Basin.[40,41]

The Plan identifies the primary uses of groundwater as municipal, agricultural, rural residential, and some environmental use via groundwater dependent ecosystems.[42] Agricultural use is the largest water use sector in the Basin, approximately 95 percent of all water use, followed by Vandenberg Space Force Base (VSFB) at approximately 3 precent, and then by a small volume of water use attributed to the LACSD and rural domestic users.

[40] San Antonio Creek Valley GSP, Section 2.2.2.6, p. 63.
[41] San Antonio Creek Valley GSP, Appendix C, p. 596.
[42] San Antonio Creek Valley GSP, Section 2.3.1, pp. 71-72.

Domestic, municipal, and agricultural water demands rely entirely on groundwater.[43] The Plan includes three figures showing the density of municipal,[44] agricultural,[45] and domestic[46] pumping wells in the Plan area. The information provided on the figures indicate there are 253 water supply wells, 149 agricultural wells, 96 domestic wells, and 8 municipal wells in the Basin. The Plan notes that the location and status of these wells is from Department databases and has not been verified by the SABGSA.[47]

The GSP includes a discussion of the water resource monitoring and management plans in the Plan area. Several programs monitoring groundwater elevation, groundwater quality, stream flows, and precipitation are ongoing in the Basin.[48]

The GSP describes in sufficient detail the organizational structure of the GSA and its legal authority to manage groundwater in the Basin and finance projects and management actions. The GSP also provides the GSA's funding strategy to support their GSP implementation activities; costs range from approximately $367,000 to $567,000 per year.[49] The GSP describes funding mechanisms that the GSA will consider for meeting the GSP implementation costs, which include a combination of contributions from landowners, grant funding, and rate payers (if available).[50]

Additionally, the SABGSA Stakeholder Outreach and Engagement Plan includes a stakeholder identification list identifying the following stakeholders: Santa Barbara County (which has land use planning authority), holders of overlying groundwater rights (including domestic and agricultural well owners), LACSD (which owns municipal wells), environmental users, surface water users, environmental justice interests, and VSFB.[51]

Department staff conclude that the administrative information included in the GSP 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 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.[52]

[43] San Antonio Creek Valley GSP, Section 2.3.1, p. 71.
[44] San Antonio Creek Valley GSP, Figure 2-2, p. 67.
[45] San Antonio Creek Valley GSP, Figure 2-3, p. 68.
[46] San Antonio Creek Valley GSP, Figure 2-4, p. 69.
[47] San Antonio Creek Valley GSP, Section 2.2.3.3, p. 66.
[48] San Antonio Creek Valley GSP, Section 2.2.2, pp. 60-61.
[49] San Antonio Creek Valley GSP, Section 7.6, p. 453.
[50] San Antonio Creek Valley GSP, Section 6.4, pp. 388-390, Section 7.6, p. 453.
[51] San Antonio Creek Valley GSP, Appendix C, pp. 591-599.
[52] 23 CCR § 354.12.

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.[53] The GSP Regulations require a descriptive hydrogeologic conceptual model that includes a written description of geologic conditions, supported by cross sections and maps,[54] and includes a description of basin boundaries and the bottom of the basin,[55] principal aquifers and aquitards,[56] and data gaps.[57]

The Plan provides a comprehensive description of the hydrogeologic conceptual model that provides details based on the available information to describe the groundwater systems in the Basin. The Plan utilizes prior technical studies, maps, and cross-sections to describe the hydrogeologic conceptual model, and expands on these prior works using additional available data.[58]

The Plan describes that the Basin is a trough, shaped like an elongated bowl, located in western Santa Barbara County, near the intersection of the Coastal Ranges and Transverse Ranges Geomorphic Provinces.[59] The Basin was formed by downward-folding rock units and is structurally controlled by a northwest-trending geologic unit made of two parallel synclines called the Los Alamos and San Antonio Synclines.[60] The Basin boundary is structurally controlled by upward folding of rock units outcropped at ground surface along the topographic divides of the Solomon and Casmalia Hills on the north and the Purisima Hills and Burton Mesa on the south in a tectonically active region.[61] Topographical highs occur along the ridgelines of the Casmalia, Solomon, and Purisima Hills while topographical lows occur along the long, flat, and narrow valley floor along the axis of the Los Alamos Syncline.[62]

The San Antonio Creek drains the valley from east to west.[63] The Basin terminates on the downgradient western end where groundwater and surface water from the Basin and

[53] 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.
[54] 23 CCR §§ 354.14 (a), 354.14 (c).
[55] 23 CCR §§ 354.14 (b)(2-3).
[56] 23 CCR § 354.14 (b)(4) *et seq.*
[57] 23 CCR § 354.14 (b)(5).
[58] San Antonio Creek Valley GSP, Section 3.1 through 3.1.3.5, pp. 81-108.
[59] San Antonio Creek Valley GSP, Executive Summary, p. 23; Section 1.2, p. 52; Figure 2-1, p. 57; Section 3.1.1, p. 82; Section 3.1.2.1, p. 91.
[60] San Antonio Creek Valley GSP, Section 3.1.2.1, p.91.
[61] San Antonio Creek Valley GSP, Section 3.1.1.1, p.82; Figure 3-1, p.83; Section 3.1.2.1, pp.91-92; Section 3.1.2.3, p. 93.
[62] San Antonio Creek Valley GSP, Section 3.1.2, p.82.
[63] San Antonio Creek Valley GSP, Section 2.2.1, pp. 58-59.

San Antonio Creek respectively, discharge into Barka Slough wetland.[64] The GSP defines the Basin boundaries in accordance with California's Groundwater Bulletin 118 as the Casmalia and Solomon Hills and Santa Maria Valley groundwater adjudication boundary on the north; the San Rafael Mountains and a watershed divide with the adjacent Santa Ynez River Valley Basin on the east; the Purisima Hills and Burton Mesa on the south; and the western edge of Barka Slough on the west.[65] Because of faulting on the west end of the basin, bedrock pushed to the surface formed a barrier to westward groundwater flow.[66] A preliminary United States Geological Survey (USGS) numerical model evaluated subsurface groundwater inflow on the eastern boundary with the adjoining Eastern Management Area of the Santa Ynez River Valley Basin and found the inflow to be negligible.[67] However, the GSP also notes that there is a small segment on the east end of the Basin "where there could be groundwater interaction with an adjacent groundwater subbasin" and that the "rate of flow was equal to the difference in hydraulic head".[68] While currently the flow is considered "negligible", given the GSA's plan to allow the groundwater levels to fall below historical lows in the Basin (see Section 4.3 Sustainable Management Criteria), Department staff are concerned that the rate of flow may change. Department staff encourage the GSA to clearly identify this as a data gap and work to fill this gap in understanding groundwater conditions in the Basin.

Older, impermeable consolidated bedrock formations both surround and underlie the Basin, which prevents movement of groundwater into the Basin from surrounding groundwater basins and out of the Basin to underlying consolidated bedrock.[69] The GSP states the bottom of the Basin is a vertical barrier to groundwater flow generally underlying the base of the Pliocene-age Careaga Sand.[70] The Plan describes the geologic units underlying the base of the Careaga Sand as the Foxen Mudstone, Sisquoc Formation, and Monterey Formation.[71] The GSP includes a cross-section depicting depths to the bottom of the Basin ranging from approximately 80 feet below ground surface west of Barka Slough to more than 3,000 feet below ground surface at the mid-section of the Basin, east of the Pezzoni-Casmalia and Los Alamos Faults.[72] A generalized regional geologic cross-section depicts the full stratigraphic section of the Basin based on oil and gas well exploratory drilling information published by the California Division of Oil, Gas, and Geothermal Resources.[73] Hence, the extent of unconsolidated water-bearing units

[64] San Antonio Creek Valley GSP, Section 3.1.4.1, p. 108; Section 3.2.1.4, p. 137; Figure 3-31, p. 140.
[65] San Antonio Creek Valley GSP, Section 1.2, p. 52; Section 2.2, pp. 58-59; Figure 3.1, p. 83; Section 3.1.1.1, p. 82; Section 3.1.3.2, pp.97-98; Section 5.11, p. 367.
[66] San Antonio Creek Valley GSP, Section 3.1.3.2. p. 99.
[67] San Antonio Creek Valley GSP, Section 3.1.3.2, p. 99.
[68] San Antonio Creek Valley GSP, Section 3.1.3.2, p. 99.
[69] San Antonio Creek Valley GSP, Section 3.1.2.3, p. 93; Section 3.1.3.2, p. 99.
[70] San Antonio Creek Valley GSP, Section 3.1.3.2, p. 97.
[71] San Antonio Creek Valley GSP, Section 3.1.2,2, p. 92; Figure 3-5, p. 90.
[72] San Antonio Creek Valley GSP, Figure 3-5, p. 90.
[73] San Antonio Creek Valley GSP, Figure 3-7, p. 95; Section 3.1.2.3, p. 93.

was differentiated across the Basin from deeper, older, consolidated non-water-bearing units based primarily on available stratigraphic data.[74]

The GSP states the Basin consists of two principal aquifers, defined as the Paso Robles Formation and the Careaga Sand. The GSP differentiates the Paso Robles Formation from the underlying Careaga Sand by the Paso Robles Formation's alternating coarse-grained beds and non-water-yielding fine-grained beds, lack of marine megafossils, and local presence of artesian conditions. The Careaga Sand is loosely consolidated, permeable, and consists of fine-grained to medium-grained sand, abundant well-rounded pebbles, and the presence of marine megafossils.[75]

The Paso Robles Formation is up to 2,000 feet thick and characterized by its vertical heterogeneity in the water-bearing properties. Based on the USGS San Antonio Creek Geohydrologic Framework Model and aquifer hydraulic and lithologic properties, the Paso Robles Formation is divided into upper, middle, and lower members. The GSP identifies the middle member as a confining layer and a barrier to vertical movement between the upper and lower members.[76] Principal hydraulic properties attributed to the Paso Robles Formation are wells producing 500 gallons per minute and specific capacities of 5-15 gallons per minute per foot of drawdown.[77]

The Careaga Sand is 1,500 feet thick and characterized by an upper coarse-grained member (Cebada) and a lower fine-grained (Graciosa) member.[78] Well yields in the Careaga Sand range from 100 to 1000 gallons per minute, and specific capacities range from fewer than 10 to more than 30 gallons per minute per foot of drawdown.[79]

According to the GSP, the primary uses of the Basin include municipal, agricultural, domestic, environmental, and operations of the VSFB.[80] The annual groundwater pumping volume of each sector for the current period is shown in Table 2-1.[81] The GSP provides maps showing all well types and the respective well density of each well type.[82]

The GSP recognizes multiple data gaps in the hydrogeologic conceptual model and states that the GSA will make efforts to address them but does not identify measures or schedules to eliminate the data gaps. Data gaps include unknown conditions in surface water flow entering and leaving Barka Slough; spatial data gaps in both aquifers in the eastern and central to northwestern upland areas of the Basin;[83] lack of well construction

[74] San Antonio Creek Valley GSP, Section 3.1.2.3, p. 93.
[75] San Antonio Creek Valley GSP, Section 3.1.3.1, pp. 96-97; Section 3.1.2.2, p. 92.
[76] San Antonio Creek Valley GSP, Section 3.1.2.2, p. 92; Figure 3-5, p. 90.
[77] San Antonio Creek Valley GSP, Section 3.1.3.1, pp. 96-97.
[78] San Antonio Creek Valley GSP, Section 3.1.2.2, p. 92.
[79] San Antonio Creek Valley GSP, Section 3.1.3.1, p. 97.
[80] San Antonio Creek Valley GSP, Section 3.1.3.5, pp. 107-108.
[81] San Antonio Creek Valley GSP, Section 2.2.1.3, p.59; Table 2-1, p.60; Section 3.1.3.5, pp. 107-108.
[82] San Antonio Creek Valley GSP, Section 2.2.3.3, p.66; Figures 2-2 through 2-4, pp. 67-69; Section 3.1.3.5, pp. 107-108; Table 3-22, p. 227.
[83] San Antonio Creek Valley GSP, Section 3.1.4.2, p. 109; Figure 5-3, p. 338; Section 5.3.2, p. 335.

information and corresponding principal aquifer that supplies the respective wells;[84] limited data for estimates of hydraulic conductivity and specific yield of individual members in both the Paso Robles Formation and the Careaga Sand.[85] Department staff encourage the GSA to provide a plan and schedule to address the data gaps, discuss whether the data gaps are critical to GSP implementation, and discuss how filling data gaps will impact achieving sustainability.

Department staff conclude that the information provided to characterize the hydrogeologic conceptual model substantially complies with the requirements outlined in the GSP Regulations. In general, the Plan's descriptions of the regional geologic setting, the basin's physical characteristics, the principal aquifer, and hydrogeologic conceptual model appear to utilize the best available information and science. Department staff are aware of no significant inconsistencies or contrary technical information to that presented in the Plan.

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 (GDEs) that includes the following: groundwater elevation contour maps and hydrographs,[86] a graph depicting change in groundwater storage,[87] maps and cross-sections of the seawater intrusion front,[88] maps of groundwater contamination sites and plumes,[89] maps depicting total subsidence,[90] identification of interconnected surface water systems and an estimate of the quantity and timing of depletions of those systems,[91] and identification of GDEs.[92]

The GSP provided a total of 56 hydrographs that depict long-term groundwater elevations for the principal aquifers.[93] The period of records for hydrographs provided in the GSP vary, but generally begin in the 1980s and extend through 2020. Hydrographs representing groundwater conditions indicate an overall downward trend. The Plan states that instances of greatest groundwater level decline have occurred in the Paso Robles Formation within the last 5 years since 2016 and in the Careaga Sand within the last 6 years since 2015.[94] The GSP associates these declines with increased groundwater pumping attributed to agricultural irrigation growth from 1981 to 2009 and 2009 level

[84] San Antonio Creek Valley GSP, Section 5.3.2, p. 339; Section 6.3, p. 380.
[85] San Antonio Creek Valley GSP, Section 3.1.4.3, p. 109.
[86] 23 CCR §§ 354.16 (a)(1-2).
[87] 23 CCR § 354.16 (b).
[88] 23 CCR § 354.16 (c).
[89] 23 CCR § 354.16 (d).
[90] 23 CCR § 354.16 (e).
[91] 23 CCR § 354.16 (f).
[92] 23 CCR § 354.16 (g).
[93] San Antonio Creek Valley GSP, Section 3.2.1.2, pp. 118-127; Appendix D-5, pp. 820-876; Table 5-2, p. 336.
[94] San Antonio Creek Valley GSP, Section 3.2.1.2, pp. 123, 127.

groundwater pumping through 2018.[95] The Basin groundwater level changes since 1981 are reflected in the changes in groundwater in storage through 2018.[96] In the deep aquifer historical low groundwater levels generally occurred in 2015 to 2016, with historical highs in 1976 to 1977. Historical lows in the shallow aquifer generally occurred in 2019 with historical highs in 1978. Hydrographs of groundwater levels are closely associated with storage. Although periods of above-average precipitation are reflected in the hydrographs, groundwater elevations continue to decline as shown in all the hydrographs included in the GSP.

The GSP includes a description of the change in groundwater storage and graphs depicting the change in storage demonstrating the annual and cumulative change in volume of groundwater storage.[97] The GSP states that the historical total average estimated groundwater storage loss is approximately 10,600 acre-feet per year since water year 1981.[98]

The GSP includes a description of current and historical groundwater quality issues including maps and has identified general minerals, major-ions, total dissolved solids (TDS), arsenic, nitrate, di(2-ethylhexyl)phthalate, iron, manganese, boron, sodium, and chloride as the water quality constituents of interest from previous studies in the Basin.[99] The GSP states that groundwater quality is "of widely varying quality and generally decreases in quality from east to west coincident with the groundwater flow direction".[100] Poor groundwater quality within the Basin is associated with historical MCL exceedances of nitrate, arsenic, and di(2-ethylhexyl)phthalate in drinking water occurring in 1989, 1990, and 2011 and SMCL exceedances of total dissolved solids, iron, manganese, and chloride in drinking and agricultural irrigation water.[101]

The GSP states that the Basin is located far from coastal areas and that seawater intrusion is not relevant in the Basin.[102]

The GSP includes a description of current and historical land subsidence conditions, along with maps, in the Basin.[103] The maps of current land subsidence cover the extent, cumulative total, and annual rate of subsidence in the Basin. Analysis described in the GSP estimated total potential subsidence on the order of one to two feet over the historical

[95] San Antonio Creek Valley GSP, Section 3.3.3.2, p. 226; Table 3-22, p. 227; Section 3.3.2.4, pp. 215-216; Appendix E, p. 926.
[96] San Antonio Creek Valley GSP, Figure 3-63, p. 225; Section 4.5.2.2, p. 279.
[97] San Antonio Creek Valley GSP, Section 3.3.3.2, pp. 222, 226; Table 3-21, p. 223; Figures 3-62 through 3-63, pp. 224-225.
[98] San Antonio Creek Valley GSP, Section 3.3.3.2, p. 228.
[99] San Antonio Creek Valley GSP, Section 3.1.3.4, p. 107; Section 3.2.3, pp. 141-173; Table 3-5, p. 142; Figures 3-32, p. 146; Section 4.8.2.1, pp. 296-297; Section 4.8.4, p. 302.
[100] San Antonio Creek Valley, Section 3.2.3.2, p. 143.
[101] San Antonio Creek Valley GSP, Table 3-5, p. 142; Section 3.2.3.1, p. 143.
[102] San Antonio Creek Valley GSP, Executive Summary, p. 36; Section 5.5, p. 343.
[103] San Antonio Creek Valley GSP, Executive Summary, pp. 41-42; Section 3.2.4, pp. 174-179; Section 4.3.3.4, p. 271.

period which appears relatively consistent with the estimated subsidence rate of 0.5 inches per year reported for a UNAVCO CGPS Station located in the town of Los Alamos.[104] The GSP states that current and historical subsidence monitoring data collected in the Basin suggest that groundwater extraction induced inelastic subsidence has not occurred.[105]

The GSP identifies surface water bodies[106] in the basin, which include Barka Slough and intermittent streams such as San Antonio Creek, but states that the "[e]phemeral surface water flows make it difficult to assess the interconnectivity of surface water and groundwater and to quantify the degree to which surface water depletion have occurred."[107] in the Basin. To fill this data gap, the GSAs plan to investigate the relationship between groundwater pumping in the Basin and groundwater flow into Barka Slough as a management action.[108] The GSP also includes a description of possible GDEs in the Basin along with a map.[109] The GDE assessment was developed and cross referenced with multiple datasets including, but not limited to, the Natural Communities Commonly Associated with Groundwater (NCCAG) dataset, U.S. Fish and Wildlife Service (USFWS), the California Department of Fish and Wildlife (CDFW), The Nature Conservancy (TNC), and local groundwater elevation data.[110] The GSP describes threatened/endangered species within the Basin and categorizes their groundwater dependence as direct, indirect, or unknown.[111] The aquatic and vegetation GDEs identified in the work group were integrated into a single potential GDE map.[112] The GSP acknowledges that potential GDE units should be further studied and verified.[113] Department staff agree with the GSA that potential GDE units should be verified through assessment of shallow groundwater data, updated field methodologies, and field verification.

Department staff conclude that, overall, the Plan sufficiently describes the historical and current groundwater conditions in the Basin, based on the best available science and information. Additionally, the information included in the Plan substantially 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

[104] San Antonio Creek Valley GSP, Section 3.2.4.3, p. 177; Appendix D-6, p. 882.
[105] San Antonio Creek Valley GSP, Section 3.2.4.3, p. 177.
[106] San Antonio Creek Valley GSP, Section 3.1.1.3, p. 86.
[107] San Antonio Creek Valley GSP, Section 3.2.5, p. 180.
[108] San Antonio Creek Valley GSP, Section 3.1.4.1, p. 108.
[109] San Antonio Creek Valley GSP, Section 3.2.6.1, pp. 185-186; Figure 3-56, p. 191.
[110] San Antonio Creek Valley GSP, Section 3.2.6, p. 185; Section 3.1.3.3, p. 104; Figure 3-10, p. 106; Section 3.2.6.1, p. 188; Section 3.2.6.2, p. 193.
[111] San Antonio Creek Valley GSP, Table 3-12, p. 194.
[112] San Antonio Creek Valley GSP, Section 3.2.6.1, pp. 188-189; Figure 3-56, p. 191.
[113] San Antonio Creek Valley GSP, Section 3.2.6.3, pp. 196-197.

leaving the basin, including historical; current; and projected water budget conditions,[114] and the sustainable yield.[115]

The GSP provides a historical water budget for water year (WY) 1981 through WY 2018, which is an accounting of the total annual volume of surface water and groundwater entering and leaving the basin and the change in the volume of water stored. The GSP utilizes inflow and outflow term estimates and a spreadsheet tool to develop the model budget.[116] The water budget information is provided in tabular and graphical form for the surface water[117,118] and groundwater systems.[119,120]Individual water budget components were developed utilizing publicly available datasets and former studies of Basin hydrological conditions, and given qualitative data rating assessments as summarized in Table 3-14.[121] Many of the water budget inputs are based upon the USGS Basin Characterization Model (BCM), including precipitation, areal recharge, mountain-front recharge, evapotranspiration, and surface runoff (and then adjusted based upon observed data correction factors).[122] The GSP states "[a] groundwater model developed by the USGS is currently being calibrated as part of a multi-year groundwater basin study [123] therefore , "it is necessary to use a spreadsheet tool to develop the water budgets for the Basin."[124] Once the study is complete, the GSA expects to utilize the groundwater flow model for basin management purposes.[125] The GSP also indicates that the water budget will be updated via management actions[126] and there is a Tier 1 (to be initiated within 1 year of GSP adoption)[127] management action to address data gaps, which includes reviewing and utilizing the USGS groundwater model. However, the process by which the USGS groundwater model information will be incorporated into the existing water budgets is not described in the Plan.

The GSP states that the average annual change in storage over the historical water budget period (WY 1981-2018) is calculated to be a deficit of 10,600 acre-feet (AF).[128] The basin yield is estimated at 8,900 acre-feet per year (AFY) based upon the average annual groundwater pumping of 19,500 AF and the average storage deficit. In the Executive Summary the GSA suggests that "basin yield" is synonymous with "safe yield", where "basin yield" is represented – incorrectly – as being defined by SGMA as "as the

[114] 23 CCR §§ 354.18 (a), 354.18 (c) *et seq*.
[115] 23 CCR § 354.18 (b)(7).
[116] San Antonio Creek Valley GSP, Section 3.3.1, p. 201.
[117] San Antonio Creek Valley GSP, Table 3-16 and Table 3-17, pp. 217-218.
[118] San Antonio Creek Valley GSP, Figure 3-61, p. 219.
[119] San Antonio Creek Valley GSP, Table 3-21, p. 223.
[120] San Antonio Creek Valley GSP, Figure 3-62 and Figure 3-63, pp. 224-225.
[121] San Antonio Creek Valley GSP, Table 3-14, pp. 208-210.
[122] San Antonio Creek Valley GSP, Appendix E, Section 2.3-3.1.3, pp. 931-938.
[123] San Antonio Creek Valley GSP, Section 3.3.2, p. 206.
[124] San Antonio Creek Valley GSP, Section 3.3.2, p. 206.
[125] San Antonio Creek Valley GSP, Section ES-2, p. 26.
[126] San Antonio Creek Valley GSP, Section 6.1, p. 370.
[127] San Antonio Creek Valley GSP, Section 6.1, p. 368.
[128] San Antonio Creek Valley GSP, Section 3.3.3.2, p. 222.

maximum quantity of water that can be continuously withdrawn from a groundwater basin without adverse effect." [129] The Plan then defines "basin yield" as "the volume of pumping that can be extracted from the basin on a long-term basis without creating a chronic and continued lowering of groundwater levels and the volume of groundwater in storage."[130] The Plan does not include an analysis demonstrating that undesirable results are not occurring, or expected to occur, at the proposed sustainable yield. Department staff note that the cumulative storage change shows a declining trend and encourage the GSA to provide additional information demonstrating that undesirable results are currently not occurring, or expected to occur, in the Basin. The GSP provides a current water budget based on WY 2011 through WY 2018. The Plan states that "[t]his period represents a very dry period overall, which…is considered representative of the current drought conditions."[131] The current average precipitation and precipitation-related percolation are approximately 77 percent (13,500 AF compared to 17,500 AF) and 66 percent (5,700 AF compared to 8,600 AF) of the historical average, respectively.[132] The GSP utilizes inflow and outflow term estimates and a spreadsheet tool to develop the current model budget.[133] The water budget information is provided in tabular and graphical form for the surface water[134,135] and groundwater systems.[136,137] During the current water budget period, agricultural groundwater pumping comprised approximately 95 percent of the total pumping and increased by approximately 27 percent when compared to the historical period.[138] The average annual change in storage associated with the current water budget is a deficit of 17,000 AF.[139]

The GSP provides projected water budgets based upon 50 water years of historical hydrology, to represent WY 2020 through WY 2070 conditions. The hydrogeological framework, geometry, and parameters are the same as those developed for the historic and current water budgets and water budget terms were developed utilizing publicly available datasets and projected into the future utilizing the methodologies summarized in Table 3-14.[140] The projected water budget is provided in tabular and graphical form for the groundwater system.[141,142] The projected water budget is provided only in tabular form for the surface water system.[143]

[129] San Antonio Creek Valley GSP, Section ES-2.6 p. 33.
[130] San Antonio Creek Valley GSP, Section ES-2.6 p. 33, Section 3.3.1, p. 201.
[131] San Antonio Creek Valley GSP, Section 3.3.1, p. 206.
[132] San Antonio Creek Valley GSP, Section 3.3.4, p. 229, Table 3-18, p. 221, Table 3-25, p. 232.
[133] San Antonio Creek Valley GSP, Section 3.3.1, p. 201.
[134] San Antonio Creek Valley GSP, Table 3-23 and Table 3-24, pp. 229-230.
[135] San Antonio Creek Valley GSP, Figure 3-64, p. 230.
[136] San Antonio Creek Valley GSP, Table 3-21, p. 223.
[137] San Antonio Creek Valley GSP, Figure 3-65 and Figure 3-66, pp. 235-236.
[138] San Antonio Creek Valley GSP, Section 3.3.4.2, p. 234.
[139] San Antonio Creek Valley GSP, Figure 3-65, p. 235.
[140] San Antonio Creek Valley GSP, Table 3-14, pp. 208-210.
[141] San Antonio Creek Valley GSP, Table 3-30 to Table 3-31, p. 244.
[142] San Antonio Creek Valley GSP, Figure 3-69 and Figure 3-70, pp. 250-251.
[143] San Antonio Creek Valley GSP, Table 3-28 to Table 3-29, pp. 242-243.

Projected water budgets were developed through water years 2042 and 2072 using estimated future land uses and related pumping volumes and repeating factors associated with observed historical climatic conditions.[144] The effects of climate change were evaluated using Department-provided climate change factors for the 2030 and 2070 climate change scenarios. It is unclear if 2030 and 2070 factors were combined for the 2042 projected water budget and only 2070 factors were used for the 2072 projected water budget (WY 2043 through WY 2072). Precipitation, evapotranspiration, and streamflow climate change factors were applied to the 50 water years of historic hydrology, which were comprised of water years 1981-2011, 1984-1992, and 1998-2001.

The GSP predicts the basin will be in a state of overdraft without the implementation of projects and management actions stating the average annual change in storage over the projected water budget periods is calculated to be -15,300 AFY and -16,200 AFY for the 2042 and 2072 water budgets, respectively[145].

The estimated "basin yield"[146]for the 2042 and 2072 projected periods are 10,700 AFY and 10,400 AFY, respectively.[147] These estimates are approximately 1,800 AFY and 1,500 AFY higher, respectively, than the estimated safe yield for the historical period. The GSP attributes the differences to increased agricultural return flow and streamflow percolation despite climate change modifiers and increased pumping.[148] The GSP does not make mention of the safe yield being considerate of the sustainable management criteria or it being equal to the sustainable yield as was described regarding the historical water budget safe yield calculations.

The GSP identifies data gaps (identified as assumptions and uncertainty) that the GSA acknowledges need to be addressed to improve the reliability of the water budgets and reduce uncertainty.[149] Department staff encourage the GSA to address the relevant data gaps to reduce uncertainty in the model results as soon as possible, including updating the sustainable yield discussion to demonstrate that undesirable results are not occurring, or expected to occur, at the proposed sustainable yield estimate, especially considering that cumulative changes in groundwater storage show a declining trend over the historical period.[150]

Department staff conclude the Plan provides the majority of the required historical, current, and future accounting and assessment of the total annual volume of groundwater and surface water entering and leaving the Basin and projected future water demands, using the best available tools and information available at the time of preparation of the Plan. Department staff recommend the GSA work to understand the reliability of the

[144] San Antonio Creek Valley GSP, Section 3.3.5.1, p. 238.
[145] San Antonio Creek Valley GSP, Table 3-21, p. 223.
[146] San Antonio Creek Valley GSP, Section 3.3.3.2, p. 228.
[147] San Antonio Creek Valley GSP, Section 3.3.5.3, p. 254.
[148] San Antonio Creek Valley GSP, Section 3.3.5.3, p. 254.
[149] White Wolf GSP, Section 9.5.3, pp. 199-200.
[150] San Antonio Creek Valley GSP, Figure 3-63, p. 225.

surface water supply to the Basin in order to develop a projected water surface water budget and revise the estimate of the sustainable yield of the Basin as more data becomes available.

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.[151]

This GSP has not defined management areas for the Basin.[152]

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.[153]

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.[154]

The GSP states the sustainability goal for the Basin is "to sustainably manage the groundwater resources of the Basin for current and future beneficial uses of groundwater, including Barka Slough (Slough), through an adaptive management approach that builds on best available science and monitoring and considers economic, social, and other objectives of Basin stakeholders."[155]

The GSA describes their approach to achieve the sustainability goal through "implementing a number of projects and management actions, including a pumping allocation program, after the GSP is adopted (see Section 6) that will result in basin pumping within the sustainable yield and avoidance of undesirable results within the next 20 years."[156] The Plan states that it is "intended to be an adaptive plan that allows for

[151] 23 CCR § 354.20.
[152] San Antonio Creek Valley GSP, Section 5.2.2, p 326.
[153] 23 CCR § 354.22 *et seq*.
[154] 23 CCR § 354.24.
[155] San Antonio Creek Valley GSP, Section 4.2, p. 266.
[156] San Antonio Creek Valley GSP, Section 4.2, p. 266.

consideration of observed basin conditions and adaptive management actions through the planning horizon."[157]

The Plan states that the general criteria used to define undesirable results in the Basin is that "there must be significant and unreasonable effects caused by pumping, a minimum threshold is exceeded in a specified number of representative monitoring sites over a prescribed period, [and] significant and unreasonable impacts to beneficial uses occur, including to GDEs and/or threatened or endangered species."[158]

The Plan states that the "[m]inimum thresholds, measurable objectives, and interim milestones have been established to measure sustainability and to assess progress toward meeting the sustainability goal over the next 20 years."[159]

Based on the information provided in the Plan relating to the sustainability goal, Department staff conclude that the Plan substantially complies with the GSP Regulations.

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.[160] 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[161] – 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 these effects become significant and unreasonable, constituting 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.[162] 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

[157] San Antonio Creek Valley GSP, Section 4.2, p. 266.
[158] San Antonio Creek Valley GSP, Section 4.3.2, p. 268.
[159] San Antonio Creek Valley GSP, Section 4.2, p. 266.
[160] 23 CCR § 351(ah).
[161] Water Code § 10721(x).
[162] 23 CCR §§ 354.26 (a), 354.26 (b)(c).

on a quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the basin.[163]

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.[164] GSAs are required to describe how conditions at minimum thresholds may affect beneficial uses and users,[165] 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.[166]

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.[167] GSP Regulations also require that the measurable objectives be established based on the same metrics and monitoring sites as those used to define minimum thresholds.[168]

The following subsections thus consolidate these 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 basin, 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.[169]

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.[170]

The GSP provides a qualitative objective to "help stakeholders understand the overall purpose for sustainably managing groundwater resources (e.g., Avoid Chronic Lowering of Groundwater Levels) and reflect the local economic, social, and environmental values within the Basin."[171] For chronic lowering of groundwater levels, the qualitative objective

[163] 23 CCR § 354.26 (b)(2).
[164] 23 CCR § 354.28 (b)(1).
[165] 23 CCR § 354.28 (b)(4).
[166] 23 CCR § 354.28 (b)(2).
[167] 23 CCR § 354.30 (a).
[168] 23 CCR § 354.30 (b).
[169] 23 CCR § 354.26 (d).
[170] 23 CCR § 354.28(c)(1) *et seq*.
[171] San Antonio Creek Valley GSP, Section 4.2.1, p. 266.

is to "[m]aintain groundwater levels that continue to support current and future groundwater uses and sustain the health of Barka Slough in the Basin."[172] The GSP characterizes significant and unreasonable groundwater declines as:

- "An acute or chronic, measurable significant and unreasonable impact to GDEs associated with interconnected surface water, specifically Barka Slough, caused by groundwater pumping in the Basin (during periods of average or above-average precipitation measured at the Los Alamos Fire Station gage).
- Lowering of groundwater levels results in an inability to produce estimated annual volume of groundwater equal to the sustainable yield for the Basin determined using the water budget method described in this GSP."[173]

The GSP states that significant or unreasonable effects associated with groundwater decline have not occurred based on groundwater users' input. The GSP describes conditions that may cause an undesirable result such as an extended drought or high rates of pumping in both principal aquifers (i.e., the Paso Robles Formation or the Careaga Sand aquifers).[174] The GSP also acknowledges that if groundwater extraction rates continue at historic rates and drought conditions persist, undesirable results may occur in the future. [175] The GSP adds that overpumping could affect well production and discharge to Barka Slough and associated GDEs.

The GSP quantitatively defines undesirable results from chronic lowering of groundwater levels to occur when levels in the Paso Robles Formation or Careaga Sand drop below the minimum threshold after periods of average and above-average precipitation[176] in 50 percent of representative wells for 2 consecutive years.[177] However, the GSP does not provide rationale for why the minimum threshold would need to be exceeded at fifty percent of the wells to be considered an undesirable result. Department staff encourage the GSA to disclose this rational or revise the definition to be based on what is considered to be adverse effects of depletion of supply to beneficial uses and users.

The Plan describes the criteria used to establish undesirable results for chronic lowering of groundwater as being based on information gathered at public meetings, historic groundwater level data plotted versus time, depths and locations of existing wells, maps of current and historic groundwater levels, mapped locations of GDEs, analysis of the

[172] San Antonio Creek Valley GSP, Section 4.2.1, p. 266.
[173] San Antonio Creek Valley GSP, Section 4.5.1, p. 275.
[174] San Antonio Creek Valley GSP, Section 4.5.1, p. 274.
[175] San Antonio Creek Valley GSP, Section 4.5.1, p. 275.
[176] As noted in the GSP: For the purposes of the Chronic Lowering of Groundwater Levels Sustainability Indicator Minimum Threshold, the total recorded precipitation from the preceding 3 water years will be used to determine if periods of average or above precipitation have occurred. Because climate change will likely have an effect on precipitation, a 20-year moving average will be utilized to determine average precipitation.
[177] San Antonio Creek Valley GSP, Section 4.5.1, p. 275.

potential impact of lowered groundwater levels, and projected future water budget "to estimate the amount of pumping that can be sustained annually."[178]

The minimum thresholds for chronic lowering of groundwater levels are set 25 feet below fall 2018 water levels.[179] The GSA's rationale for the minimum threshold is based on the GSA's well impact analysis and stakeholder feedback that "setting the minimum threshold for water levels at 25 feet below fall 2018 water levels will not result in depletion of supply or undesirable results… [and] allows time for project and management actions to be implemented before minimum thresholds are reached."[180] The minimum thresholds for the Basin are presented in Table 4.1 of the GSP.[181] The well impact analysis used 61 of the 423 well completion reports, selecting a combination of agricultural, municipal, and domestic wells screened in principal aquifers within the Basin based on known location and well construction information.[182] The Plan states that "groundwater elevations in fall 2018 were below top of screen in 20 percent of domestic wells, 12 percent of agricultural wells, and no municipal supply wells. As expected, the analysis indicates that as water levels decline further, the number of wells and percentages of the different types of wells with water level below top of screen increase, but not significantly."[183] The Plan goes on to state that the "well impact analysis presented in Section 3.2 indicates that the majority of the agricultural and domestic wells can tolerate additional groundwater level decline without experiencing undesirable results.

The measurable objectives for chronic lowering of groundwater levels are set at the groundwater level measured in spring 2015 at each RMS.[184] The Plan states that the "measurable objective levels were set so that: (1) declining water level trends caused by pumping do not continue to occur and (2) water levels stabilize with no chronic decline that continues during average and above-average rainfall conditions. With stakeholder input, the measurable objective groundwater elevation at representative wells was set at spring 2015 elevations when SGMA was enacted."[185] The measurables objectives for the Basin are presented in Table 4.1 of the GSP.[186]

The Plan states that interim milestones are established "to show how the [GSA] would move from current conditions to meeting the measurable objectives in the 20-year GSP implementation horizon.

The GSP states "there is no adjacent downstream groundwater basin; therefore, this section of the SGMA regulations [Effects of Minimum Thresholds on Neighboring Basins]

[178] San Antonio Creek Valley GSP, Section 4.3.3.1, pp. 269-270.
[179] San Antonio Creek Valley GSP, Section 4.5.2.1, p. 279.
[180] San Antonio Creek Valley GSP, Section 4.5.2, p. 277.
[181] San Antonio Creek Valley GSP, Table 4-1, p. 278.
[182] San Antonio Creek Valley GSP, Section 4.5.2, p. 277.
[183] San Antonio Creek Valley GSP, Section 4.5.2, p. 277.
[184] San Antonio Creek Valley GSP, Section 4.5.3.2, p. 283.
[185] San Antonio Creek Valley GSP, Section 4.5.3.1, p. 283.
[186] San Antonio Creek Valley GSP, Table 4-1, p. 278.

is not applicable to the Basin or this GSP."[187] The Plan also states "[t]he minimum thresholds set for chronic groundwater level decline are protective of all beneficial uses and do not result in undesirable effects for the other sustainability indicators."[188] However, as discussed in Section 4.2.1 Hydrogeologic Conceptual Model, Department staff encourage the GSA investigate the groundwater interaction with adjacent groundwater basins given the planned groundwater management in the Basin.

Department staff conclude that the sustainable management criteria for groundwater levels are generally commensurate with the understanding of the basin setting, responsive to interested party feedback, and reasonably consider the groundwater uses and users in the Basin. However, Department staff have identified components of the sustainable management criteria that should be reevaluated and revised by the first periodic evaluation of the Plan, as discussed below and highlighted in the recommended corrective actions identified in section 5.

The Plans includes only average and above-average precipitation years (i.e., excludes dry and critically dry years) in the definition of undesirable results even though the Plan recognizes undesirable results due to chronic lowering of groundwater levels may occur if groundwater pumping exceeds the sustainable yield regardless of water year type.[189] Department staff note that SGMA includes a provision which states, "overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods."[190] If the GSA intends to incorporate this concept into their definition of the undesirable result for chronic lowering of groundwater levels, the GSP must identify specific extraction and groundwater recharge management actions the GSA would implement or otherwise describe how the Basin would be managed to offset – by increases in groundwater levels or storage during non-drought periods – dry year reductions of groundwater storage.[191] The GSP identifies potential management actions and projects that, once implemented, may lead to the elimination of long-term overdraft conditions in the Basin. However, the GSP states that only a select number of management actions described as Tier 1 and Tier 2 will be implemented within three years of GSP adoption. The Plan does not provide sufficient detail on how these projects and management actions, in conjunction with the proposed chronic lowering of groundwater levels sustainable management criteria, will offset drought-related groundwater reductions and avoid significant and unreasonable impacts when groundwater level minimum thresholds are potentially exceeded for an extended period in the absence of two consecutive non-dry years. Department staff recommend

[187] San Antonio Creek Valley GSP, Section 4.5.2.3, p. 281.
[188] San Antonio Creek Valley GSP, Section 4.5.2.2, p. 280.
[189] San Antonio Creek Valley GSP, Section 4.5.1, pp. 274-275.
[190] Water Code § 10721(x)(1).
[191] 23 CCR § 354.44 (b)(9).

the GSA revise their definition of undesirable results to include all water year types and further evaluate how the proposed projects and management actions may offset any potential overdraft conditions (see Recommended Corrective Action 1a).

The GSA conducted a well impact analysis to determine where to establish the minimum thresholds for groundwater levels and how those groundwater levels may impact beneficial uses and users. The well impact analyses compared fall 2018 water levels to available well infrastructure. As documented in the Plan and discussed above, the well impact analyses predicted various percentages of agricultural wells, municipal wells, and domestic wells that would have their water levels fall below the top of the well screens at minimum threshold levels. However, the Plan does not describe or explicitly assess the quantity, percentage, or location of wells that may experience more permanent impacts such as lowering of water levels below pump intakes or wells going completely dry. Department staff recommend the GSA analyze where the proposed minimum thresholds are set relative to well construction information that would indicate whether or not more substantial impacts to beneficial users are occurring (i.e., depth of pump intake, bottom of the screen interval, well dewatering) (see Recommended Corrective Action 1b).

Department staff conclude that the established minimum thresholds and measurable objectives for chronic lowering of groundwater levels appear commensurate with the GSAs' understanding of the Basin's current and historical groundwater level conditions and considers beneficial use and users in the Basin. Staff also conclude that in general, the Plan adequately addresses the specific requirements of in the GSP Regulations. However, as highlighted in the recommended corrective actions above, the Plan should include additional supporting technical details that provides further description and disclosure regarding how the minimum thresholds and related definition of undesirable results for groundwater levels will help the GSA achieve its sustainability goal and avoid a depletion of supply.

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.[192]

The Plan states that "[based] on well-established hydrogeologic principles, maintaining long-term stability in groundwater levels above the minimum threshold for chronic

[192] 23 CCR § 354.28(c)(2).

lowering of groundwater levels will limit continued depletion of groundwater from storage."[193]

The Plan's proposed minimum thresholds for the reduction of groundwater storage uses groundwater levels as a proxy.[194] The Plan states that "minimum threshold for reduction of groundwater in storage is based on the groundwater level minimum thresholds established for chronic groundwater level decline at RMSs."[195]

The GSP provides a description of the potential causes of reduction of groundwater storage undesirable results and the possible effects on beneficial uses and users in the Basin.

Being that groundwater levels are used as a proxy for reduction in groundwater storage, the GSP should be revised to reflect any modifications to the chronic lowering of groundwater levels sustainable management criteria (see Recommended Corrective Action 2).

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 by a chloride concentration isocontour for each principal aquifer where seawater intrusion may lead to undesirable results.[196]

The GSP states that the "Basin is located approximately 8 miles inland from the Pacific Ocean and a bedrock high is located at the western end of the Basin…Consequently, the seawater intrusion sustainability indicator is not applicable in the Basin,"[197] Therefore, sustainable management criteria were not developed for seawater intrusion.

As the Basin is located inland, away from the ocean, Department staff concur with the GSP's rationale for not defining sustainable management criteria for seawater intrusion.

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.

[193] San Antonio Creek Valley GSP, Section 4.6.2, p. 289.
[194] San Antonio Creek Valley GSP, Section 4.6.2, p. 289.
[195] San Antonio Creek Valley GSP, Section 4.6.2, p. 289.
[196] 23 CCR § 354.28(c)(3).
[197] San Antonio Creek Valley GSP, Section 5.5, p 343.

In setting minimum thresholds for degraded water quality, the Agency shall consider local, state, and federal water quality standards applicable to the basin.[198]

The GSP provides a qualitative objective of avoiding degraded groundwater quality as to "[m]aintain access to drinking water supplies, [m]aintain access to agricultural water supplies, [and m]aintain quality consistent with current ecosystem uses."[199] The GSP characterizes significant and unreasonable results for groundwater quality as when:

- "Concentrations of regulated contaminants in untreated groundwater from private domestic wells, agricultural wells. or municipal wells exceed regulatory thresholds as a result of pumping or SABGSA activities.
- Groundwater pumping or SABGSA activities cause concentrations of TDS, chloride, sulfate, boron, sodium, and nitrate to increase and exceed WQOs since SGMA was enacted in January 2015."[200]

The GSP does not explicitly establish a quantitative definition of undesirable results related to the degradation of water quality. Rather, the GSA intends to "avoid increased degradation of groundwater quality from baseline concentrations since enactment of SGMA in January 2015."[201] The GSP currently establishes a minimum threshold for degraded groundwater quality as WQOs for "TDS, chloride, sulfate, boron, sodium, and nitrate as measured by SWRCB ILRP and DDW programs in 20 percent of wells monitored. In cases where the ambient (prior to January 2015) water quality exceeds the WQO, the minimum threshold concentration is 110 percent of the ambient water quality in 20 percent of the wells."[202] It appears to Department staff that the GSA is conflating the establishment of minimum thresholds with defining quantitative criteria for undesirable results. Department staff do not believe this oversight should preclude GSP approval at this time, because the GSP states the goal of the GSA's management is to avoid increased degradation of groundwater quality beyond January 2015 conditions and incorporates the Basin Plan WQOs as sustainable management criteria. Department staff suggest that the GSA revisit the quantitative definition of an undesirable result and provide a quantitative description of the combination of minimum threshold exceedances that would be expected to cause significant and unreasonable effects in the Basin, as required by the GSP Regulations[203] (see Recommended Corrective Action 2).

The GSP states that the purpose of the "minimum thresholds for constituents of concern in this Basin is to avoid increased degradation of groundwater quality from baseline concentrations measured since enactment of SGMA in January 2015."[204] The GSP states that the degraded water quality minimum thresholds will not negatively impact beneficial

[198] 23 CCR § 354.28(c)(4).
[199] San Antonio Creek Valley GSP, Section 4.2.1, p. 267.
[200] San Antonio Creek Valley GSP, Section 4.8.1, p. 294.
[201] San Antonio Creek Valley GSP, Section 4.8.2, p. 295.
[202] San Antonio Creek Valley GSP, Section 4.8.2.2, p. 297.
[203] 23 CCR § 354.26(b)(2).
[204] San Antonio Creek Valley GSP, Section 4.8.2, p. 295.

uses and users as they are based on the Water Quality Objectives (WQOs) established in the Basin Plan and are conducive to water quality suitable for each beneficial user.[205] The GSA plans to assess the minimum thresholds through direct measurement for the existing or new municipal, domestic and agricultural wells. The Plan states that "[e]xceedances of regulatory standards and WQOs will be assessed on an annual basis in accordance with the monitoring program." [206]

The Plan states that the measurable objective for "salts and nutrients (TDS, chloride, sulfate, boron, sodium, and nitrate) is to maintain groundwater quality equal to or below WQO presented in the Basin Plan, or equal to or below concentrations present in groundwater when SGMA was enacted." [207] The GSP states that interim milestones were not established for degraded water quality because no significant or unreasonable results have been observed in the Basin.[208]

Department staff conclude that the sustainable management criteria for the degradation of water quality are generally commensurate with the understanding of the basin setting and reasonably consider the groundwater uses and users in the Basin. However, Department staff have identified components of the sustainable management criteria that should be revised and reevaluated by the first Periodic Evaluation, as discussed below and highlighted in the recommended corrective actions included in Section 5.

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.[209] 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.[210]

The GSP states that the qualitative objective for land subsidence is to "[p]revent land subsidence that causes significant and unreasonable effects to groundwater supply, land uses, infrastructure, and property interests."[211] The GSP characterizes significant and unreasonable results for land subsidence as:

[205] San Antonio Creek Valley GSP, Section 4.8.2.5, p. 299.
[206] San Antonio Creek Valley GSP, Section 4.8.2.7, p 300.
[207] San Antonio Creek Valley GSP, Section 4.8.2, p 301.
[208] San Antonio Creek Valley GSP, Section 4.8.4, p 302.
[209] 23 CCR § 354.28(c)(5).
[210] 23 CCR §§ 354.28(c)(5)(A-B).
[211] San Antonio Creek Valley GSP, Section 4.2.1, p. 267.

- "Groundwater extraction results in subsidence that substantially interferes with surface land uses (including agricultural, residential, rural residential, and town buildings) and property interests.
- Groundwater extraction results in subsidence that causes land surface deformation that impacts the use of critical infrastructure (including LACSD wells, WWTP, and associated infrastructure) and roads.
- Groundwater extraction results in land subsidence greater than minimum thresholds at the UNAVCO CGPS Station ORES." [212]

The GSP explains that InSAR and UNAVCO data were used to evaluate land surface elevation changes throughout the Plan area. The Plan states that InSAR data show "that meaningful (greater than the range of uncertainty of InSAR data) land subsidence did not occur during the period between June 2015 and June 2019)."[213] UNAVCO GPS Stations estimated that land surface elevations declined approximately 0.82 feet from 2000 to 2020.[214] The GSA conducted an additional evaluation to supplement the InSAR and UNAVCO data by assessing the long-term land surface elevation changes caused by groundwater extraction.[215] The GSP states that an undesirable result would occur if "…subsidence caused by groundwater extraction exceeds the minimum threshold and causes damage to structures and infrastructure and substantially interferes with land uses."[216] The GSP does not include a quantitative definition of minimum thresholds that would constitute an undesirable result: however, since the GSP only proposes to have one representative monitoring point, Department staff assume any exceedance at this location would be considered an undesirable result.

The GSP sets the minimum threshold for land subsidence to "not exceed 0.05 feet (0.6 inches) per year for 3 consecutive years measured at the UNAVCO CGPS Station ORES." [217] The Plan explains that this "minimum threshold was selected because undesirable results have not been observed in the last 20 years and this rate of subsidence would indicate an increased rate of subsidence compared to the average rate of subsidence measured at the UNAVCO CGPS Station ORES from 2000 to 2020 (0.04 feet or 0.5 inches per year)." The minimum thresholds for the Basin are presented in Table 4.4 of the GSP.[218]

Department staff question whether one representative monitoring point for the entire basin is sufficient to adequately represent conditions throughout the basin. For more

[212] San Antonio Creek Valley GSP, Section 4.2.1, p. 267.
[213] San Antonio Creek Valley GSP, Section 4.9.1, p 303.
[214] San Antonio Creek Valley GSP, Section 4.9.1, p 303.
[215] San Antonio Creek Valley GSP, Appendix D, pp. 877-916.
[216] San Antonio Creek Valley GSP, Section 4.9.1, p 303.
[217] San Antonio Creek Valley GSP, Section 4.9.2, p 305.
[218] San Antonio Creek Valley GSP, Table 4-4, p 306.

information on recommendations related to the land subsidence monitoring network, see Section 4.6 Monitoring Network.

The GSP states that the measurable objectives "are set based on maintaining current conditions and changes and are measured by UNAVCO CGPS station data."[219] The measurable objectives for the Basin are presented in Table 4.5 of the GSP.[220] The interim milestone for land subsidence is not established because no significant or unreasonable conditions have been observed.[221]

Department staff conclude that the GSP adequately describes the sustainable management criteria and approach to managing land subsidence. Department staff also believe the Agency used the best information and science available at the time of Plan development. Department staff have also identified components of the sustainable management criteria for subsidence that should be revised or clarified by the first Periodic Evaluation, as discussed above and highlighted in the recommended corrective action.

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.[222] 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.[223] 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.[224]

The Plan acknowledges the presence of interconnected surface waters in the Basin and identifies their location at the Barka Slough. The GSP states interconnected surface water was identified through an "analysis of surface water discharges leaving Barka Slough at the Casmalia stream gage and results from the water budget computations." [225] The GSP appears to consider only the Barka Slough area as an interconnected surface water system and does not provide a figure specifically identifying interconnected surface water or potential interconnected surface water locations.[226] Several locations outside of Barka

[219] San Antonio Creek Valley GSP, Section 4.9.3.1, p 308.
[220] San Antonio Creek Valley GSP, Table 4-5, p 309.
[221] San Antonio Creek Valley GSP, Section 4.9.4, p 309.
[222] Water Code § 10721(x)(6).
[223] 23 CCR § 354.16 (f).
[224] 23 CCR § 354.28 (c)(6).
[225] San Antonio Creek Valley GSP, Section 4.10.2, p. 314.
[226] San Antonio Creek Valley GSP, Section 3.2.5, p. 181.

Slough area are known to be fed by springs or seeps[227] and support GDEs;[228] however, the GSP appears to discount these areas as potential ISW locations as it is "unknown whether the groundwater source of these springs or seeps is from the underlying principal aquifer or from perched water."[229]

The GSP does not quantify the rate or volume of surface water depletions due to groundwater pumping as the sustainable management criteria as required by the GSP Regulations.[230] Instead, the GSP proposes to set minimum thresholds using surface water discharge at stream gages.[231] The GSP states "[b]ecause the USGS model for the Basin is still under development and could not be used to estimate depletion."[232] Instead, the GSP used other methods "including analysis of surface water discharges leaving Barka Slough at the Casmalia stream gage and results from the water budget computations."[233] The sustainable management criteria developed by the GSP are "based on the best available information, focusses on avoiding depletion and maintaining surface water and groundwater flow entering and leaving the Slough."[234] The GSP states this is an interim approach "[u]ntil more is known about the relationship between groundwater and surface water in the vicinity of the Slough and depletion can be quantified and monitored.".[235] The lack of data does not amount to a technical justification for the use of groundwater contributions to instream flows instead of depletions of interconnected surface water due to pumping as required by GSP Regulations. Department staff note the GSP does not demonstrate, with adequate evidence, that the use of this alternate method based on a surface water balance is sufficient to quantify the location, quantity, and timing of depletions.

For depletion of interconnected surface water, the qualitative objective is to "[a]void significant and unreasonable effects to beneficial uses, including GDEs, caused by groundwater extraction [and m]aintain sufficient groundwater levels to maintain areas of interconnected surface water as of January 2015 when SGMA was enacted."[236] The GSP states, "significant and unreasonable depletion of surface water and reduction of groundwater flowing into the Slough causing impacts to GDEs at the Slough would include the following undesirable result: Permanent loss or significant degradation of existing native riparian or aquatic habitat due to lowered groundwater levels and reduced surface water flow into Barka Slough caused by groundwater pumping."[237]

[227] San Antonio Creek Valley GSP, Section 3.2.5, p. 181.
[228] San Antonio Creek Valley GSP, Section 3.2.6, p. 189.
[229] San Antonio Creek Valley GSP, Section 3.2.5, p. 180.
[230] 23 CCR § 354.28 (c)(6).
[231] San Antonio Creek Valley GSP, Section 4.10.2, p 317.
[232] San Antonio Creek Valley GSP, Section 4.10.2, pp. 313-314.
[233] San Antonio Creek Valley GSP, Section 4.10.2, pp. 313-314.
[234] San Antonio Creek Valley GSP, Section 4.10.2, p. 317.
[235] San Antonio Creek Valley GSP, Section 4.10.2, p. 317.
[236] San Antonio Creek Valley GSP, Section 4.2.1, p. 267.
[237] San Antonio Creek Valley GSP, Section 4.10.1, p. 311.

The GSP describes conditions that may cause an undesirable result for interconnected surface water such as an extended drought or high rates of pumping in both principal aquifers (i.e., the Paso Robles Formation or the Careaga Sand aquifers).[238] The GSP adds that overpumping could affect well production and discharge to Barka Slough and associated groundwater dependent ecosystems. As the GSP states, increased pumping due to proposed golf course would exacerbate this problem.[239]

The GSP set the minimum threshold for interconnected surface water to and average based flow[240] of "0.15 cfs of surface water flow measured at the Casmalia stream gage west of the Slough."[241] The Plan acknowledges the "[s]lough exhibits a diverse and complex interaction between surface water and groundwater and determination of what portions of the Slough are sustained by surface water flows and areas sustained by groundwater is not straightforward" and the minimum threshold is "based on the best available information, focusses on avoiding depletion and maintaining surface water and groundwater flow entering and leaving the Slough."[242] The minimum thresholds for the Basin are presented in Table 4.6 of the GSP.[243]

The GSP states that the measurable objective "is surface water flow measured at the Casmalia stream gage equal to the geometric mean flow (0.5 cfs) between 2015 and 2018 (since enactment of SGMA through the end of the historical and current water budget)."[244] The measurable objectives for the Basin are presented in Table 4.7 of the GSP.[245, 246]

The GSP discusses the relationship between the interconnected surface water minimum thresholds and the other sustainability indicators applicable to the Plan area.[247] The GSP also discusses the impact of the minimum thresholds on neighboring basins and management areas. The Plan states the interconnected surface water minimum thresholds are not anticipated to negatively impact beneficial uses and users, however it is not clear to Department staff whether the GSP has fully evaluated the potential impacts of future climate change on the establishment of the minimum threshold and what actions will take place if these impacts occur.

The interim milestone for interconnected surface water is not established because no significant or unreasonable conditions have been observed.[248] While the GSP concludes

[238] San Antonio Creek Valley GSP, Section 4.10.1, p 310.
[239] San Antonio Creek Valley GSP, Section 4.5.1, p. 274.
[240] As noted in the GSP: Measured over 3 consecutive months from June to September.
[241] San Antonio Creek Valley GSP, Section 4.10.2, p. 317.
[242] San Antonio Creek Valley GSP, Section 4.10.2, p. 317.
[243] San Antonio Creek Valley GSP, Table 4-6, p 317.
[244] San Antonio Creek Valley GSP, Section 4.10.3, p. 321.
[245] San Antonio Creek Valley GSP, Table 4-7, p 322.
[246] As noted in the GSP: The measurable objective value is reported as geometric mean daily discharge measured in cubic feet per second at the Casmalia stream gage between 2015-2018.
[247] San Antonio Creek Valley GSP, Section 4.10.2.1, p. 319.
[248] San Antonio Creek Valley GSP, Section 4.10.4, p 322.

that significant and unreasonable impacts are not anticipated to occur, Department staff encourage the GSA to consider establishing interim milestones for interconnected surface water.

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 3a). 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 3b). 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 3c).

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.[249]

[249] 23 CCR § 354.32.

Specifically, a monitoring network must be able to monitor impacts to beneficial uses and users,[250] monitor changes in groundwater conditions relative to measurable objectives and minimum thresholds,[251] capture seasonal low and high conditions,[252] include required information such as location and well construction and include maps and tables clearly showing the monitoring site type, location, and frequency.[253] Department staff encourage GSAs to collect monitoring data as specified in the GSP, follow SGMA data and reporting standards,[254] fill data gaps identified in the GSP prior to the first periodic evaluation,[255] update monitoring network information as needed, follow monitoring best management practices,[256] 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 has identified 50 wells to include in the groundwater level monitoring network.[257] All wells in the monitoring network are screened within the principal aquifers of the Basin.[258] A total of 15 representative monitoring wells are used as representative monitoring sites in the Basin.[259] There are a total of 51 wells uploaded to the Department's Sustainable Groundwater Management Act Portal's Monitoring Network Module (MNM). The MNM is consistent with the GSP regarding the 15 representative monitoring sites in the monitoring network. The Department's review of the groundwater level monitoring network is based on information provided in the MNM rather than the information provided in the GSP. The GSP identifies the principal aquifer that each well is monitoring—27 wells are screened in the Careaga Sand, and 23 wells are screened in the Paso Robles Formation.[260]

The GSP states that 10 wells in the groundwater level monitoring network are equipped with pressure transducers that measure groundwater levels every four hours and that are calibrated each quarter. For the remaining wells in the network, the GSP measures groundwater levels semi-annually to quarterly.[261] The GSP does not include information regarding how semi-annual or quarterly data collection is frequent enough to characterize

[250] 23 CCR § 354.34(b)(2).
[251] 23 CCR § 354.34(b)(3).
[252] 23 CCR § 354.34(c)(1)(B).
[253] 23 CCR §§ 354.34(g-h).
[254] 23 CCR § 352.4 *et seq*.
[255] 23 CCR § 354.38(d).
[256] Department of Water Resources, 2016, Best Management Practices and Guidance Documents.
[257] San Antonio Creek Valley GSP, Executive Summary, p. 41; Section 5.3, p. 328; Table 5-1, pp. 329-330; Figure 3-11, p. 111; Figure 5-1, p. 331.
[258] San Antonio Creek Valley GSP, Table 5-1, pp. 329-330.
[259] San Antonio Creek Valley GSP, Section 4.4, p. 272; Table 5-1, pp. 329-330; Figure 5-1, p. 331.
[260] San Antonio Creek Valley GSP, Section 3.1.3, p. 96; Table 5-1, pp. 329-330.
[261] San Antonio Creek Valley GSP, Section 5.3, p. 328; Figure 5-2, p. 332.

the seasonal high and seasonal low within the Basin. Department staff encourage the GSA to provide further information to ensure that the proposed semi-annual and quarterly data collection frequency will accurately represent seasonal high and low groundwater conditions, such as an analysis of historical groundwater level measurements.

The GSP proposes to use 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.[262]

The GSP concludes that seawater intrusion is not applicable because the Basin is approximately eight miles inland from the Pacific Ocean; the presence of a bedrock high on the west end creates a barrier to groundwater flow; groundwater discharges to surface water at the western end of the Basin.[263] Thus, the GSP does not intend to monitor seawater intrusion.

The groundwater quality monitoring network consists of 89 wells, all of which are representative wells. The network includes eight municipal drinking water supply wells and 81 wells are sampled annually as part of the State Water Resource Control Board (SWRCB) Irrigated Lands Regulatory Program; of these wells, 21 are domestic supply wells, and 60 are agricultural supply wells.[264] Thirteen of the wells in the monitoring network are included in the SWRCB Division of Drinking Water program with data ranging back to 1984.[265] Constituents of concern for the Basin are shown in Table 4-3 and will be monitored at these public supply wells.[266] While the 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 measurement frequency for each site in the degraded water quality monitoring network as required by the GSP Regulations.[267] Including this information will provide the Department additional clarity on how monitoring in the Basin will comply with the requirements of the GSP Regulations and SGMA (see Recommended Corrective Action 4).

The GSP states that in addition to utilizing Interferometric Satellite Aperture Radar (InSAR) data, one continuous GPS site will be included in the land subsidence monitoring network.[268] The Plan's proposal to use one representative monitoring point for the entire Basin is insufficient. Department staff recommend the GSA expand the land subsidence

[262] San Antonio Creek Valley GSP, Executive Summary, p. 41; Section 4.5.2.2, p. 279; Section 4.6.2, p. 289; Section 5.4.1, p. 340.
[263] San Antonio Creek Valley GSP, Executive Summary, p. 36; Table ES-2, p. 39; Section 3.2, p. 109; Section 4, p. 263; Section 4.2.1, p. 267; Section 5.2.1, p. 326; Section 5.5, p. 343.
[264] San Antonio Creek Valley GSP, Executive Summary, p. 41; Section 5.6, p. 345; Table 5-3, pp. 346-348.
[265] San Antonio Creek Valley GSP, Section 3.2.3.1, p. 141.
[266] San Antonio Creek Valley GSP, Section 5.6, p. 345; Table 4-3, p. 297.
[267] 23 CCR §§ 354.34 (h).
[268] San Antonio Creek Valley GSP, Section 5.7.1, pp. 356-357.

monitoring network to include additional representative monitoring locations that will be utilized in the assessment of sustainable management criteria to provide sufficient coverage of the Basin. The GSA may consider the use of additional GPS stations, extensometers, or publicly available remote sensing data (e.g., InSAR) to expand the land subsidence monitoring network in the Basin (see Recommended Corrective Action 5).

The interconnected surface water monitoring network consists of one streamflow gage, located more than two miles west of the downgradient end of the Basin,[269] and two nested wells that are continuously monitored using pressure transducers. The nested wells will be used to calculate the vertical gradient of groundwater.[270] There are no streamflow gages within the Basin boundary but the GSA intends to install two streamflow gages on San Antonio Creek—one upstream and one downstream of Barka Slough to measure surface water inflow and outflow and to assess surface water depletion and potential impacts to Barka Slough.[271]

Department staff have determined the proposed density of monitoring sites is reasonable, in most areas of the Plan, for most of the sustainability indicators. Department staff agree with the GSP regarding improvements to the spatial density of the monitoring networks for groundwater levels and surface water that would provide more data to better quantify and understand conditions and effects of Plan implementation on Basin sustainability.[272]

While a recommended corrective action is identified, the description of the monitoring network included in the Plan substantially complies with the requirements outlined in the GSP Regulations. Overall, the Plan describes in sufficient detail a monitoring network that promotes the collection of data of sufficient quality, frequency, and distribution to characterize groundwater and related surface water conditions in the basin and evaluate changing conditions that occur through Plan implementation. The monitoring network appears to be supported by the best available information and data and is designed to ensure adequate coverage of sustainability indicators. The Plan also describes existing data gaps and the steps that will be taken to fill data gaps and improve the monitoring network. Department staff will evaluate the GSA's progress of filling data gaps through review of Annual Reports and Periodic Evaluations of the GSP.

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 basin.[273] Each Plan's description of projects and management actions must include

[269] San Antonio Creek Valley GSP, Figure 4-4, p. 318.
[270] San Antonio Creek Valley GSP, Section 5.8, pp. 359-360; Section 5.8.1, p. 361; Figures 5-1 and 5-2, pp. 331-332.
[271] San Antonio Creek Valley GSP, Section 5.8, p. 360.
[272] San Antonio Creek Valley GSP, Section 6.3, pp. 378-381.
[273] 23 CCR § 354.44 (a).

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. [274]

The GSP states that the projects and management actions discussed in the Plan were "developed to address sustainability goals, measurable objectives, and undesirable results identified for the Basin."[275] The Plan further states that the GSA "plan[s] to continually monitor and assess the sustainable management criteria (SMCs) (see Section 4) and under conditions where minimum thresholds are projected to be reached, the SABGSA will perform assessments to determine if the trends are caused by groundwater pumping, caused by drought conditions, or both."[276]

The GSP states that the GSA "will perform annual assessments of the effectiveness of the implemented projects and management actions and utilize adaptive management strategies to re-evaluate the implementation sequencing and priorities, as deemed appropriate."[277] The Plan classifies the identified "management actions and potential future projects" using a four-tiered system.[278] Tier 1 and Tier 2 consist of management actions while Tier 3 and 4 consist of projects and management actions. The Plan states that because of the GSA's desire "to begin addressing the observed water level declines and the storage deficit soon after adoption of the GSP" both the Tier 1 and 2 management actions will be initiated within one and three years of GSP adoption, respectively.[279] The implementation of the Tier 3 and 4 priority projects and management actions are to be considered "in the future as conditions in the Basin dictate, and as the effectiveness of the lower tiered initiatives are assessed."[280]

The management actions and projects are itemized by tier, indicate relevant measurable objective benefits, required permits, pumping reduction outcome reliability, estimated implementation cost and benefit:cost ratio.[281]

The Plan adequately describes proposed projects and management actions in a manner that is generally consistent and substantially complies with the GSP Regulations. The projects and management actions are directly related to the sustainable management criteria and present a generally feasible approach to achieving the sustainability goal of the Basin.

[274] 23 CCR § 354.44 (b) *et seq.*
[275] San Antonio Creek Valley GSP, Section 6.1, p. 368.
[276] San Antonio Creek Valley GSP, Section 6.1, p. 369.
[277] San Antonio Creek Valley GSP, Section 6.1, p. 371.
[278] San Antonio Creek Valley GSP, Section 6.1, p. 368.
[279] San Antonio Creek Valley GSP, Section 6.1, p. 368.
[280] San Antonio Creek Valley GSP, Section 6.1, p. 368.
[281] San Antonio Creek Valley GSP, Table 6.1, pp. 372-374.

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."[282] 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.[283]

The San Antonio Basin has one has adjacent Basin: the Santa Ynez River Valley Basin. The Plan includes an analysis of potential impacts to adjacent basins with the defined minimum thresholds for each sustainability indicator. The Plan does not anticipate any impacts to adjacent basins resulting from the minimum thresholds defined in the Plan.[284]

Department staff will continue to review periodic updates to the Plan to assess whether implementation of the San Antonio Creek Valley GSP is potentially impacting adjacent basins.

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.[285]

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:

1. Explore how their proposed groundwater level thresholds have been established in consideration of groundwater level conditions in the basin 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 basin 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, and

[282] Water Code § 10733(c).
[283] 23 CCR § 354.28(b)(3).
[284] San Antonio Creek Valley GSP, Section 4.5.2.3, p. 281.
[285] 23 CCR § 354.18.

5. 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 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 San Antonio Valley Creek 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 San Antonio Creek Valley Basin. 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 assessment 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

The GSA should reevaluate the sustainable management criteria for the chronic lowering of water levels:

a. Revise the definition of undesirable results and language pertaining to significant and unreasonable chronic lowering of groundwater levels to remove the average and above-average year condition and discuss how extractions and recharge will be managed as necessary to ensure that reductions in groundwater levels or storage during dry years are offset by increases in groundwater levels or storage during other years within the sustainable management criteria for the chronic lowering of groundwater levels.

b. Department staff recommend the GSA, through their well impact analysis, describe where the proposed minimum thresholds are set relative to well construction information that would indicate whether or not more substantial impacts to beneficial users are occurring. This assessment would include evaluating how the sustainable management criteria may affect production wells relative to the depth of pump intake, bottom of the screen interval, and well dewatering, as applicable. This information should be clearly reported in the Plan for the entire Basin including quantities of wells that may be impacted and the approximate locations of where any potential impacts may occur.

RECOMMENDED CORRECTIVE ACTION 2

The GSP should reevaluate the quantitative definition of undesirable results related to degradation of water quality. The quantitative definition of an undesirable result should incorporate a combination of minimum threshold exceedances and clearly explain how

that quantitative criteria represent significant and unreasonable conditions occurring throughout the Basin.

RECOMMENDED CORRECTIVE ACTION 3

Department staff understand that estimating the location, quantity, and timing of stream depletion due to ongoing, basin-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. Consider utilizing the interconnected surface water guidance, as appropriate, when issued by the Department to establish quantifiable minimum thresholds, measurable objectives, and management actions.

b. 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.

c. 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 4

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

RECOMMENDED CORRECTIVE ACTION 5

Expand the land subsidence monitoring network to provide sufficient coverage of the Basin. The GSA may consider the use of additional GPS stations, extensometers, or publicly available remote sensing data (e.g., InSAR) to expand the land subsidence monitoring network in the Basin.