CALIFORNIA DEPARTMENT OF WATER RESOURCES

SUSTAINABLE GROUNDWATER MANAGEMENT OFFICE

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June 27, 2024

Vanessa De La Piedra
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA, 95118
vdelapiedra@valleywater.org

RE: Santa Clara Valley - Santa Clara Subbasin - Periodic Review of Alternative Groundwater Sustainability Plan

Dear Vanessa De La Piedra,

The Department of Water Resources (Department) has evaluated the alternative to a groundwater sustainability plan (Alternative) submitted for the Santa Clara Valley - Santa Clara Subbasin and has determined the Alternative is approved. The approval is based on recommendations from the Staff Assessment, included as an exhibit to the attached Statement of Findings, which describes that the Santa Clara Valley - Santa Clara Subbasin Alternative satisfies the objectives of the Sustainable Groundwater Management Act (SGMA) and substantially complies with the Groundwater Sustainability Plan (GSP) Regulations. The Staff Assessment also proposes recommended corrective actions that will enhance the Alternative 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 Alternative 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 Alternative at least every five years and whenever the Alternative is amended, and to provide a written assessment to the Department. Accordingly, the Department will evaluate approved Alternatives and issue an assessment at least every five years. The agencies are required to submit their second periodic review of the Santa Clara Valley - Santa Clara Subbasin Alternative no later than December 17, 2026.

Please contact Department 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 Alternative.

Thank You,

Paul Gosselin

Paul Gosselin
Deputy Director
Sustainable Groundwater Management

Attachment:

1. Statement of Findings Regarding the Periodic Review and Approval of the Santa Clara Valley - Santa Clara Subbasin Alternative Groundwater Sustainability Plan

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

STATEMENT OF FINDINGS REGARDING THE PERIODIC REVIEW AND APPROVAL OF THE SANTA CLARA VALLEY – SANTA CLARA SUBBASIN ALTERNATIVE GROUNDWATER SUSTAINABILITY PLAN JUNE 27, 2024

Under the Sustainable Groundwater Management Act (SGMA), an alternative to a groundwater sustainability plan (Alternative) must be resubmitted every five years,[1] and the Department of Water Resources (Department) is required to review the Alternative to assess progress in achieving the sustainability goal within the basin and recommend corrective action to address any deficiencies.[2] The Department evaluates updates to Alternatives in accordance with the criteria used to evaluate Groundwater Sustainability Plans, as applicable.[3] This Statement of Findings explains the Department's determination regarding the Alternative submitted on December 17, 2021, by the Santa Clara Valley Water District – Santa Clara Groundwater Sustainability Agency (Agency) for the Santa Clara Valley – Santa Clara Subbasin (Basin No. 2-009.02), herein referred to as the Department's "Periodic Review" of the Alternative.

Department management have discussed the Alternative with staff and have reviewed the written assessment titled *Periodic Review of Alternative Groundwater Sustainability Plan, Staff Assessment*, Santa Clara Subbasin, attached as Exhibit A, and have incorporated the findings, which recommends approval of the Alternative. Department management is satisfied that staff have conducted a thorough evaluation and assessment of the Alternative and concurs with staff's recommendation. The Department therefore **APPROVES** the Alternative and makes the following findings:

A. The Alternative satisfies the conditions listed in 23 CCR Section 358.4 on the grounds that:

   1. The Alternative was submitted within five years of its initial submission date as required by Water Code Section 10733.6(c).

   2. The Department has confirmed that the Alternative is within a basin that is in compliance with Part 2.11 (commencing with Water Code Section 10920) as required by Water Code Section 10733.6(d).

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[1] Water Code § 10733.6(c))
[2] Water Code § 10733.8
[3] 23 CCR § 358.4(b))

3. The Alternative is complete and includes the applicable information required by SGMA for the type of alternative submitted.

4. The Alternative covers the entire basin. The Department determined that the Alternative, as originally submitted, covered the entire basin, and those boundaries remain unchanged.

B. In addition to the grounds listed above, the Department also finds that the Alternative remains consistent with SGMA and is being implemented in a manner that will likely achieve the sustainability goal for the basin because:

1. At this time, there do not appear to be exceedances of any minimum thresholds or any failures of the Agency to meet any interim milestones which are likely to affect the ability of the Agency to achieve the sustainability goal for the basin within 20 years of implementation of the Alternative (23 CCR Section 355.6(c)(1)).

2. The Agency is implementing projects and management actions consistent with the Alternative (23 CCR Section 355.6(c)(2)). The suite of projects and management actions being implemented and considered in the Subbasin appears to be sufficient to address the water budget deficit, provides a buffer against climate change, and considers imported and local water supply reliability.

3. The Agency is addressing data gaps and reducing the levels of uncertainty identified in the Alternative (23 CCR Section 355.6(c)(3)). The Agency presents several technical memoranda addressing data gaps on a variety of important topics and has incorporated this information into the 2021 Alternative. The Agency appears to be actively working to address known data gaps and continually improve its understanding of the Subbasin for improved management using best-available science and practices.

4. As explained in the attached Staff Assessment, the Alternative continues to satisfy the criteria described in 23 CCR Section 355.6(c)(4), as applicable.

C. Furthermore, the Department also finds that the Alternative sufficiently demonstrates its ability to achieve the objectives of SGMA at this time because:

1. The Agency has demonstrated that the Alternative is functionally equivalent to the elements of a GSP; and

2. The Agency has taken steps to improve the Alternative by considering the recommended actions previously provided by staff. To ensure that the Alternative continues to satisfy SGMA's objectives, staff have provided additional recommended corrective actions for the Agency to consider before the Alternative's next Periodic Evaluation.

D. The Department also finds:

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 GSP 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 Alternative (Water Code Section 106.3; 23 CCR Section 350.4(g)).

2. The California Environmental Quality Act (CEQA) (Public Resources Code Sections 21000 *et seq*.) does not apply to the Department's evaluation and assessment of Alternatives, and the Department's evaluation and assessment of Alternatives is statutorily or categorically exempt from CEQA.

Accordingly, the Alternative submitted by the Agency for the Santa Clara Valley – Santa Clara Subbasin is hereby **APPROVED.** The recommended corrective actions identified in the attached Staff Assessment will assist the Department's future review of the Alternative's implementation for consistency with SGMA, and the Department, therefore, recommends the Agency address them in the next Periodic Evaluation, which is set to be submitted on June 17, 2026, as required by Water Code Section 10733.6(c). Department staff will continue to monitor and evaluate the progress toward achieving the basin's sustainability goal through continued Annual Reporting and future revisions to the Alternative. Failure to address the Department's recommended corrective actions before future, subsequent Alternative evaluations, may lead to the Alternative being determined incomplete or inadequate.

Signed:

Karla Nemeth

Karla Nemeth, Director
Date: June 27, 2024

Exhibit A: Periodic Review of Alternative Groundwater Sustainability Plan, Staff Assessment, Santa Clara Valley – Santa Clara Subbasin

State of California
Department of Water Resources
Sustainable Groundwater Management Program
Periodic Review of
Alternative Groundwater Sustainability Plan
Staff Assessment

Groundwater Basin Name:	Santa Clara Valley – Santa Clara Subbasin (2-009.02)
Number of GSAs or Local Agencies:	One (1)
Basin Plan Manager:	Vanessa De La Piedra
Type of Alternative:	Existing Groundwater Management Plan
Date Alternative First Submitted:	December 21, 2016
Date Alternative First Approved:	July 17, 2019
Date Periodic Evaluation Submitted:	December 17, 2021
Date Periodic Review Completed:	June 27, 2024
Staff Recommendation:	Approved

This assessment addresses the Department of Water Resources' (Department) statutory and regulatory responsibility to periodically review and evaluate approved groundwater sustainability plans (GSPs) and approved alternatives to a GSP (Alternative) pursuant to the Sustainable Groundwater Management Act (SGMA)[1] and the GSP Regulations.[2] As stated in the GSP Regulations: "The Department shall periodically review an approved Plan to ensure the Plan, as implemented, remains consistent with the Act and in substantial compliance with this Subchapter, and is being implemented in a manner that will likely achieve the sustainability goal for the basin. The Department shall evaluate approved Plans and issue an assessment at least every five years. The Department review shall be based on information provided in the annual reports and the periodic evaluation of the Plan prepared and submitted by the Agency."[3]

SGMA allows for basins to be managed under alternative groundwater management structures rather than a GSP.[4] An alternative can be based on an existing groundwater management plan or other law authorizing groundwater management, management pursuant to an adjudication action, or an analysis of basin conditions that demonstrates

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[1] Water Code § 10720 *et seq*.
[2] 23 CCR § 350 *et seq*.
[3] 23 CCR §§ 355.6(a) and 355.6(b). For the purposes of this Periodic Review, "Plan" refers to a groundwater sustainability plan as defined in SGMA and the GSP Regulations, while "Alternative" refers to an alternative to a groundwater sustainability plan described in Water Code § 10733.6.
[4] Water Code §10733.6; 23 CCR §§ 358.2 and 358.4.

the basin has operated within its sustainable yield over a period of at least ten years. Basins with approved alternatives are not explicitly subject to the Periodic Evaluation requirements like those basins with approved GSPs;[5] however, basins with approved alternatives must submit Annual Reports and the alternative must be submitted to the Department at least every five years for review and assessment.[6] Like GSPs, alternatives are subject to Periodic Reviews, in which the Department issues an assessment evaluating the progress toward achieving or maintaining the basin's sustainability goal.

If an alternative is not amended or is not in some other way materially changed, a Periodic Evaluation may be submitted in lieu of resubmission of the entire, identical alternative that was previously approved by the Department. A Periodic Evaluation, as it applies to alternatives, is a written assessment prepared by the local agency or groundwater sustainability agency (GSA) describing whether the implementation of the alternative, including implementation of projects and management actions, is meeting or maintaining the basin's sustainability goal. As indicated throughout this assessment, the Department's Periodic Review is based on information provided in Annual Reports and any available alternative or Periodic Evaluation submitted by local agencies or GSAs managing the basin for SGMA compliance.[7]

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

This Periodic Review includes the following sections:

- **Section 1 – Alternative Summary**: A description of the basin's alternative submittal, an overview of the Department's responsibility to periodically review and evaluate approved alternatives, and a summary of the alternative's recommended actions.

- **Section 2 – Periodic Review Criteria**: Describes the applicable statutory and regulatory requirements and the Department's evaluation criteria for approved alternatives.

- **Section 3 – Periodic Review of Approved Alternative**: Summarizes the Department's evaluation of the basin's approved alternative and may recommend corrective actions to facilitate the Department's ongoing evaluation of the basin's existing groundwater management program.

- **Section 4 – Progress Towards Addressing 2019 Recommended Actions**: A discussion of whether the agencies in the basin have made progress towards

[5] 23 CCR § 356.4.
[6] 23 CCR § 358.2(b).
[7] Water Code § 10733.8.

addressing the recommended actions identified by the Department in its previous assessment.

- **Section 5 – Staff Recommendation**: Includes the alternative's recommended status for approval, and provides new recommended corrective actions, if necessary.

1 Alternative Summary

In the Santa Clara Valley – Santa Clara Subbasin (Subbasin) a single alternative groundwater sustainability plan (GSP),[8] an alternative based on an existing groundwater management plan and other law authorizing groundwater management, was prepared and submitted by the Santa Clara Valley Water District (Valley Water), the sole GSA in the Subbasin. The *2016 Groundwater Management Plan for the Santa Clara and Llagas Subbasins* (2016 GWMP) was adopted by the GSA's Board of Directors on November 22, 2016. At the same public meeting, the GSA's Board authorized the 2016 GWMP to be adopted as an alternative GSP. The 2016 GWMP updated and expanded upon technical information from the groundwater management plan adopted by Valley Water in 2012, and Valley Water indicated that "the 2016 GWMP…meets the objectives of SGMA and contains information and elements that are functionally equivalent to the elements of a GSP…"[9] While the 2016 GWMP was the primary document relied upon to comply with SGMA's planning deadlines, Valley Water also relied upon additional plans, reports, and technical documents, which for the purposes of this assessment, are collectively referred to as the 2016 Alternative.[10]

The GSA's 2016 Alternative was first approved by the Department on July 17, 2019, with five recommended actions.[11] The 2016 Alternative's recommended actions, which were intended to improve the Alternative and facilitate the Department's ongoing evaluation of the basin's existing groundwater management program, are presented in detail in Section 4 of this assessment and generally relate to the following topics:

- Identification of groundwater dependent ecosystems (Recommended Action 1).
- Incorporation of climate change and population growth projections into the water budget over the 50-year planning and implementation horizon (Recommended Action 2).
- Establish separate water quality outcome measures for the Santa Clara and Llagas Subbasins (Recommended Action 3).

[8] Water Code § 10733.6(b)(1); 23 CCR § 358.2.
[9] 2021 GWMP, Chapter 1.1.1, p. 24.
[10] https://sgma.water.ca.gov/portal/alternative/print/18.
[11] https://sgma.water.ca.gov/portal/alternative/assessments/18.

- Development of outcome measures specific to seawater intrusion, separate from water quality (Recommended Action 4).
- Clarify definition and relation of outcome measures to the avoidance of undesirable results by sustainability indicator (Recommended Action 5).

Since the Alternative was first adopted in 2016, the Subbasin's Plan Manager has been submitting Annual Reports to the Department and has been documenting progress of the Subbasin's existing groundwater management program. At the time this Periodic Review was conducted by Department staff, the most recent Annual Report, which was submitted to the SGMA Portal on March 29, 2023, covered water year 2022.[12]

The *2021 Groundwater Management Plan for the Santa Clara and Llagas Subbasins* (2021 GWMP or 2021 Alternative)[13] was prepared pursuant to the authority granted by the Santa Clara Valley Water District Act and was adopted on November 23, 2021; the 2021 GWMP is intended to supersede all previous groundwater management plans.[14] As stated in the 2021 GWMP, "Basin management goals, strategies, programs, and outcome measures in the 2021 GWMP are very similar to the 2016 plan, as they have been effective in ensuring sustainable conditions. Valley Water's 2016 GWMP documented numeric outcome measures to assess performance in meeting basin sustainability goals. These outcome measures relate to groundwater storage, land subsidence, and water quality and are largely unchanged in this 2021 GWMP because they have been effective in avoiding undesirable results and prompting action when needed…"[15] The 2021 Alternative was submitted to the Department for evaluation on December 17, 2021. Functional equivalence to a GSP is documented in detail by the GSA throughout Appendix B of the 2021 GWMP.[16]

1.1 Recommendation Summary

Department staff conclude that the 2021 Alternative includes the components of a functionally equivalent GSP, demonstrates a thorough understanding of the Subbasin based on what appears to be the best available science and information, sets well explained, supported, and reasonable sustainable management criteria to prevent undesirable results as defined in the 2021 Alternative, and proposes a set of projects and management actions that will likely achieve the sustainability goals defined for the Subbasin. Department staff will continue to monitor and evaluate the progress toward achieving the Subbasin's sustainability goals through continued Annual Reporting and future revisions to the Alternative.

[12] https://sgma.water.ca.gov/portal/alternative/annualreport/60.
[13] https://sgma.water.ca.gov/portal/alternative/periodiceval/preview/6.
[14] 2021 GWMP, Executive Summary, p. 15.
[15] 2021 GWMP, Chapter 1.1.1, pp. 24-25.
[16] 2021 GWMP, Appendix B, pp. 339-369.

For reference, the sustainability goals of the Subbasin are "*related to groundwater supply reliability and protection [and] are based on Board Policy:*

- *Manage groundwater to ensure sustainable supplies and avoid land subsidence.*
- *Aggressively protect groundwater from the threat of contamination*."[17]

As stated in the 2021 Alternative, "These goals describe the overall objectives of Valley Water's groundwater management programs. The basin management strategies below are used to meet the sustainability goals. Many of these strategies…have overlapping benefits, acting to improve water supply reliability, minimize subsidence, and protect or improve groundwater quality.

1. Manage groundwater in conjunction with surface water.
2. Implement programs to protect and promote groundwater quality.
3. Maintain and develop adequate groundwater models and monitoring networks.
4. Work with regulatory and land use agencies to protect recharge areas, promote natural recharge, and prevent groundwater contamination."[18]

Based on the current evaluation of the 2016 Alternative, and after considering information provided by the Subbasin's GSA, Department staff recommend that the 2021 Alternative be approved with recommended corrective actions, which are related to consideration of adjacent basins and alignment of monitoring networks. Additional evaluation details, implementation observations, and recommendations are provided herein.

2 PERIODIC REVIEW CRITERIA

At least every five years after the initial submission of a plan prepared pursuant to Water Code Section 10733.4, the Department is required to review any available GSP, as well as any alternative[19] submitted in accordance with Water Code Section 10733.6.[20] The Department is required to periodically review an approved alternative to ensure it remains consistent with the objectives of SGMA and continues to substantially comply with the GSP Regulations.[21] The Department is also required to ensure that an approved alternative is being implemented in a manner that will likely achieve the basin's sustainability goal.[22]

The Department's Periodic Review is based on information provided in the Annual Reports as well as the alternative's functionally equivalent Periodic Evaluation, which may

[17] 2021 GWMP, Executive Summary, p. 20.
[18] 2021 GWMP, Executive Summary, p. 20.
[19] 23 CCR § 358.2.
[20] 23 CCR § 358.4.
[21] 23 CCR §§ 355.6 and 358.4.
[22] 23 CCR § 355.4(b).

be either a Periodic Evaluation prepared in accordance with Section 356.4 of the GSP Regulations or an amended version of its approved alternative.[23] In both cases, the entity submitting an alternative is required to explain how the elements of the alternative are functionally equivalent to the elements of a GSP.[24]

The Department considers the following in determining whether an alternative and its implementation remains consistent with SGMA and the GSP Regulations:[25]

- Whether the exceedances of any minimum thresholds or failure to meet any interim milestones are likely to affect the ability of the local agencies and/or GSAs in the basin to achieve the basin's sustainability goal.
- Whether the local agencies and/or GSAs in the basin are implementing projects and management actions consistent with the alternative, or that the local agencies and/or GSAs have demonstrated that actions described in the alternative have been rendered unnecessary based on changing basin conditions or an improved understanding of basin conditions.
- Whether the local agencies and/or GSAs are addressing data gaps in the basin and reducing the levels of uncertainty identified in the alternative.
- Whether the alternative continues to satisfy the evaluation criteria described in Section 355.4 of the GSP Regulations.

Following its Periodic Review of the approved alternative, the Department is required to issue a written assessment of its findings and potentially make a new determination of the alternative's status, as follows: approved,[26] incomplete,[27] or inadequate.[28] The assessment may recommend corrective actions to address any new or remaining regulatory deficiencies identified by the Department.

As defined in the GSP Regulations, the Department may request any information it deems necessary to evaluate the progress toward achieving the basin's sustainability goal and the potential for adverse effects on adjacent basins.[29] Additionally, the Department may evaluate the implementation of an alternative at any time to determine whether it is consistent with the objectives of SGMA and in substantial compliance with the GSP Regulations.[30]

[23] 23 CCR §§ 358.2(d) and (e).
[24] 23 CCR § 358.2(d).
[25] 23 CCR § 355.6(c).
[26] 23 CCR § 355.6(d)(1).
[27] 23 CCR § 355.6(d)(2).
[28] 23 CCR § 355.6(d)(3).
[29] 23 CCR § 355.6(e).
[30] 23 CCR § 355.6(f).

3 PERIODIC REVIEW OF APPROVED ALTERNATIVE

Pursuant to the GSP Regulations, the Department is required to consider basin conditions and associated minimum thresholds, the status of projects and management actions, and efforts taken to address data gaps and uncertainty when determining whether an alternative remains consistent with SGMA and continues to substantially comply with the GSP Regulations.[31] The perspective of Department staff of whether the approved alternative continues to satisfy Section 355.4 of the GSP Regulations in a functionally equivalent manner is provided below in Section 5.

As part of its Periodic Review responsibilities, the Department must also assess whether implementation of an alternative will adversely affect the ability of an adjacent basin to implement its alternative or its GSP, and Department staff must ensure that the monitoring network described in the alternative aligns with the data uploaded to the SGMA Portal Monitoring Network Module. Staff perspective regarding adjacent basins and monitoring networks is provided within this section.

As described in the 2016 GWMP, and as incorporated into the updated 2021 GWMP, the GSA has documented functional equivalence to a GSP by submitting an updated groundwater management plan and associated justification.[32] Although the terminology and approaches differ slightly from basins with GSPs, the 2021 GWMP is based on existing groundwater management practices in the Subbasin. The GSA describes an adaptive management approach to groundwater management, which is informed by the continually evolving monitoring network.[33] The 2021 GWMP describes that "all outcome measures and outcome measure-lower thresholds will be evaluated annually and related reporting occurs through Valley Water's Annual Groundwater Report and annually in the Water Year [Annual] Reports due each April 1 to [the Department]."[34] Additionally, as reported in the 2021 GWMP and on Valley Water's website, the monitoring network and near-real time reporting of conditions allows the GSA to prioritize, develop, and implement projects and management actions to ensure sustainable Subbasin conditions are not threatened. The GSA has continued to demonstrate that it is able to operate the Subbasin at or near the measurable objective (outcome measure), is meeting its sustainability goals, and will continue to adaptively manage the Subbasin by incorporating best available science and information.

The GSA has internally identified several areas for improvement of its 2021 GWMP and Department staff concur that those items are important and should be addressed as soon as practicable.[35] Department staff have identified additional recommendations that should be considered by the GSA as the 2021 GWMP is being implemented and improved upon.

[31] 23 CCR § 355.6.
[32] 2021 GWMP, Appendix B, pp. 339-369.
[33] 2021 GWMP, Appendix J, p. 771.
[34] 2021 GWMP, Appendix B, p. 340.
[35] 2021 GWMP, Chapter 8, pp. 219-221.

Addressing these recommendations will be important to demonstrate that the GSA is likely to maintain its sustainability goals. Details regarding these recommendations can be found in the following sections grouped by sustainability indicator.

3.1 Minimum Thresholds

The GSP Regulations require that the description of minimum thresholds include the information and criteria relied upon to establish and justify the thresholds established for each sustainability indicator.[36] The numeric value used to define those thresholds should represent a point in the basin that, if exceeded, may cause undesirable results.[37] As part of its Periodic Review responsibility, the Department is required to consider whether the exceedances of any minimum thresholds, or failure to meet any interim milestones, are likely to affect the ability of the local agencies and/or GSAs to achieve the basin's sustainability goal.[38]

The Alternative applies functionally equivalent minimum thresholds in the Subbasin. As stated in the 2021 GWMP, "The outcome measures are quantifiable goals to track performance of sustainable management and are functionally equivalent to measurable objectives under SGMA. This 2021 GMWP has new outcome measure-lower thresholds that are quantifiable values used to define undesirable results and are functionally equivalent to minimum thresholds under SGMA. The outcome measure-lower thresholds account for a reasonable margin of operational flexibility below the outcome measures that accommodate drought, climate change, conjunctive use operations, and other groundwater management activities. Valley Water has a long-established history of sustainable groundwater management and will continue to proactively manage groundwater to minimize the risk of reaching the outcome measure-lower thresholds and related undesirable results."[39] Department staff agree that the use of outcome measures by the GSA is functionally equivalent to sustainable management criteria as defined by the GSP Regulations. Below is information for each of the applicable sustainability indicators discussed in the 2021 Alternative.

3.1.1 Chronic Lowering of Groundwater Levels

According to the 2021 Alternative, the Subbasin's groundwater level monitoring network includes 171 wells monitored by Valley Water, as well as 107 wells monitored by water retailers. The GSA states that all data collected is maintained in Valley Water's database and is used in regional condition and trend analysis.[40] Department staff note that, although monitoring groundwater levels is an integral part of Valley Water's basin management activities and is intimately connected to managing land subsidence, groundwater storage, seawater intrusion, and water quality, there are no sustainable

[36] 23 CCR § 354.28(b)(1).
[37] 23 CCR § 354.28(a).
[38] 23 CCR § 355.6(c)(1).
[39] 2021 GWMP, Chapter 5.4, p. 145.
[40] 2021 GWMP, Chapter 7.1.1, pp. 179-181; Appendix K, Table K-1, pp. 815-822.

management criteria explicitly set for the chronic lowering of groundwater levels sustainability indicator. However, because the Subbasin has been, and continues to be, managed pursuant to an updated groundwater management plan, as well as the policies of Valley Water's District Act, sustainable management criteria for chronic lowering of groundwater levels are not directly warranted. Instead, the GSA uses "outcome measures" to monitor groundwater conditions and meet its sustainability goals.[41]

Outcome Measures (functionally equivalent measurable objectives) and Outcome Measures-Lower Thresholds (functionally equivalent minimum thresholds) have been established for groundwater levels for the purpose of preventing land subsidence in the Subbasin. As stated in the 2021 GWMP, "Significant inelastic (permanent) land subsidence occurred in the Santa Clara Plain through the 1960s due to long-term overdraft. Permanent subsidence was essentially halted by about 1970 through Valley Water's expanded conjunctive use programs, which allowed a substantial recovery in groundwater levels. The avoidance of inelastic land subsidence has been and continues to be a major driver for Valley Water given the extremely high costs associated with damaged infrastructure, reduced carrying capacity of flood control structures, and seawater encroachment into freshwater aquifers."[42] In 1991, Valley Water evaluated the remaining land subsidence potential to avoid additional inelastic subsidence due to groundwater overdraft. Based on the findings of the 1991 study, Valley Water established an acceptable subsidence rate of no more than 0.01 feet per year on average, measured over a multi-year period.

Ten index wells throughout the Subbasin, shown in Table 5-1 in the 2021 GWMP, were selected as control points for subsidence model calibration and prediction, and the rate of 0.01 feet per year of inelastic subsidence was applied to determine threshold groundwater levels for these wells. The subsidence thresholds are the groundwater levels that must be maintained to ensure a low risk of unacceptable land subsidence.[43] The "outcome measure relies on continued observation of groundwater levels at the subsidence index wells and comparison to subsidence thresholds to ensure groundwater levels are maintained above these thresholds."[44]

- Outcome Measure [measurable objectives]: Groundwater levels are above subsidence thresholds at the Santa Clara Subbasin subsidence index wells.
- Outcome Measure – Lower Threshold [minimum thresholds]: Groundwater levels are above the historical low water levels at the majority of the Santa Clara Subbasin subsidence index wells.

As reported in the 2021 GWMP, "From 2010 to 2019, groundwater levels at all 10 subsidence index wells remained above their respective subsidence threshold elevations

[41] 2021 GWMP, Chapter 5.4, pp. 145-152.
[42] 2021 GWMP, Chapter 5.4.2, pp. 146-148.
[43] 2021 GWMP, Table 5-1, p. 147.
[44] 2021 GWMP, Chapter 5.4.2, p. 146.

except during the 2012–2016 drought when water levels temporarily dropped below the subsidence threshold at one well (07S01W22E002) during the summer and fall of 2014. Because the water levels at two other index wells (07S01W02G024 and 07S01E16C006) were also approaching their respective thresholds, Valley Water worked with several water retailers to reduce groundwater pumping in these areas. Due to this coordinated effort, Valley Water's recharge programs, and community water use reduction, the groundwater levels at 07S01W22E002 quickly recovered to levels above the subsidence threshold in early 2015 despite continued dry conditions. Water levels at the other nine subsidence index wells had a similar response and water levels rose to healthy levels above the subsidence thresholds."[45]

The Water Year 2022 Annual Report describes recovery of water levels since the 2012 to 2016 drought, attributing this to "robust managed recharge and continued water use reduction…"[46] The Water Year 2022 Annual Report continues, describing "healthy groundwater conditions in WY 2017 through 2020 (Figure 5), with the groundwater basins essentially full heading into the recent drought (2020 to present)."[47] The Water Year 2022 Annual Report describes impacts on water levels due to recent challenging hydrologic conditions, describing that "WY 2022 groundwater elevations in many regional wells were lower than WY 2021 due to statewide drought conditions and increased groundwater pumping. However, the groundwater elevations remain far above the historical [minimums] and levels observed during the last major droughts of 1987-1992 and 2012-2016. Despite drought conditions, artesian pressures were observed in the northern Santa Clara Subbasin. Groundwater elevations in WY 2022 were also well above Valley Water thresholds established to minimize the risk of land subsidence in the Santa Clara Subbasin."[48]

Although there are no sustainable management criteria directly set for the chronic lowering of groundwater levels, it is apparent that the GSA has been monitoring and managing groundwater levels in the Subbasin for many years to address the undesirable results associated with land subsidence. Department staff note that the Subbasin appears to be meeting its sustainability goals with respect to chronic lowering of groundwater levels, as well as land subsidence (see Section 3.1.5 below).

3.1.2 Reduction of Groundwater Storage

The 2021 GWMP contains the following functionally equivalent sustainable management criteria for the reduction of groundwater storage sustainability indicator.[49] As discussed below, no exceedances of groundwater storage minimum thresholds have occurred in the Subbasin.

[45] 2021 GWMP, Chapter 4.5.2, pp. 147-148.
[46] 2022 WY Annual Report, Chapter 2, p. 9.
[47] 2022 WY Annual Report, Chapter 2, p. 9.
[48] 2022 WY Annual Report, Chapter 2, p. 9.
[49] 2021 GWMP, Chapter 5.4.1, p. 145.

- Outcome Measure [measurable objective]: Projected end of year groundwater storage is greater than 278,000 acre-feet (AF) in the Santa Clara Plain, 5,000 AF in the Coyote Valley, and 17,000 AF in the Llagas Subbasin.
- Outcome Measure – Lower Threshold [minimum threshold]: Projected end of year countywide groundwater storage is greater than Stage 5 (150,000 AF) of the Water Shortage Contingency Plan.

The 2021 GWMP describes the importance of the sustainable management of groundwater storage, indicating that it "is a critical consideration in water supply reliability and is the county's best protection against drought or facility outage. The end of year groundwater storage is projected to support operational decisions, including the timing and location of reservoir releases and managed recharge, and decisions related to imported water such as short-term water exchanges or out of county banking."[50] The 2021 GWMP continues that, "Valley Water regularly analyzes groundwater storage to support operational decisions, contingency planning, and planning to meet future needs. To support near-term operations, Valley Water uses groundwater models to estimate storage for the current year and simulate conditions for the following calendar year under a range of projected water supply and hydrologic scenarios. As the water year progresses and more water supply and demand information become available, operations plans are updated accordingly."[51]

While the GSA's 2020 Urban Water Management Plan provides an overall storage target of 300,000 acre-feet in both the Santa Clara and Llagas subbasins, based on groundwater storage observed historically, the end of year storage targets established in the 2021 GWMP are 283,000 acre-feet in the Santa Clara Subbasin (278,000 acre-feet in the Santa Clara Plain and 5,000 acre-feet in the Coyote Valley) and 17,000 acre-feet in the Llagas Subbasin. The rationale for adopting these outcome measures was "to account for a reasonable operational flexibility, including more severe future droughts or infrastructure outages, the outcome measure-lower threshold for groundwater storage in the Santa Clara and Llagas subbasins is greater than stage 5 (150,000 acre-feet) of the water shortage contingency plan. If storage falls below this target, there would be a greatly increased risk of resumed permanent subsidence and more widespread reports of dry wells. The outcome measure-lower threshold accounts for the integrated groundwater management and operational decisions that are necessary for Valley Water to make across both Santa Clara and Llagas subbasins, particularly during a drought response."[52]

In addition to monthly reports on Valley Water's website, the 2021 GWMP describes recent groundwater storage conditions, stating that "From 2010 to 2019, countywide groundwater storage in the Santa Clara and Llagas subbasins remained in the normal stage (>300,000 AF) each year except during the 2012–2016 drought when storage

[50] 2021 GWMP, Chapter 5.4.1, pp.145-146.
[51] 2021 GWMP, Chapter 7.6.3, p. 216.
[52] 2021 GWMP, Chapter 5.4.1, p. 146.

dipped into stage 3 during 2014 and 2015."[53] The 2021 GWMP continues, "Despite this drop in storage, there were very limited impacts to well users, with fewer than 15 reports of wells going dry for domestic wells along the basin margins where well yield is more uncertain. No permanent subsidence was observed. Due to Valley Water's recharge programs, coordination with water retailers, and community water use reductions in response to Board action, groundwater storage quickly recovered to the normal stage (stage 1) in 2016."[54]

The Water Year 2022 Annual Report summarizes general groundwater storage conditions, although not expressly compared to the functionally equivalent sustainable management criteria, "Due to increased recharge and decreased groundwater use starting in WY 2021 and continuing through WY 2022, Valley Water estimates a net increase in countywide groundwater storage of 2,200 AF in WY 2022 compared to WY 2021. Storage increased by 2,500 AF in the Santa Clara Subbasin and decreased by 300 AF in the Llagas Subbasin. Groundwater storage is the primary trigger for action under Valley Water's Water Shortage Contingency Plan, and storage remained within the low "Normal" stage in WY 2022."[55]

Additional information supporting the Subbasin's groundwater management program, organized by calendar year rather than water year as required by SGMA and the GSP Regulations, is found on the GSA's website. Because the GSA does not appear to be exceeding its "Outcome Measure – Lower Threshold"[56] with respect to the reduction of groundwater storage sustainability indicator, the Subbasin appears to be on track to meeting its sustainability goals.

3.1.3 Seawater Intrusion

The 2021 GWMP contains the following functionally equivalent sustainable management criteria for the seawater intrusion sustainability indicator.[57] As discussed below, the GSA has demonstrated that no exceedances of the seawater intrusion minimum threshold have occurred in the Subbasin.

- Outcome Measure [measurable objective]: In the Santa Clara Subbasin shallow aquifer, the 100 milligram per liter chloride isocontour area is less than the historical maximum extent area (57 square miles).
- Outcome Measure – Lower Threshold [minimum threshold]: In the Santa Clara Subbasin shallow aquifer, the 100 milligram per liter chloride isocontour area is less than 81 square miles, which represents a one-mile radial buffer of the historical maximum extent area.

[53] 2021 GWMP, Chapter 5.4.1, p. 145.
[54] 2021 GWMP, Chapter 5.4.1, pp.145-146.
[55] 2022 WY Annual Report, Chapter 3.4, p. 24.
[56] 2021 GWMP, Chapter 5.4.1, p. 145.
[57] 2021 GWMP, Chapter 5.4.4, pp. 150-152.

As stated, "This 2021 GWMP includes a new seawater intrusion outcome measure for the Santa Clara Subbasin. A detailed technical memorandum that documents the current understanding of seawater intrusion mechanisms, approach, and analysis used to develop the seawater intrusion outcome measure is included in Appendix H. Appendix H also documents current understanding of climate change driven sea-level rise and implications for monitoring and managing seawater intrusion in the Santa Clara Subbasin."[58]

The rationale for development of the functionally equivalent sustainable management criteria for seawater intrusion is provided in the 2021 GWMP, indicating that "The number and location of supply wells were evaluated in relation to the 100 [milligram per liter (mg/L)] isocontours to identify an appropriate outcome measure and outcome measure-lower threshold. Most supply wells are screened in the deeper, principal aquifer zone, where no widespread [seawater intrusion (SWI)] has been observed. The 100 mg/L chloride isocontours are based on monitoring wells screened in the shallow aquifer zone and thus represent potential vulnerability of contamination of the deeper, principal aquifer, via improperly constructed or destroyed wells that may serve as vertical conduits for poorer quality water from the shallow zone."[59] Potential impacts to supply wells were factored into the analysis, and the GSA indicates that the "maximum known extent and the 5,280-foot radial buffer have a combined total of 49 active wells that pump 1,558 AF, which is equivalent to only about 1.7% of the total groundwater pumping in the Santa Clara Subbasin in 2013 (Appendix H). Using the 5,280-foot [one mile] buffer as a lower threshold to the outcome measure will help minimize the risk of SWI vulnerability to supply wells in the Santa Clara Subbasin."[60]

The 2021 GWMP describes the importance of the seawater intrusion sustainability indicator given its long history studying and grappling with the impacts of it in the Subbasin. The 2021 GWMP states that "Due to historic high groundwater pumping and land subsidence, particularly in the years following World War II, seawater intrusion has been observed in the shallow aquifer of the Santa Clara Plain."[61] The 2021 GWMP describes the early understanding of the relationship between the seawater intrusion and subsidence sustainability indicators, describing that "seawater intrusion was exacerbated by land subsidence, which decreased the elevation of the land surface adjacent to San Francisco Bay, causing further inland movement along tidal creeks."[62] The GSA describes monitoring water quality with respect to seawater intrusion, stating that "Valley Water has been monitoring groundwater quality in the Santa Clara Subbasin for decades. Chloride data from wells screened in the shallow aquifer zone was presented as the mg/L chloride isocontour in the 2016 GWMP and Valley Water's Annual Groundwater Report.

[58] 2021 GWMP, Chapter 5.4.4, pp. 150; Appendix H, pp. 705-763.
[59] 2021 GWMP, Chapter 5.4.4, p. 150.
[60] 2021 GWMP, Chapter 5.4.4, pp.150-152.
[61] 2021 GWMP, Chapter 2.2.6, p. 85.
[62] 2021 GWMP, Chapter 2.2.6, p. 85.

This concentration is used as an early warning of potential seawater intrusion since the [Secondary Maximum Contaminant Level (SMCL)] for chloride is 250 mg/L."[63]

The 2021 GWMP continues that "Figure 5-3 is a compilation of available 100 mg/L isocontours that have been presented in recent Valley Water reports, spanning the years from 1945 to 2019. Figure 5-3 indicates that the maximum known extent of SWI (denoted by the 100 mg/L chloride isocontour) occurred around 1960, which coincided with groundwater overdraft conditions and historic low groundwater levels throughout much of the Santa Clara Subbasin…The maximum known extent of the 100 mg/L chloride isocontour in 1960 covered an area of about 57 square miles as compared to only 40 square miles in 2019. Additional details of the historical progress of the 100 mg/L chloride isocontours are presented in Appendix H."[64] With respect to the seawater intrusion sustainability indicator, because the area impacted by chloride is 40 square miles and well below the 57 square mile Outcome Measure, the Subbasin appears to be maintaining its sustainability goal with respect to seawater intrusion.

While the Department acknowledges that water quality data specific to seawater intrusion is provided in Valley Water's Calendar Year Annual Reports, documentation of progress on the seawater intrusion sustainability indicator should be provided in the SGMA Annual Reports to better determine if the Subbasin is meeting its sustainability goals. Most of the pertinent information provided in the GSA's Calendar Year Annual Reports is not reported to the Department in the required Water Year Annual Reports. For example, the 2022 Calendar Year Annual Report incorporates the recent development of a separate outcome measure (measurable objective) and outcome measure-lower threshold (minimum threshold) for the seawater intrusion sustainability indicator and presents the 2022 chloride contour against these new sustainable management criteria.[65] As described in the 2022 Calendar Year Annual Report, the chloride isocontour extent of 46 square miles is less than the historical maximum extent area (57 square miles) outcome measure (measurable objective), indicating that the outcome measure was met.[66] Although there does not appear to be exceedances of the seawater intrusion minimum threshold at this time, the Department staff encourage the GSA to incorporate information about all applicable sustainability indicators in future versions of the SGMA Annual Report and organize that information by water year not calendar year.

3.1.4 Degraded Water Quality

The 2021 GWMP contains the following functionally equivalent sustainable management criteria for the degraded water quality sustainability indicator.[67] As discussed below, no exceedances of water quality minimum thresholds have occurred in the Subbasin.

[63] 2021 GWMP, Chapter 5.4.4, p. 150.
[64] 2021 GWMP, Chapter 5.4.4, p. 150; Appendix H, Table 1, p. 730.
[65] 2022 Calendar Year Annual Report, Figure 27, p.54.
[66] 2022 Calendar Year Annual Report, Executive Summary, p. 14.
[67] 2021 GWMP, Chapter 5.4.3, pp. 148-150.

- Outcome Measure [measurable objective]: For Santa Clara Subbasin water supply wells, at least 95% meet primary drinking water standards, and at least 90% have stable or decreasing trends for total dissolved solids (TDS).
- Outcome Measure – Lower Threshold [minimum threshold]: At least 70% of water supply wells have stable or decreasing trends for nitrate and TDS.

As stated in the 2021 GWMP, "Based on DWR Recommended Actions…the water quality outcome measures in the 2021 GMWP include new and separate outcome measures and corresponding outcome measures-lower thresholds related to groundwater quality in the Santa Clara and Llagas subbasins. These separate subbasin-specific criteria will allow for a determination of whether each subbasin, separately, is meeting or making progress toward the outcome measures. Additionally, the new water quality outcome measure for the Santa Clara Subbasin is distinctly different than the new outcome measure for seawater intrusion in the subbasin…"[68]

The 2021 GWMP explains that the water quality outcome measures evaluate the percentage of water supply wells that meet all primary Maximum Contaminant Level (MCLs) and that the outcome measures will be evaluated annually using data collected at water supply wells sampled by Valley Water and water retailers. Additionally, the 2021 GWMP states, "The target percentage for water supply wells meeting primary MCLs is set high (95%) since these are health-based regulatory standards that must be met by public water systems. This measure is not set at 100% for several reasons. Some of the wells monitored by Valley Water are private domestic wells, which are assumed to have less stringent wellhead protection, maintenance, and testing. The water quality at these wells may be more influenced by local land use and conditions near the well as they are typically shallower than public water supply wells."[69] Additionally, "to account for reasonable operational flexibility, including annual factors that can affect groundwater quality, the outcome measure-lower threshold for groundwater quality is that at least 70% of supply wells have stable or decreasing concentrations of nitrate and TDS."[70]

The primary water quality constituents of concern in the Subbasin are TDS and nitrate. Concentrations of TDS in groundwater are an indicator of salt loading and overall groundwater conditions, while nitrate is reported to be "the one parameter that is frequently detected above the MCL and affects the largest number of wells..."[71] As stated, "The trend-based component of the outcome measures will help Valley Water to better

[68] 2021 GWMP, Chapter 5.4.3, p. 148.
[69] 2021 GWMP, Chapter 5.4.3, p. 149.
[70] 2021 GWMP, Chapter 5.4.3, p. 150.
[71] 2021 GWMP, Chapter 5.4.3, p. 149.

understand how groundwater quality is changing over time and highlight areas that may warrant further study or action to protect the beneficial use of groundwater."[72]

In the Santa Clara Plain Management Area of the Subbasin, groundwater quality is reported to be of very good quality with infrequent detections of water quality parameters above health-based MCLs.[73] In the 2021 GWMP, Figures 2-20 and 2-21 show the relative concentrations of inorganic parameters, including those with health-based MCLs and aesthetic-based secondary MCLs (SMCLs) for the period 2010 to 2019 in the principal aquifer. The median concentration in the principal aquifer zone between 2010-2019 was 406 mg/L for TDS (SMCL is 500 mg/L) and 2.7 mg/L for nitrate as nitrogen (MCL is 10 mg/L).[74] The nitrate exceedances are reported to be a legacy issue from agricultural land use, which was widespread throughout the Santa Clara Plain Management Area.[75] A full water quality summary of multiple water quality constituents is provided in Table 2-2 (shallow aquifer zone) and Table 2-3 (principal aquifer zone) for the Santa Clara Plain Management Area in the 2021 GWMP. With respect to the degraded water quality sustainability indicator, the Subbasin appears to be meeting its sustainability goals.

In the Coyote Valley Management Area of the Subbasin, groundwater quality is reported to be "…typically of good quality."[76] The 2021 GWMP describes nitrate as the primary exception, which is detected above the MCL in some wells due to historic and ongoing sources. In the 2021 GWMP, Figures 2-20 and 2-21 show the relative concentrations of inorganic parameters, including those with health-based MCLs and aesthetic-based SMCLs for the period 2010 to 2019. The median concentration between 2010-2019 was 388 mg/L for TDS (SMCL is 500 mg/L) and 5.1 mg/L for nitrate as nitrogen (MCL is 10 mg/L).[77] The nitrate exceedances in the Coyote Valley Management Area are reported to be from historical and ongoing agricultural practices and use of septic systems.[78] A full water quality summary of multiple water quality constituents is provided in Table 2-6 and Table 2-7 for the Coyote Valley Management Area in the 2021 GWMP. With respect to the degraded water quality sustainability indicator, the Subbasin appears to be meeting its sustainability goals.

Water quality conditions are not discussed in the GSA's Annual Reports as they pertain to SGMA's annual reporting requirements, but they are discussed in Valley Water's Calendar Year Annual Reports.[79] The 2022 Calendar Year Annual Report explains that "elevated nitrate continues to be the primary groundwater protection challenge in the Coyote Valley [within Santa Clara Subbasin] and Llagas groundwater management areas, where a significant number of domestic wells contain water with nitrate above the

[72] 2021 GWMP, Chapter 5.4.3, p. 149.
[73] 2021 GWMP, Chapter 2.2.5.1, pp. 71-80.
[74] 2021 GWMP, Chapter 2.2.5.1, Table 2-3, p. 78.
[75] 2021 GWMP, Chapter 2.2.5.1, p. 73.
[76] 2021 GWMP, Chapter 2.2.5.2, p. 81.
[77] 2021 GWMP, Chapter 2.2.5.2, Table 2-6, pp. 83-84.
[78] 2021 GWMP, Chapter 2.2.5.2, p. 82.
[79] https://www.valleywater.org/your-water/groundwater.

drinking water standard (Table ES-4).”[80] The 2022 Calendar Year Annual Report describes how the GSA coordinates “with land use and regulatory agencies to influence related policies, regulations, and decisions. More directly, Valley Water’s managed recharge programs help dilute nitrate, and water quality testing helps to reduce well owner exposure. While most wells have stable or decreasing long-term chloride concentrations, increasing concentrations in some shallow aquifer wells warrant continued tracking and evaluation.”[81]

While the Department acknowledges that water quality data is provided in Valley Water’s Calendar Year Annual Reports, documentation of progress on the degraded water quality sustainability indicator should be provided in the SGMA Annual Reports to determine if the Subbasin is meeting its sustainability goals. Most of the pertinent information is provided in the Calendar Year Annual Reports, which is not reported to the Department in Water Year Annual Reports. For example, and importantly, the 2022 Calendar Year Annual Report describes recent performance against the functionally equivalent sustainable management criteria, indicating that the outcome measure (measurable objective) for degraded water quality was met, stating that “96% of Santa Clara Subbasin water supply wells tested met all primary drinking water standards; and 92% had stable or decreasing trends for TDS.”[82] Though the GSA appears to be on track to meeting its water quality sustainability goals, Department staff encourage the GSA to incorporate information about all applicable sustainability indicators in future versions of the SGMA Annual Report and organize that information by water year, not calendar year.

3.1.5 Land Subsidence

The 2021 GWMP contains the following functionally equivalent sustainable management criteria for the land subsidence sustainability indicator.[83] As indicated in the 2021 GWMP, these outcome measures are the same as those established for groundwater levels. As discussed below, no exceedances of land subsidence minimum thresholds have occurred in the Subbasin.

- Outcome Measure [measurable objective]: Groundwater levels are above subsidence thresholds at the Santa Clara Subbasin subsidence index wells.
- Outcome Measure – Lower Threshold [minimum threshold]: Groundwater levels are above the historical low water levels at the majority of the Santa Clara Subbasin subsidence index wells.

The 2021 GWMP describes the importance of the land subsidence sustainability indicator, stating that “Significant inelastic (permanent) land subsidence occurred in the Santa Clara Plain through the 1960s due to long-term overdraft. Permanent subsidence was essentially halted by about 1970 through Valley Water’s expanded conjunctive use

[80] 2022 Calendar Year Annual Report, Executive Summary, p. 12.
[81] 2022 Calendar Year Annual Report, Executive Summary, p.12
[82] 2022 Calendar Year Annual Report, Executive Summary, p.14.
[83] 2021 GWMP, Chapter 5.4.2, pp. 146-148.

programs, which allowed a substantial recovery in groundwater levels. The avoidance of inelastic land subsidence has been and continues to be a major driver for Valley Water given the extremely high costs associated with damaged infrastructure, reduced carrying capacity of flood control structures, and seawater encroachment into freshwater aquifers. It is critical to prevent inelastic subsidence because it is irreversible."[84]

The 2021 GWMP describes the development of land subsidence criteria, stating that "In 1991, Valley Water evaluated the remaining land subsidence potential to avoid additional inelastic subsidence due to groundwater overdraft. Based on the findings of this study, Valley Water has established an acceptable subsidence rate of no more than 0.01 feet per year on average, measured over a multi-year period."[85] The 2021 GWMP describes the development of the subsidence monitoring network and indicates that "Ten index wells throughout the Santa Clara Subbasin were selected as control points for subsidence model calibration and prediction and the tolerable rate of 0.01 feet per year of inelastic subsidence was applied to determine threshold groundwater levels for these wells. These subsidence thresholds (Table 5-1) are the groundwater levels that must be maintained to ensure a low risk of unacceptable land subsidence."[86]

The 2021 GWMP describes the use of groundwater levels as a proxy stating "This outcome measure relies on continued observation of groundwater levels at the subsidence index wells and comparison to subsidence thresholds to ensure groundwater levels are maintained above these thresholds (Table 5-1). It should be noted that a few wells shown in Table 5-1 differ from those in the 1991 study due to well destruction or loss of access. Replacement wells are chosen such that they are in close proximity to and display similar water level patterns as the original well."[87] Further detail on the Agency's land subsidence monitoring program is provided in its 2022 Calendar Year Annual Report, which describes that "Valley Water conducts ongoing monitoring of land surface benchmarks, extensometers, and groundwater levels at subsidence index wells to determine if land subsidence is occurring and threatening to exceed established thresholds. The subsidence monitoring network is shown in Figure 17. Recent monitoring data from land benchmark surveys, extensometers, and subsidence index wells indicate that there is a low risk of subsidence, as described further below and in the 2022 Subsidence Data Analysis Technical Memorandum (Appendix A)."[88]

The 2021 GWMP also describes the rationale for the adoption of the new outcome measure-lower threshold (minimum threshold), in response to the Department's Recommended Action 4 from its 2019 Staff Report, "To account for a reasonable operational flexibility, including more severe future droughts or infrastructure outages, the outcome measure-lower threshold for subsidence is that groundwater levels remain above the historical low water levels at the majority of the Santa Clara Subbasin

[84] 2021 GWMP, Chapter 5.4.2, p. 146.
[85] 2021 GWMP, Chapter 5.4.2, p. 146.
[86] 2021 GWMP, Chapter 5.4.2, p. 146.
[87] 2021 GWMP, Chapter 5.4.2, p. 146.
[88] 2022 Calendar Year Annual Report, Chapter 4, p. 46.

subsidence index wells. If groundwater levels fall below historical low levels, widespread, permanent subsidence will resume. The outcome measure-lower threshold accounts for short-term and localized water levels dropping below the subsidence thresholds, which may not result in inelastic subsidence across the Santa Clara Subbasin."[89]

The 2021 GWMP also describes groundwater levels with respect to land subsidence monitoring, stating that "From 2010 to 2019, groundwater levels at all 10 subsidence index wells remained above their respective subsidence threshold elevations except during the 2012–2016 drought when water levels temporarily dropped below the subsidence threshold at one well (07S01W22E002) during the summer and fall of 2014."[90] The GSA describes a robust feedback mechanism, where management actions are triggered to avoid undesirable results from land subsidence, "…Valley Water worked with several water retailers to reduce groundwater pumping in these areas. Due to this coordinated effort, Valley Water's recharge programs, and community water use reduction, the groundwater levels at 07S01W22E002 quickly recovered to levels above the subsidence threshold in early 2015 despite continued dry conditions. Water levels at the other nine subsidence index wells had a similar response and water levels rose to healthy levels above the subsidence thresholds."[91]

More recently, the Water Year 2022 Annual Report states that "Groundwater elevations in WY 2022 were also well above Valley Water thresholds established to minimize the risk of land subsidence in the Santa Clara Subbasin."[92] Detailed information regarding the subsidence monitoring program can be found in the Calendar Year Annual Reports on the GSA's website. The 2022 Calendar Year Annual Report states that the subsidence outcome measure (measurable objective) was met, stating, "Groundwater levels were above subsidence thresholds at all ten Santa Clara Plain subsidence index wells."[93] Department staff note that the 2022 Calendar Year Annual Report depicts, in Figures 20b (subsidence index well 2) and 20c (subsidence index well 3), subsidence thresholds (presumably meant to be the outcome measure [measurable objective] per definition above) which are below the historical low (presumably meant to be the outcome measure-lower limit [minimum threshold] per definition above). Further, Table 5-1 of the 2021 GWMP presents subsidence thresholds that are less than the historical low in those same two wells, describing that "Subsidence index wells 2 and 3 have subsidence threshold elevations lower than the historical low groundwater elevations due to the local geology and the minimal historical subsidence at those locations."[94] Department staff understand that subsidence index well 2 has been replaced, as Figure 20b from the 2022 Calendar Year Annual Report notes "Valley Water no longer has access to the former PRESS well

[89] 2021 GWMP, Chapter 5.4.2, p. 148.
[90] 2021 GWMP, Chapter 5.4.2, p. 147.
[91] 2021 GWMP, Chapter 5.4.2, p. 147-148.
[92] 2022 Water Year Annual Report, Chapter 2, p. 9.
[93] 2022 Calendar Year Annual Report, Executive Summary, p. 13.
[94] 2021 GWMP, Chapter 5.4.2, Table 5-1, p. 147.

2 (well 08S01E05N002) as of June 2021. A replacement well 08S01E10J004 was implemented as the new PRESS well 2 on June 9, 2021."[95]

Department staff note that the outcome measure (measurable objective) groundwater levels for subsidence monitoring at subsidence index wells 2 and 3 are set below their respective outcome measure-lower limit (minimum threshold) levels. This appears to be a mistake because outcome measures (measurable objectives) refer to specific, quantifiable goals for the maintenance or improvement of the sustainability indicator to achieve the sustainability goal for the Subbasin, while minimum thresholds are used to define undesirable results. By definition, the outcome measure (measurable objective) groundwater level should be above the outcome measure-lower limit (minimum threshold).

The 2021 GWMP describes that "During the next five-year GWMP update cycle, Valley Water will evaluate the maximum magnitude and duration that water levels can drop below subsidence thresholds without resulting in inelastic subsidence."[96] Department staff agree that it is important to revisit and reevaluate sustainable management criteria as new data and information warrants, given the enormous potential community costs from inelastic land subsidence in the Santa Clara Plain. However, the GSA should either clarify or revise the outcome measure-lower threshold (minimum threshold) definitions, or the outcome measure (measurable objective), to account for the discrepancy at subsidence index wells 2 and 3 and consider the planned evaluation described above.

Additional information supporting the Subbasin's groundwater management program, organized by calendar year rather than water year as required by SGMA and the GSP Regulations, is found on the GSA's website. Given that there do not appear to be exceedances of minimum thresholds with respect to the land subsidence sustainability indicator, the Subbasin appears to be meeting its sustainability goals. However, Department staff encourage the GSA to incorporate information about all applicable sustainability indicators in future versions of the SGMA Annual Report and organize that information by water year, not calendar year.

3.1.6 Depletions of Interconnected Surface Water

Although there are no sustainable management criteria set for the depletions of interconnected surface water sustainability indicator in the 2021 GWMP, nor were they recommended by the Department in its 2019 Staff Report that approved the 2016 Alternative, the 2021 GWMP presents information pertinent to the depletions of interconnected surface water sustainability indicator, including sections on surface water and groundwater interaction and groundwater dependent ecosystems, while incorporating a discussion of current monitoring and associated data gaps in the Subbasin.

[95] 2022 Calendar Year Annual Report, Chapter 4.3, p. 52.
[96] 2021 GWMP, Chapter 5.4.2, p. 148.

The 2021 GWMP includes a section, *Surface Water and Groundwater Interaction*, generally describing the GSA's current understanding of surface water and groundwater interaction.[97] The GSA makes the distinction between managed recharge program influenced areas and those under direct influence of groundwater, describing "Valley Water's managed recharge program includes significant recharge through many miles of stream channels over the recharge area, indicating groundwater and surface water generally are disconnected in these reaches. As described…the managed recharge program helps to maintain flows in these creeks, most of which would flow only intermittently otherwise."[98] To monitor surface water the GSA describes "Valley Water has a comprehensive surface water monitoring network to measure creek flows, comply with water rights reporting and reservoir restrictions, and meet environmental requirements…Surface water flow data can be used to evaluate which reaches of streams are gaining or losing streams with regard to groundwater..."[99] The GSA states that "Figure 2-15 shows areas of known and suspected surface water/groundwater interaction. Identification of these areas is based on long-term observations by Valley Water field staff and supported by a 2018 differential gauging study conducted by Valley Water staff…"[100] The GSA describes generally that, with a few exceptions, "Gaining reaches in the Santa Clara Subbasin are primarily located in sections of the creeks overlying the confined area of the subbasin closer to San Francisco Bay (Figure 2-15)."[101] The GSA also presents a historical ecology map and depth to groundwater map that "can help evaluate surface water/groundwater interaction."[102] Finally, the GSA states that historically, "…the Guadalupe River was the only perennial stream in the Santa Clara Subbasin. The other creeks were intermittent, running during the wet season, but dry in the summers."[103]

As previously stated, functionally equivalent sustainable management criteria for the depletions of interconnected surface water sustainability indicator were not recommended by Department staff in its 2019 Staff Report; however, the 2021 GWMP did identify groundwater dependent ecosystems in the Subbasin in response to Recommended Action 1 from the Department's 2019 Staff Report. Information regarding groundwater dependent ecosystems and what the GSA did in response to Recommended Action 1 is provided in this assessment in Section 4.1.

3.2 Projects and Management Actions

The GSP Regulations require a description of the projects and management actions the local agencies and/or GSAs in the basin have determined will achieve the established sustainability goal, including projects and management actions to respond to changing

[97] 2021 GWMP, Chapter 2.2.3, pp. 64-68.
[98] 2021 GWMP, Chapter 2.2.3, p. 64.
[99] 2021 GWMP, Chapter 2.2.3, p. 64.
[100] 2021 GWMP, Chapter 2.2.3, p. 64.
[101] 2021 GWMP, Chapter 2.2.3, p. 65.
[102] 2021 GWMP, Chapter 2.2.3, pp. 66-68.
[103] 2021 GWMP, Chapter 2.2.3, p. 66.

conditions.[104] As part of its Periodic Review responsibility, the Department is required to determine whether the local agencies and/or GSAs in the basin are implementing projects and management actions consistent with the alternative, or that the local agencies and/or GSAs have demonstrated that actions described in the alternative have been rendered unnecessary based on changing basin conditions or an improved understanding of basin conditions.[105]

The 2021 GWMP describes the implementation of projects and management actions, as well as their effect on groundwater conditions, in *Chapter 6 – Basin Management Programs and Activities*.[106] Chapter 6 details programs to maintain a reliable groundwater supply, programs to protect groundwater quality, programs related to surface water-groundwater interaction, and other projects and activities to support continued sustainability. The 2021 GWMP provides a portfolio of projects and management actions that are currently being implemented by Valley Water or other agencies to address County-wide sustainability goals. The GSA explains that it has the authority to implement "capital projects as needed to protect and augment groundwater resources. These projects are described in Valley Water's Capital Improvement Program."[107]

Projects and management actions described in the 2021 GWMP are as follows:

- Programs to maintain reliable groundwater supply include managed aquifer recharge, in-lieu recharge, protection of natural recharge, groundwater production management, water accounting, groundwater level and storage assessments, and asset management.[108]

- Programs to protect groundwater quality include a well ordinance program, domestic well testing program, recycled water irrigation evaluation, vulnerability assessment, coordination with land use and regulatory agencies, and public outreach.[109]

- Programs related to surface water-groundwater interaction are described as in-stream releases of surface water, stormwater management, seawater intrusion prevention, and watershed management.[110]

- Other projects and activities to support continued sustainability include monitoring network improvements, assessments of managed recharge system capacity, stormwater projects, and various capital improvement projects.[111]

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[104] 23 CCR § 354.44(a).
[105] 23 CCR § 355.6(c)(2).
[106] 2021 GWMP, Chapter 6, pp. 153-178.
[107] 2021 GWMP, Chapter 6, p. 153.
[108] 2021 GWMP, Chapter 6.1, pp. 153-165.
[109] 2021 GWMP, Chapter 6.2, pp. 166-173.
[110] 2021 GWMP, Chapter 6.3, pp. 173-176.
[111] 2021 GWMP, Chapter 6.4, pp. 176-178.

Additionally, as stated in the 2021 GWMP, "Valley Water's proactive groundwater management programs and activities have maintained sustainable groundwater levels and storage, minimized land subsidence, and improved groundwater protection. To maintain the long-term sustainability of groundwater resources, the following actions are recommended…"[112]

- Maintain existing conjunctive water management programs and evaluate opportunities for enhancement or increased efficiency.
- Continue to aggressively protect groundwater quality through Valley Water programs and collaboration with land use agencies, regulatory agencies, and basin stakeholders.
- Continue to incorporate groundwater sustainability in Valley Water planning efforts.
- Maintain adequate monitoring programs and modeling tools.
- Continue and enhance groundwater management partnerships with water retailers and land use agencies.

In support of management action planning, the 2021 GWMP describes various GSA Board resolutions adopted in support of sustainable groundwater management since the 2016 GWMP (approved 2016 Alternative) was adopted and submitted to the Department. Notably, Valley Water Board Resolution No. 18-04 (provided in Appendix F of the 2021 GWMP) memorializes "the process to regulate groundwater extraction under SGMA, if needed. The resolution lays out an implementation framework for Valley Water, in coordination with stakeholders, to address worsening basin conditions."[113]

The GSA has established groundwater zones and has implemented groundwater pumping/use charges for quite some time, and in 2020 conducted "an extensive groundwater benefit zone study that re-evaluated the zone boundaries and resulted in new and modified zones that became effective in July 2020."[114] With respect to metering to enable groundwater use charges, the 2021 GWMP describes that in "the Santa Clara Plain [Management Area], meters are required for facilities producing more than 4 [acre-feet] of agricultural water or more than 1 [acre-foot] of non-agricultural water annually. Within the Coyote Valley [Management Area] or Llagas Subbasin, meters are required for facilities producing more than 20 [acre-feet] of agricultural water or more than 2 [acre-feet] of non-agricultural water. The Valley Water Board has the ability to modify the volumetric thresholds for metering as well as related responsibilities for installation, maintenance, and reading."[115]

[112] 2021 GWMP, Chapter 8, pp. 219-221.
[113] 2021 GWMP, Chapter 1.4.2.2, p. 38.
[114] 2021 GWMP, Chapter 6.1.4.3, pp. 160-162.
[115] 2021 GWMP, Chapter 6.1.4.1, p. 159.

With respect to project implementation, notably, the GSA has been engaging in managed recharge operations since 1934 and 1955 (depending on recharge system)[116] to "offset groundwater withdrawals and ensure the long-term sustainability of groundwater resources…with local and imported surface waters in Valley Water recharge facilities."[117] Absent careful management and recharge operations, the Santa Clara Subbasin would be in chronic decline, as groundwater withdrawals are in excess of natural recharge and other inflows. Having acknowledged the importance of conjunctive use for many years, one of six major internal recommendations in the 2022 Water Year Annual Report is to "maintain existing conjunctive water management programs and evaluate opportunities for enhancement or increased efficiency."[118] The 2022 Water Year Annual Report describes the importance of direct recharge and conjunctive use, explaining that "Valley Water continues to focus on extensive groundwater recharge through direct replenishment and in-lieu recharge"[119] and reports that it was able to recharge about 70,000 acre-feet of local and imported water in the Santa Clara Subbasin during water year 2022.[120]

The suite of projects and management actions being implemented and considered in the Subbasin appears to be sufficient to address the water budget deficit, provides a buffer against climate change, and considers imported and local water supply reliability. With respect to implementation of projects and management actions, the Subbasin appears to be meeting its sustainability goal.

3.3 Data Gaps

Data gaps can relate to information about the physical setting and characteristics of a basin, a basin's current conditions, its hydrogeologic conceptual model, or its monitoring network.[121] As part of its Periodic Review responsibility, the Department is required to determine whether the local agencies and/or GSAs are addressing the basin's data gaps and are reducing the levels of uncertainty identified in the alternative.[122]

The GSA appears to be actively working to address known data gaps and continually improve its understanding of the Subbasin for improved management. The 2021 GWMP describes the importance of working "to ensure that the monitored locations and the data collected provide adequate information to understand groundwater conditions to support informed decision-making. This includes assessments of data gaps and redundancies, monitoring protocols, and data management, evaluation, and reporting."[123] The GSA

[116] 2021 GWMP, Chapter 4.4.2.2, Table 4-4, p. 132.
[117] 2021 GWMP, Chapter 6.1.1, p. 153.
[118] 2022 WY Annual Report, Chapter 4, p. 28.
[119] 2022 WY Annual Report, Chapter 4, p. 28.
[120] 2022 WY Annual Report, Chapter 3.2, p. 22.
[121] 23 CCR §§ 354.12; 354.15(b)(5); 354.38.
[122] 23 CCR § 355.6(c)(3).
[123] 2021 GWMP, Chapter 7, p. 179.

states that "regular evaluations of monitoring gaps and redundancies will be reported and summarized in each five-year update of the GWMP."[124]

The GSA presents several technical memoranda addressing data gaps on a variety of topics in the 2021 GWMP. The technical memorandum *Groundwater Monitoring Network Gap Analysis for the 2021 Groundwater Management Plan*[125] fulfills an internal recommendation from its 2016 GWMP. The gap analysis was prepared to "compile, inventory, and map the locations of the existing groundwater monitoring networks, and identify any gaps and redundancies in those networks, as well as outline recommendations to fills gaps or eliminate redundancies."[126] The memorandum additionally states "Results and recommendations summarized in this memo indicate the need to fill several gaps in the groundwater level and quality monitoring networks, with a priority of co-located gaps overlying the shallow and principal aquifer zones, especially in the confined area of the Santa Clara Plain near southern San Francisco Bay."[127]

With respect to groundwater dependent ecosystems, the 2021 GWMP includes another technical memorandum, *Identification of Groundwater Dependent Ecosystems (GDEs) for the 2021 Groundwater Management Plan*,[128] which fulfills Recommended Action 1 from the Department's 2019 Staff Report.[129] The memorandum describes there are approximately 3,303 acres of "likely and transition"[130] GDE categories in the Santa Clara Plain Management Area and 851 acres in the Coyote Valley Management Area (Figure 28 and Table 7).[131] As stated in *Chapter 8 – Next Steps* of the 2021 GWMP, the GSA describes that it will "[c]ontinue to improve understanding of surface water/groundwater interaction…" and "[e]xpand on Valley Water's 2018 differential gauging study to include additional time periods, hydrologic conditions, and methods, as appropriate."[132]

The 2021 GWMP includes another relevant technical memorandum, *Evaluation of Dry Supply Wells During Drought in the Santa Clara and Llagas Subbasins*,[133] which "presents information on water supply wells that went dry during the 2012 to 2016 drought and evaluates the vulnerability of wells going dry in the Santa Clara and Llagas subbasins."[134] The memorandum describes that the "findings from this memo are being incorporated into the gap analysis of Valley Water's groundwater level monitoring program that is being conducted as part of the 2021 GWMP update."[135] The memorandum further describes that, "filling such gaps in the water level monitoring

[124] 2021 GWMP, Appendix J, p. 812.
[125] 2021 GWMP, Appendix J, pp. 769-813.
[126] 2021 GWMP, Appendix J, p. 770.
[127] 2021 GWMP, Appendix J, p. 770.
[128] 2021 GWMP, Appendix G, pp. 651-704.
[129] 2021 GWMP, Appendix C, p. 425.
[130] 2021 GWMP, Appendix G, p. 701.
[131] 2021 GWMP, Appendix G, pp. 700-702.
[132] 2021 GWMP, Chapter 8, p. 221.
[133] 2021 GWMP, Appendix D, pp. 427-441.
[134] 2021 GWMP, Appendix D, p. 428.
[135] 2021 GWMP, Appendix D, p. 441.

program are likely to provide data that will result in a better understanding of groundwater conditions and vulnerability of water supply wells to drought."[136]

With respect to land subsidence data gaps, the 2021 GWMP describes that "during the next five-year GWMP update cycle, Valley Water will evaluate the maximum magnitude and duration that water levels can drop below subsidence thresholds without resulting in inelastic subsidence."[137]

Department staff agree that it is important to revisit and reevaluate sustainable management criteria as new data and information warrants. The findings and conclusions from these technical memoranda have been incorporated into the 2021 GWMP. It is apparent that the GSA continues to adaptively manage its Subbasin and seeks to incorporate best-available science and practices into its management and will continue to identify and address data gaps while doing so.

3.4 Consideration of Adjacent Basins

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."[138] Furthermore, the GSP Regulations state that minimum thresholds defined in each GSP be selected to avoid causing undesirable results in adjacent basins or affecting the ability of adjacent basins to achieve sustainability goals.[139]

The Santa Clara Subbasin (No. 2-009.02) is part of the larger Santa Clara Valley Groundwater Basin and is adjacent to the Santa Clara Valley – Niles Cone Subbasin (No. 2-009.01) to the northeast and the Santa Clara Valley – San Mateo Plain Subbasin (No. 2-009.03) to the northwest. The hydrologically separate Gilroy Hollister Valley – Llagas Area Subbasin (No. 3-003.01) lies to the south. The 2021 GWMP describes that the Santa Clara Subbasin "borders the San Mateo Plain and Niles Cone subbasins, respectively, at institutional boundaries formed by county boundaries."[140] The Santa Clara Subbasin borders the Llagas Area Subbasin at its southern extent at a topographic and hydrologic divide.

The GSA should be aware of the adjacent basins' sustainability goals and actively coordinate with the respective Plan Managers to ensure the Santa Clara Subbasin's groundwater management program is not affecting the adjacent basins. Furthermore, the GSA should be aware of the recommended corrective actions that adjacent basins are actively working to address. Department staff recommend the GSA provide an explanation in future updates or Periodic Evaluations of its Alternative how inter-basin items, such as: thresholds across basin boundaries; monitoring networks; hydrogeologic

[136] 2021 GWMP, Appendix D, p. 441.
[137] 2021 GWMP, Chapter 5.4.2, p. 148.
[138] Water Code § 10733(c).
[139] 23 CCR § 354.28(b)(3).
[140] 2021 GWMP, Chapter 2.1.1, p. 48.

conceptual models, including principal aquifer designations; water budgets; and management of interconnected surface water have been coordinated (see Recommended Corrective Action 1).

The 2021 Alternative, at this time, does not anticipate any negative impacts to the adjacent basins resulting from the minimum thresholds defined for the Santa Clara Subbasin, and the Department is not aware of any information, at this time, suggesting or claiming that adjacent basins' implementation of plans have been, or will be, negatively impacted by implementation of the Subbasin's Alternative. While Department staff are not aware of any information that would refute this position, additional information related to coordination with adjacent basins may be warranted. Department staff will continue to review the GSA's Periodic Evaluations to assess whether implementation of the Santa Clara Subbasin Alternative is potentially impacting plans in the adjacent basins.

3.5 Alignment of 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 sufficient quality and quantity is necessary for the successful implementation of an alternative or a GSP. 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 alternative or GSP.[141] Specifically, a monitoring network must be able to monitor impacts to beneficial uses and users,[142] monitor changes in groundwater conditions relative to measurable objectives and minimum thresholds,[143] capture seasonal low and high conditions,[144] include required information such as location and well construction and include maps and tables clearly showing the monitoring site type, location, and frequency.[145]

Department staff encourage local agencies and GSAs to collect monitoring data as specified in their respective plans, follow SGMA data and reporting standards,[146] fill data gaps,[147] update monitoring network information as needed, follow monitoring best management practices, 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 respective plan area that is used for making groundwater management decisions. Department staff note that if agencies do not fill their identified data gaps, the agencies' understanding of the basin may not represent the best available science for use in monitoring basin conditions.

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[141] 23 CCR § 354.32.
[142] 23 CCR § 354.34(b)(2).
[143] 23 CCR § 354.34(b)(3).
[144] 23 CCR § 354.34(c)(1)(B).
[145] 23 CCR §§ 354.34(g-h).
[146] 23 CCR § 352.4 *et seq*.
[147] 23 CCR § 354.38(d).

Department staff recommend the GSA ensure the monitoring network details included in its Alternative are consistent with the information contained in the SGMA Portal Monitoring Network Module (see Recommended Corrective Action 2).

3.6 Consideration of Climate Change and Future Conditions

Since the 2021 Alternative 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 ten percent of California's water supply. As California adapts to a hotter, drier climate, local agencies and GSAs should be preparing for these changing conditions as they work to sustainably manage groundwater within their jurisdictional areas. Specifically, the Department encourages local agencies and GSAs to:

- 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.
- 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.
- Take into consideration changes to surface water reliability and the potential impact on groundwater conditions.
- Evaluate updated watershed studies that may modify assumed frequency and magnitude of recharge projects, if applicable.
- Continually coordinate with the appropriate groundwater users, including but not limited to domestic well owners and state small water systems, as well as the appropriate overlying county jurisdictions developing drought plans and establishing local drought task forces, to evaluate how their respective groundwater management strategy aligns with drought planning, response, and mitigation efforts within the basin.

4 Progress Towards Addressing 2019 Recommended Actions

The July 17, 2019, *Statement of Findings Regarding the Approval of the Santa Clara Subbasin Alternative* explains the Department's decision to review and approve the GSA's Alternative. As stated in the Statement of Findings, "Based on its review of the Staff Report, Department management is satisfied that [Department] staff have conducted a thorough evaluation and assessment of the Alternative and concurs with staff's recommendation and all the recommended actions and thus hereby approves the

Alternative on the following grounds..."[148] The Statement of Findings further states, "The recommended actions in the Staff Report will assist the Department's review of the Alternative's implementation for consistency with SGMA and are thus recommended to be included in the resubmitted Alternative, due on January 1, 2022, as required by Water Code Section 10733.6(c)."[149]

The 2021 GWMP summarizes the GSA's response to the Department's five Recommended Actions from the 2019 Staff Report in Appendix C – *Response to DWR Recommended Actions*.[150] As part of that effort, new information regarding the Subbasin has been made available and has been incorporated into the 2021 GWMP. The Department appreciates the effort put forth in addressing the Recommended Actions from the 2016 Alternative and notes the progress made to date on implementation of the recommendations.

The GSA's efforts to address the Department's recommended actions are summarized below. New recommended corrective actions and considerations for improvement of the Alternative are provided in Section 5.

4.1 Recommended Action 1

Recommended Action 1. Staff recommend that the District provide an identification of groundwater dependent ecosystems in the Subbasin.

In response to Recommended Action 1, the GSA states that "within the Basin Setting of the 2021 GWMP, section *2.2.4 Groundwater Dependent Ecosystems* includes a new map identifying groundwater dependent ecosystems (GDEs) for the Santa Clara Subbasin, and section *3.2.4 Groundwater Dependent Ecosystems* includes a new map identifying GDEs for the Llagas Subbasin. A detailed technical memorandum that documents the current understanding, approach, and methods used to identify and map GDEs in the Santa Clara and Llagas subbasins is included in Appendix G of the 2021 GWMP."[151]

The GSA describes that it mapped GDEs in the Subbasin in general accordance with the 2018 guidance published by The Nature Conservancy, *Groundwater Dependent Ecosystems under the Sustainable Groundwater Management Act: Guidance for Preparing Groundwater Sustainability Plans* and presents findings from the 34 field assessments performed by Valley Water biologists.[152] The GSA describes that "…most GDEs in the recharge (unconfined) areas of the Santa Clara Plain and Coyote Valley are along losing stream reaches that are disconnected from the regional water table and thus are not interconnected surface water. Because these losing stream reaches are not interconnected surface water and streamflow is supported by natural runoff and in-stream

[148] https://sgma.water.ca.gov/portal/alternative/assessments/18.
[149] https://sgma.water.ca.gov/portal/alternative/assessments/18.
[150] 2021 GWMP, Appendix C, pp. 370-372.
[151] 2021 GWMP, Appendix C, pp. 371; Section 2.2.4, p 69-71; Section 3.2.4, pp. 104-106; Appendix G, pp. 651-704.
[152] 2021 GWMP, Chapter 2.2.4, p. 69.

recharge operations, GDEs are not affected by groundwater pumping in these recharge areas of the Santa Clara Plain and Coyote Valley."[153] The 2021 GWMP continues, describing "The Laguna Seca is an area of known wetlands in northern Coyote Valley that has several GDEs, as detailed in Appendix G. Valley Water's groundwater management activities, including managed recharge operations in Coyote Valley, have maintained sustainable groundwater supply conditions in the northern Coyote Valley that support GDEs in Laguna Seca. Long-term groundwater levels are stable in Laguna Seca and demonstrate sustainable groundwater conditions in northern Coyote Valley. Droughts of limited duration may suppress the shallow water table, but effects to GDEs are expected to be minimal with continued management activities."[154] The GDE memo describes there are approximately 3,303 acres of "likely and transition"[155] GDE categories in the Santa Clara Plain management area and 851 acres in the Coyote Valley management area.[156]

4.1.1 Staff Assessment of Agency's Response to Recommended Action 1

Based on the information provided in the 2021 GWMP, Department staff believe that Recommended Action 1 has been sufficiently addressed. The GSA prepared the GDE memo to specifically address the Department's recommendations. The GDE memo is a detailed technical memorandum documenting the current understanding, approach, and methods used to identify and map GDEs. The GSA not only identifies GDEs but incorporates and builds upon findings from the memo by applying them throughout the 2021 GWMP and into future actions. The GSA's Gap Analysis memo incorporates recommendations from the GDE memo, stating "the gaps identified as 1 in the Coyote Valley and Llagas Subbasin would help to quantify the groundwater/surface-water interaction in the Laguna Seca area, downstream of Uvas Reservoir and at the Pajaro River, which are identified as recommendations in the groundwater dependent ecosystem (GDE) analysis (Appendix G) of the 2021 GWMP."[157] Staff agree that filling these data gaps are important and that these data would aid in refining its interconnected surface water conceptual model and assist in monitoring potential impacts to GDEs and other beneficial uses and users. The GSA appears intent on incorporating best available science and information into its management of the Subbasin.

4.2 Recommended Action 2

Recommended Action 2. Staff recommend that the District provide a projected water budget incorporating climate change and expected population growth over the planning and implementation horizon of 50 years.

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[153] 2021 GWMP, Chapter 2.2.4, p. 70.
[154] 2021 GWMP, Chapter 2.2.4, p. 71.
[155] 2021 GWMP, Appendix J, p. 787.
[156] 2021 GWMP, Appendix G, Figure 28 and Table 7, pp. 700-702.
[157] 2021 GWMP, Appendix J, p. 787.

In response to Recommended Action 2, the GSA states that "Section [4.6] *Climate Change Impacts on Groundwater Budget* of the 2021 GWMP includes an analysis of projected groundwater budget considering climate change for the year 2045. This analysis focuses on 2045 to stay consistent with other Valley Water planning documents, including the 2020 Urban Water Management Plan. During the next five-year update cycle of the GWMP, Valley Water plans to conduct a more integrated analysis of climate change impacts that also considers projected climate change impacts on imported water supply."[158]

4.2.1 Staff Assessment of Agency's Response to Recommended Action 2

Based on the information provided in the 2021 GWMP, Department staff believe that Recommended Action 2 has been sufficiently addressed. Although the analysis presented in the 2021 GWMP does not cover the entire planning and implementation horizon, Department staff concur that it is reasonable for the GSA to align and leverage activities from other related efforts to be compliant with SGMA and create a local financial and planning nexus. Furthermore, evaluating climate change impacts to the water budget as it pertains to imported water supplies is of great importance to the GSA, given that conjunctive use and active recharge operations in the Subbasin are critical components of groundwater management and water supply reliability. The Department looks forward to reviewing the updated analysis and determining how it will be incorporated into basin management activities over the 50-year SGMA planning and implementation horizon, as planned for the next update to the Subbasin's Alternative. Note that Section 3.6 in this assessment (Consideration of Climate Change and Future Conditions) provides additional considerations and recommendations to anticipate how future water use may change in response to changing climate conditions.

4.3 Recommended Action 3

Recommended Action 3. Staff recommend that the District create separate outcome measures related to water quality in the Santa Clara and Llagas subbasins. Separate subbasin-specific criteria will allow for a determination of whether each subbasin, separately, is meeting or making progress toward the outcome measures.

In response to Recommended Action 3, the GSA states that "Section 5.4 Outcome Measures of the 2021 GWMP includes new and separate outcome measures related to water quality in the Santa Clara and Llagas subbasins. These separate subbasin-specific criteria will allow for a determination of whether each subbasin, separately, is meeting or making progress toward the outcome measures. The new water quality outcome measure for the Santa Clara Subbasin is distinctly different than the new outcome measure for seawater intrusion in the subbasin…"[159] More detailed information as it pertains to Recommended Action 3 is provided in this assessment in Section 3.1.4.

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[158] 2021 GWMP, Appendix C. p. 371.
[159] 2021 GWMP, Appendix C. pp. 371.

4.3.1 Staff Assessment of Agency's Response to Recommended Action 3

Based on the information provided in the 2021 GWMP, Department staff believe that Recommended Action 3 has been sufficiently addressed. The 2021 GWMP explains that the water quality outcome measures evaluate the percentage of water supply wells that meet all primary Maximum Contaminant Levels (MCLs) and that the outcome measures will be evaluated annually using data collected at water supply wells sampled by Valley Water and water retailers.

4.4 Recommended Action 4

Recommended Action 4. Staff recommend the District develop specific seawater intrusion outcome measures separate from other water quality outcome measures.

In response to Recommended Action 4, the GSA describes that "Section 5.4 Outcome Measures of the 2021 GWMP includes a new seawater intrusion outcome measure for the Santa Clara Subbasins. A detailed technical memorandum that documents the current understanding of seawater intrusion mechanisms, approach, and analysis used to develop the seawater intrusion outcome measure is included in Appendix H of the 2021 GWMP. This memo also documents current understanding of climate change driven sea-level rise and implications for monitoring and managing seawater intrusion in the Santa Clara Subbasin."[160] More detailed information as it pertains to Recommended Action 4 is provided in this assessment in Section 3.1.3.

4.4.1 Staff Assessment of Agency's Response to Recommended Action 4

Based on the information provided in the 2021 GWMP, Department staff believe that Recommended Action 4 has been sufficiently addressed. The rationale for development of the functionally equivalent sustainable management criteria for seawater intrusion is provided in the 2021 GWMP, indicating that "the number and location of supply wells were evaluated in relation to the 100 mg/L isocontours to identify an appropriate outcome measure and outcome measure-lower threshold."[161]

4.5 Recommended Action 5

Recommended Action 5. Staff recommend that the District clarify how meeting its outcome measures relates to the avoidance of undesirable results in the Santa Clara Subbasin. Specifically, it should clarify whether not meeting the outcome measures represents an undesirable result for the applicable sustainability indicator. If that is not the intent of the District, then it should provide additional clarification and additional metrics that can be used by the District, and by the Department as it reviews the Alternative on an ongoing basis, to determine what effects represent undesirable results and to objectively assess the presence or absence of those undesirable results.

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[160] 2021 GWMP, Appendix C. pp. 371. Note that the 2021 GWMP mistakenly labeled the Department's Recommended Action 4 as Recommended Action 5.
[161] 2021 GWMP, Section 5.4.4, p. 150.

In response to Recommended Action 5, the GSA describes that "Section 5.4 Outcome Measures of the 2021 GWMP includes new outcome measure-lower thresholds for each of the five corresponding outcome measures in the Santa Clara and Llagas subbasins. These outcome measure-lower thresholds are designed to be functionally equivalent to a minimum threshold and thus help define undesirable results for each corresponding sustainability indicator. Additional details are provided in section 5.4 of the 2021 GWMP."[162] In summary, the functionally equivalent sustainable management criteria for each of the applicable sustainability indicators defined in the 2021 GWMP include the following.

- Groundwater Levels and Land Subsidence.
    - Outcome Measure [measurable objectives]: Groundwater levels are above subsidence thresholds at the Santa Clara Subbasin subsidence index wells.
    - Outcome Measure – Lower Threshold [minimum thresholds]: Groundwater levels are above the historical low water levels at the majority of the Santa Clara Subbasin subsidence index wells.
- Groundwater Storage.
    - Outcome Measure [measurable objective]: Projected end of year groundwater storage is greater than 278,000 acre-feet (AF) in the Santa Clara Plain, 5,000 AF in the Coyote Valley, and 17,000 AF in the Llagas Subbasin.
    - Outcome Measure – Lower Threshold [minimum threshold]: Projected end of year countywide groundwater storage is greater than Stage 5 (150,000 AF) of the Water Shortage Contingency Plan.
- Seawater Intrusion.
    - Outcome Measure [measurable objective]: In the Santa Clara Subbasin shallow aquifer, the 100 milligram per liter chloride isocontour area is less than the historical maximum extent area (57 square miles).
    - Outcome Measure – Lower Threshold [minimum threshold]: In the Santa Clara Subbasin shallow aquifer, the 100 milligram per liter chloride isocontour area is less than 81 square miles, which represents a one-mile radial buffer of the historical maximum extent area.

[162] 2021 GWMP, Appendix C. pp. 371. Note that the 2021 GWMP mistakenly labeled the Department's Recommended Action 5 as Recommended Action 4.

- Water Quality.
    - Outcome Measure [measurable objective]: For Santa Clara Subbasin water supply wells, at least 95% meet primary drinking water standards, and at least 90% have stable or decreasing trends for total dissolved solids (TDS).
    - Outcome Measure – Lower Threshold [minimum threshold]: At least 70% of water supply wells have stable or decreasing trends for nitrate and TDS.

4.5.1 Staff Assessment of Agency's Response to Recommended Action 5

Based on the information provided in the 2021 GWMP, Department staff believe that Recommended Action 5 has been sufficiently addressed. As stated in the 2021 GWMP, "The outcome measures are quantifiable goals to track performance of sustainable management and are functionally equivalent to measurable objectives under SGMA. This 2021 GMWP has new outcome measure-lower thresholds that are quantifiable values used to define undesirable results and are functionally equivalent to minimum thresholds under SGMA. The outcome measure-lower thresholds account for a reasonable margin of operational flexibility below the outcome measures that accommodate drought, climate change, conjunctive use operations, and other groundwater management activities. Valley Water has a long-established history of sustainable groundwater management and will continue to proactively manage groundwater to minimize the risk of reaching the outcome measure-lower thresholds and related undesirable results."[163]

5 STAFF RECOMMENDATION

The Department previously approved the Alternative submitted for the Subbasin based on the grounds presented in the July 17, 2019, *Statement of Findings Regarding the Approval of the Santa Clara Subbasin Alternative*. As part of its ongoing Periodic Review responsibility, the Department is required to assess whether the approved 2016 Alternative continues to satisfy the evaluation criteria described in Section 355.4 of the GSP Regulations and determine whether the updated 2021 Alternative should be considered approved, incomplete, or inadequate.[164]

Based on the current evaluation of the 2016 Alternative, and after considering information provided by the Subbasin's GSA, Department staff recommend that the 2021 Alternative for the Santa Clara Subbasin be approved with recommended corrective actions. Department staff conclude that the 2021 Alternative includes the components of a functionally equivalent GSP, demonstrates a thorough understanding of the Subbasin based on what appears to be the best available science and information, sets well explained, supported, and reasonable sustainable management criteria to prevent

[163] 2021 GWMP, Chapter 5.4, p. 145.
[164] 23 CCR §§ 355.6(c)(4) and 355.6(d).

undesirable results, and proposes a set of projects and management actions that will likely achieve the sustainability goal defined for the Subbasin.

5.1 Recommended Corrective Actions

Although Department staff believe that the 2021 Alternative continues to comply with the objectives of SGMA and substantially complies with the GSP Regulations, new corrective actions have been recommended.[165] Although the issues addressed by the recommended corrective actions do not, at this time, preclude approval of the 2021 Alternative, they are intended to facilitate progress in achieving the Subbasin's sustainability goals and guide the Department's ongoing evaluation process. Additionally, the new recommended corrective actions will allow the Department to better evaluate whether implementation of the 2021 Alternative could adversely affect an adjacent basin from reaching its sustainability goal. As with GSPs, a GSA's failure to address the Department's recommended corrective actions could potentially lead to an alternative being determined incomplete or inadequate.

The GSA has identified several areas for improvement of its GWMP and Department staff concur that those items are important and should be addressed as soon as practicable.[166] Department staff have described additional recommendations throughout the preceding sections of this assessment that should be considered by the GSA as the 2021 GWMP is being implemented.

Recommended Corrective Action 1

Provide an explanation in future Alternative updates how inter-basin items, such as: thresholds across basin boundaries; monitoring networks; hydrogeologic conceptual models, including principal aquifer designations; water budgets; and management of interconnected surface water along basin boundaries have been coordinated.

Recommended Corrective Action 2

Ensure the monitoring network details included in the Alternative are consistent with the information contained in the Department's SGMA Portal Monitoring Network Module.

[165] Water Code § 10733.8.
[166] 2021 GWMP, Chapter 8, pp. 219-221.