



CALIFORNIA DEPARTMENT OF WATER RESOURCES

SUSTAINABLE GROUNDWATER MANAGEMENT OFFICE

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July 27, 2023

James Wolfe
City of Brentwood Groundwater Sustainability Agency
150 City Park Way
Brentwood, CA 94513
jwolfe@brentwoodca.gov

RE: San Joaquin Valley – East Contra Costa Subbasin - 2022 Groundwater Sustainability Plan

Dear James Wolfe,

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

Recognizing SGMA sets a long-term horizon for groundwater sustainability agencies (GSAs) to achieve their basin sustainability goals, monitoring progress is fundamental for successful implementation. GSAs are required to evaluate their GSPs at least every five years and whenever the Plan is amended, and to provide a written assessment to the Department. Accordingly, the Department will evaluate approved GSPs and issue an assessment at least every five years. The Department will initiate the first periodic review of the East Contra Costa Subbasin GSP no later than January 25, 2027.

Please contact Sustainable Groundwater Management staff by emailing sgmps@water.ca.gov if you have any questions related to the Department's assessment or implementation of your GSP.

Thank You,

Paul Gosselin

Paul Gosselin
Deputy Director
Sustainable Groundwater Management

Attachment:

1. Statement of Findings Regarding the Approval of the San Joaquin Valley – East Contra Costa Subbasin Groundwater Sustainability Plan

**STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES**

**STATEMENT OF FINDINGS REGARDING THE
APPROVAL OF THE
SAN JOAQUIN VALLEY – EAST CONTRA COSTA SUBBASIN
GROUNDWATER SUSTAINABILITY PLAN**

The Department of Water Resources (Department) is required to evaluate whether a submitted groundwater sustainability plan (GSP or Plan) conforms to specific requirements of the Sustainable Groundwater Management Act (SGMA or Act), is likely to achieve the sustainability goal for the basin covered by the Plan, and whether the Plan adversely affects the ability of an adjacent basin to implement its GSP or impedes achievement of sustainability goals in an adjacent basin. (Water Code § 10733.) The Department is directed to issue an assessment of the Plan within two years of its submission. (Water Code § 10733.4.) This Statement of Findings explains the Department's decision regarding the Plan submitted by the City of Antioch, County of Contra Costa, Discovery Bay Community Services District, Byron-Bethany Irrigation District, City of Brentwood, Diablo Water District, and East Contra Costa Irrigation District Groundwater Sustainability Agencies (GSAs or Agencies) for the San Joaquin Valley – East Contra Costa Subbasin (Basin No. 5-022.19).

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

- A. The Plan satisfies the required conditions as outlined in § 355.4(a) of the GSP Regulations (23 CCR § 350 et seq.):
 1. The Plan was submitted within the statutory deadline of January 31, 2022. (Water Code § 10720.7(a); 23 CCR § 355.4(a)(1).)
 2. The Plan was complete, meaning it generally appeared to include the information required by the Act and the GSP Regulations sufficient to warrant a thorough evaluation and issuance of an assessment by the Department. (23 CCR § 355.4(a)(2).)
 3. The Plan, either on its own or in coordination with other Plans, covers the entire Subbasin. (23 CCR § 355.4(a)(3).)

- B. The general standards the Department applied in its evaluation and assessment of the Plan are: (1) “conformance” with the specified statutory requirements, (2) “substantial compliance” with the GSP Regulations, (3) whether the Plan is likely to achieve the sustainability goal for the Subbasin within 20 years of the implementation of the Plan, and (4) whether the Plan adversely affects the ability of an adjacent basin to implement its GSP or impedes achievement of sustainability goals in an adjacent basin. (Water Code § 10733.) Application of these standards requires exercise of the Department’s expertise, judgment, and discretion when making its determination of whether a Plan should be deemed “approved,” “incomplete,” or “inadequate.”

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

- C. In making these findings and Plan determination, the Department also recognized that: (1) the Department maintains continuing oversight and jurisdiction to ensure the Plan is adequately implemented; (2) the Legislature intended SGMA to be implemented over many years; (3) SGMA provides Plans 20 years of implementation to achieve the sustainability goal in a Subbasin (with the possibility that the Department may grant GSAs an additional five years upon request if the GSA has made satisfactory progress toward sustainability); and, (4) local agencies acting as GSAs are authorized, but not required, to address undesirable results that occurred prior to enactment of SGMA. (Water Code §§ 10721(r); 10727.2(b); 10733(a); 10733.8.)
- D. The Plan conforms with Water Code §§ 10727.2 and 10727.4, substantially complies with 23 CCR § 355.4, and appears likely to achieve the sustainability goal for the Subbasin. It does not appear at this time that the Plan will adversely

affect the ability of adjacent basins to implement their GSPs or impede achievement of sustainability goals.

1. The sustainable management criteria and the Plan's goal to protect and maintain safe and reliable sources of groundwater for beneficial uses and users are sufficiently justified and explained. The Plan relies on credible information and science to quantify the groundwater conditions that the Plan seeks to avoid and provides an objective way to determine whether the Subbasin is being managed sustainably in accordance with SGMA. (23 CCR § 355.4(b)(1).)
2. The Plan demonstrates an understanding of where data gaps are present (i.e., hydrogeologic conceptual model for water levels, water quality, and lithology, seawater intrusion monitoring network, incomplete understanding interconnected surface water systems) and a commitment to eliminate those data gaps. The Plan intends to address data gaps in the Subbasin's hydrogeologic conceptual model through the installation of additional monitoring wells at four separate sites. The GSAs plan to include additional maps and cross-sections depicting chloride concentrations to address the seawater intrusion data gap in the forthcoming Periodic Evaluation. Filling these known data gaps, and others described in the Plan, should lead to the refinement of the GSAs' monitoring networks, the Subbasin's water model, and sustainable management criteria to better inform and guide future adaptive management strategies. (23 CCR § 355.4(b)(2).)
3. The projects and management actions are reasonable and commensurate with the level of understanding of the Subbasin setting. The projects and management actions described in the Plan provide a feasible approach to achieving the Subbasin's sustainability goal and should provide the GSAs with greater versatility to adapt and respond to changing conditions and future challenges during GSP implementation. (23 CCR § 355.4(b)(3).)
4. The Plan provides a detailed explanation of how the various interests of groundwater uses and users in the Subbasin were considered in developing the sustainable management criteria and how those interests would be impacted by the chosen minimum thresholds. (23 CCR § 355.4(b)(4).)
5. The Plan's projects and management actions appear feasible at this time and appear capable of preventing undesirable results and ensuring that the Subbasin is managed within its sustainable yield within 20 years. The Department will continue to monitor Plan implementation and reserves the right to change its determination if projects and management actions are

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not implemented or appear unlikely to prevent undesirable results or achieve sustainability within SGMA timeframes. (23 CCR § 355.4(b)(5).)

6. The Plan includes a reasonable assessment of overdraft conditions and includes reasonable means to mitigate overdraft, if present. (23 CCR § 355.4(b)(6).)
7. At this time, it does not appear that the Plan will adversely affect the ability of an adjacent basin to implement its GSP or impede achievement of sustainability goals in an adjacent basin. The Plan provides an analysis of potential impacts of minimum thresholds on adjacent basins and does not anticipate a negative impact to these basins if minimum thresholds are reached. (23 CCR § 355.4(b)(7).)
8. Because a single plan was submitted for the Subbasin, a coordination agreement was not required. (23 CCR § 355.4(b)(8).)
9. Given the diverse authorities and resources of the GSAs' member agencies, which consists of cities and a variety of special districts, and the additional authorities granted the GSAs' under SGMA, the Department concludes the GSAs likely have the legal authority and financial resources necessary to implement the Plan. (23 CCR § 355.4(b)(9).)
10. Through review of the Plan and consideration of public comments, the Department determines that the GSAs adequately responded to comments that raised credible technical or policy issues with the Plan, sufficient to warrant approval of the Plan at this time. The Department also notes that the recommended corrective actions included in the Staff Report are important to addressing certain technical or policy issues that were raised and, if not addressed before future, subsequent plan evaluations, may preclude approval of the Plan in those future evaluations. (23 CCR § 355.4(b)(10).)

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

1. The Plan considers potential impacts of chronic lowering of groundwater level minimum thresholds on beneficial uses and users by comparing domestic well depths to minimum thresholds throughout the Subbasin. The Plan estimates that less than 5 percent of domestic wells in the Subbasin would go dry if minimum thresholds were reached (i.e., the well will experience less than 10 feet of saturated screen). Department staff have provided a recommended corrective action related to these potential impacts as discussed in the East Contra Costa Groundwater Sustainability Plan Assessment Staff Report (Exhibit A). However, the Plan complies with the requirements of SGMA and substantially complies with the GSP Regulations and supports the state policy regarding the human right to

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

2. The Plan acknowledges and identifies interconnected surface waters within the Subbasin. The GSAs propose initial sustainable management criteria to manage this sustainability indicator and measures to improve understanding and management of interconnected surface water. The GSAs acknowledge, and the Department agrees, many data gaps related to interconnected surface water exist within the Subbasin. The GSAs should continue filling data gaps, collecting additional monitoring data, and coordinating with resources agencies and interested parties to understand beneficial uses and users that may be impacted by depletions of interconnected surface water caused by groundwater pumping. Future updates to the Plan should aim to improve the initial sustainable management criteria as more information and improved methodology becomes available.
3. The basin is not currently in a state of long-term overdraft and projections of future basin extractions are likely to stay within current and historic ranges, at least until the next periodic evaluation by the GSA and the Department. Basin groundwater levels and other SGMA sustainability indicators are unlikely to deteriorate while the GSA implements the Department's recommended corrective actions. State intervention is not necessary at this time to ensure that local agencies manage groundwater in a sustainable manner. (Wat. Code § 10720.1(h).)
4. The California Environmental Quality Act (Public Resources Code § 21000 *et seq.*) does not apply to the Department's evaluation and assessment of the Plan.


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Accordingly, the GSP submitted by the Agencies for the San Joaquin Valley– East Contra Costa Subbasin is hereby **APPROVED**. The recommended corrective actions identified in the Staff Report will assist the Department’s future review of the Plan’s implementation for consistency with SGMA and the Department therefore recommends the Agencies address them by the time of the Department’s periodic review, which is set to begin on January 25, 2027, as required by Water Code § 10733.8. Failure to address the Department’s Recommended Corrective Actions before future, subsequent plan evaluations, may lead to a Plan being determined incomplete or inadequate.

Signed:



Karla Nemeth, Director
Date: July 27, 2023

Exhibit A: Groundwater Sustainability Plan Assessment Staff Report – San Joaquin Valley– East Contra Costa Subbasin

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

Groundwater Basin Name: San Joaquin Valley – East Contra Costa Subbasin (No. 5-022.19)

Submitting Agency: City of Antioch Groundwater Sustainability Agency, County of Contra Costa Groundwater Sustainability Agency, Discovery Bay Community Services District Groundwater Sustainability Agency, Byron-Bethany Irrigation District Groundwater Sustainability Agency, City of Brentwood Groundwater Sustainability Agency, Diablo Water District Groundwater Sustainability Agency, and East Contra Costa Irrigation District Groundwater Sustainability Agency

Submittal Type: Initial GSP Submission

Submittal Date: January 25, 2022

Recommendation: Approved

Date: July 27, 2023

The City of Antioch, County of Contra Costa, Discovery Bay Community Services District, Byron-Bethany Irrigation District, City of Brentwood, Diablo Water District, and East Contra Costa Irrigation District Groundwater Sustainability Agencies (GSAs or Agencies) submitted the East Contra Costa Subbasin Groundwater Sustainability Plan (GSP or Plan) for the San Joaquin Valley – East Contra Costa Subbasin (Subbasin) to the Department of Water Resources (Department) for evaluation and assessment as required by the Sustainable Groundwater Management Act (SGMA)¹ and GSP Regulations.² The GSP covers the entire Subbasin for the implementation of SGMA.

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

¹ Water Code § 10720 *et seq.*

² 23 CCR § 350 *et seq.*

³ 23 CCR § 350 *et seq.*

progress toward achieving the sustainability goal through annual reporting and future periodic evaluations of the GSP and its implementation.

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

This assessment includes five sections:

- **Section 1 – Summary**: Overview of Department staff’s assessment and recommendations.
- **Section 2 – Evaluation Criteria**: Describes the legislative requirements and the Department’s evaluation criteria.
- **Section 3 – Required Conditions**: Describes the submission requirements, Plan completeness, and basin coverage required for a GSP to be evaluated by the Department.
- **Section 4 – Plan Evaluation**: Provides an assessment of the contents included in the GSP organized by each Subarticle outlined in the GSP Regulations.
- **Section 5 – Staff Recommendation**: Includes the staff recommendation for the Plan and any recommended or required corrective actions, as applicable.

1 SUMMARY

Department staff recommend approval of the East Contra Costa Subbasin GSP. The GSAs have identified areas for improvement of its Plan (e.g., incomplete understanding of interconnected surface water systems, expanding the monitoring network to address water level, water quality, and lithologic data gaps) Department staff concur that those items are important and recommend the GSAs address them as soon as possible. Department staff have also identified additional recommended corrective actions within this assessment that the GSAs should consider addressing by the first periodic evaluation of the Plan. The recommended corrective actions generally focus on the following:

- (1) Further assessing the potential impact of establishing minimum thresholds for the chronic lowering of groundwater levels;
- (2) Revise sustainable management criteria for degraded water quality;
- (3) Continuing to fill data gaps, collecting additional monitoring data, coordinating with resources agencies and interested parties to understand beneficial uses and users that may be impacted by depletions of interconnected surface water caused by groundwater pumping, and potentially refine sustainable management criteria; and,
- (4) Providing more information related to the water quality monitoring network.

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

2 EVALUATION CRITERIA

The GSAs submitted a single GSP to the Department to evaluate whether the Plan conforms to specified SGMA requirements⁴ and is likely to achieve the sustainability goal for the East Contra Costa Subbasin.⁵ To achieve the sustainability goal for the Subbasin, the GSP must demonstrate that implementation of the Plan will lead to sustainable groundwater management, which means the management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results.⁶ Undesirable results must be defined quantitatively by the GSAs.⁷ The Department is also required to evaluate whether the GSP will adversely affect the ability of an adjacent basin to implement its GSP or achieve its sustainability goal.⁸

For the GSP to be evaluated by the Department, it must first be determined that the Plan was submitted by the statutory deadline,⁹ and that it is complete and covers the entire basin.¹⁰ If these conditions are satisfied, the Department evaluates the Plan to determine whether it complies with specific SGMA requirements and substantially complies with the GSP Regulations.¹¹ Substantial compliance means that the supporting information is sufficiently detailed and the analyses sufficiently thorough and reasonable, in the judgment of the Department, to evaluate the Plan, and the Department determines that any discrepancy would not materially affect the ability of the Agencies to achieve the sustainability goal for the basin, or the ability of the Department to evaluate the likelihood of the Plan to attain that goal.¹²

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

⁴ Water Code §§ 10727.2, 10727.4.

⁵ Water Code § 10733(a).

⁶ Water Code § 10721(v).

⁷ 23 CCR § 354.26 *et seq.*

⁸ Water Code § 10733(c).

⁹ 23 CCR § 355.4(a)(1).

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

¹¹ 23 CCR § 350 *et seq.*

¹² 23 CCR § 355.4(b).

¹³ 23 CCR § 351(h).

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

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

To the extent overdraft is present in a basin, the Department evaluates whether the Plan provides a reasonable assessment of the overdraft and includes reasonable means to mitigate the overdraft.¹⁶ The Department also considers whether the Plan provides reasonable measures and schedules to eliminate identified data gaps.¹⁷ Lastly, the Department's review considers the comments submitted on the Plan and evaluates whether the GSAs adequately responded to the comments that raise credible technical or policy issues with the Plan.¹⁸

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

Even when review indicates that the GSP satisfies the requirements of SGMA and is in substantial compliance with the GSP Regulations, the Department may recommend corrective actions.²⁴ Recommended corrective actions are intended to facilitate progress in achieving the sustainability goal within the basin and the Department's future evaluations, and to allow the Department to better evaluate whether the Plan adversely affects adjacent basins. While the issues addressed by the recommended corrective actions do not, at this time, preclude approval of the Plan, the Department recommends that the issues be addressed to ensure the Plan's implementation continues to be consistent with SGMA and the Department is able to assess progress in achieving the sustainability goal within the basin.²⁵ Unless otherwise noted, the Department proposes that recommended corrective actions be addressed by the submission date for the first periodic assessment.²⁶

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

¹⁵ 23 CCR § 355.4(b)(9).

¹⁶ 23 CCR § 355.4(b)(6).

¹⁷ 23 CCR § 355.4(b)(2).

¹⁸ 23 CCR § 355.4(b)(10).

¹⁹ Water Code § 10733.4(d); 23 CCR § 355.2(e).

²⁰ Water Code § 10733.4(d); 23 CCR § 355.2(e).

²¹ 23 CCR § 355.2(e)(1).

²² 23 CCR § 355.2(e)(2).

²³ 23 CCR § 355.2(e)(3).

²⁴ Water Code § 10733.4(d).

²⁵ Water Code § 10733.8.

²⁶ 23 CCR § 356.4 *et seq.*

engineering analysis of that information. The staff recommendation to approve a Plan does not signify that Department staff, were they to exercise the professional judgment required to develop a GSP for the basin, would make the same assumptions and interpretations as those contained in the Plan, but simply that Department staff have determined that the assumptions and interpretations relied upon by the submitting GSAs are supported by adequate, credible evidence, and are scientifically reasonable.

Lastly, the Department's review and approval of the Plan is a continual process. Both SGMA and the GSP Regulations provide the Department with the ongoing authority and duty to review the implementation of the Plan.²⁷ Also, GSAs have an ongoing duty to provide reports to the Department, periodically reassess their plans, and, when necessary, update or amend their plans.²⁸ The passage of time or new information may make what is reasonable and feasible at the time of this review to not be so in the future. The emphasis of the Department's periodic reviews will be to assess the progress toward achieving the sustainability goal for the basin and whether Plan implementation adversely affects the ability of adjacent basins to achieve their sustainability goals.

3 REQUIRED CONDITIONS

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

3.1 SUBMISSION DEADLINE

SGMA required basins categorized as high- or medium-priority and not subject to critical conditions of overdraft to submit a GSP no later than January 31, 2022.²⁹

The GSAs submitted their Plan on January 25, 2022.

3.2 COMPLETENESS

GSP Regulations specify that the Department shall evaluate a GSP if that GSP is complete and includes the information required by SGMA and the GSP Regulations.³⁰

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

²⁷ Water Code § 10733.8; 23 CCR § 355.6.

²⁸ Water Code §§ 10728 *et seq.*, 10728.2.

²⁹ Water Code § 10720.7(a)(2).

³⁰ 23 CCR § 355.4(a)(2).

required information, sufficient to warrant a thorough evaluation by the Department.³¹ The Department posted the GSP to its website on February 7, 2022.³²

3.3 BASIN COVERAGE

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

The GSP intends to manage the entire East Contra Costa Subbasin and the jurisdictional boundary of the submitting GSA fully contains the Subbasin.³⁴

4 PLAN EVALUATION

As stated in Section 355.4 of the GSP Regulations, a basin “shall be sustainably managed within 20 years of the applicable statutory deadline consistent with the objectives of the Act.” The Department’s assessment is based on a number of related factors including whether the elements of a GSP were developed in the manner required by the GSP Regulations, whether the GSP was developed using appropriate data and methodologies and whether its conclusions are scientifically reasonable, and whether the GSP, through the implementation of clearly defined and technically feasible projects and management actions, is likely to achieve a tenable sustainability goal for the basin. The Department staff’s evaluation of the likelihood of the Plan to attain the sustainability goal for the Subbasin is provided below.

4.1 ADMINISTRATIVE INFORMATION

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

The GSP states that the GSAs have exclusive GSA status to develop and implement a GSP per the Water Code.³⁸ The GSP provides the contact information for each GSA and

³¹ The Department undertakes a preliminary completeness review of a submitted Plan under section 355.4(a) of the GSP Regulations to determine whether the elements of a Plan required by SGMA, and the Regulations have been provided, which is different from a determination, upon review, that a Plan is “incomplete” for purposes of section 355.2(e)(2) of the Regulations.

³² <https://sgma.water.ca.gov/portal/gsp/preview/120>.

³³ Water Code § 10727(b); 23 CCR § 355.4(a)(3).

³⁴ East Contra Costa GSP, Section 2.1, p. 54.

³⁵ 23 CCR § 354.6 *et seq.*

³⁶ 23 CCR § 354.8 *et seq.*

³⁷ 23 CCR § 354.6(e).

³⁸ East Contra Costa GSP, Section 1.2.1, p. 43.

Contra Costa Water District along with the Plan Manager (City of Brentwood).³⁹ Under SGMA, the GSAs are provided with additional authorities that can be used when necessary to manage the Subbasin.

The East Contra Costa Subbasin encompasses a 107,596-acre area and is located in the eastern portion of Contra Costa County. The Subbasin is bounded by the Solano Subbasin to the north, the Tracy Subbasin to the east and south, and the Coast Range to the west.⁴⁰ The agencies located within the Subbasin's boundaries and with jurisdiction include the City of Antioch, County of Contra Costa, Discovery Bay Community Services District, Byron-Bethany Irrigation District, City of Brentwood, Diablo Water District, and East Contra Costa Irrigation District.⁴¹ Land use within the Subbasin includes agricultural (41%), urban (23%), and native vegetation or water (14%).⁴² The GSP states that the primary water sources are surface water, groundwater, and recycled water.⁴³ A map showing the Subbasin boundary along with adjacent basins is shown in Figure 1 below.

³⁹ East Contra Costa GSP, Section 1.2.2, p. 45.

⁴⁰ East Contra Costa GSP, Section 2.1.1, p. 54.

⁴¹ East Contra Costa GSP, Section 1.2.1, p. 43.

⁴² East Contra Costa GSP, Section 2.3.1, p. 77.

⁴³ East Contra Costa GSP, Section 2.3.3, p. 86.

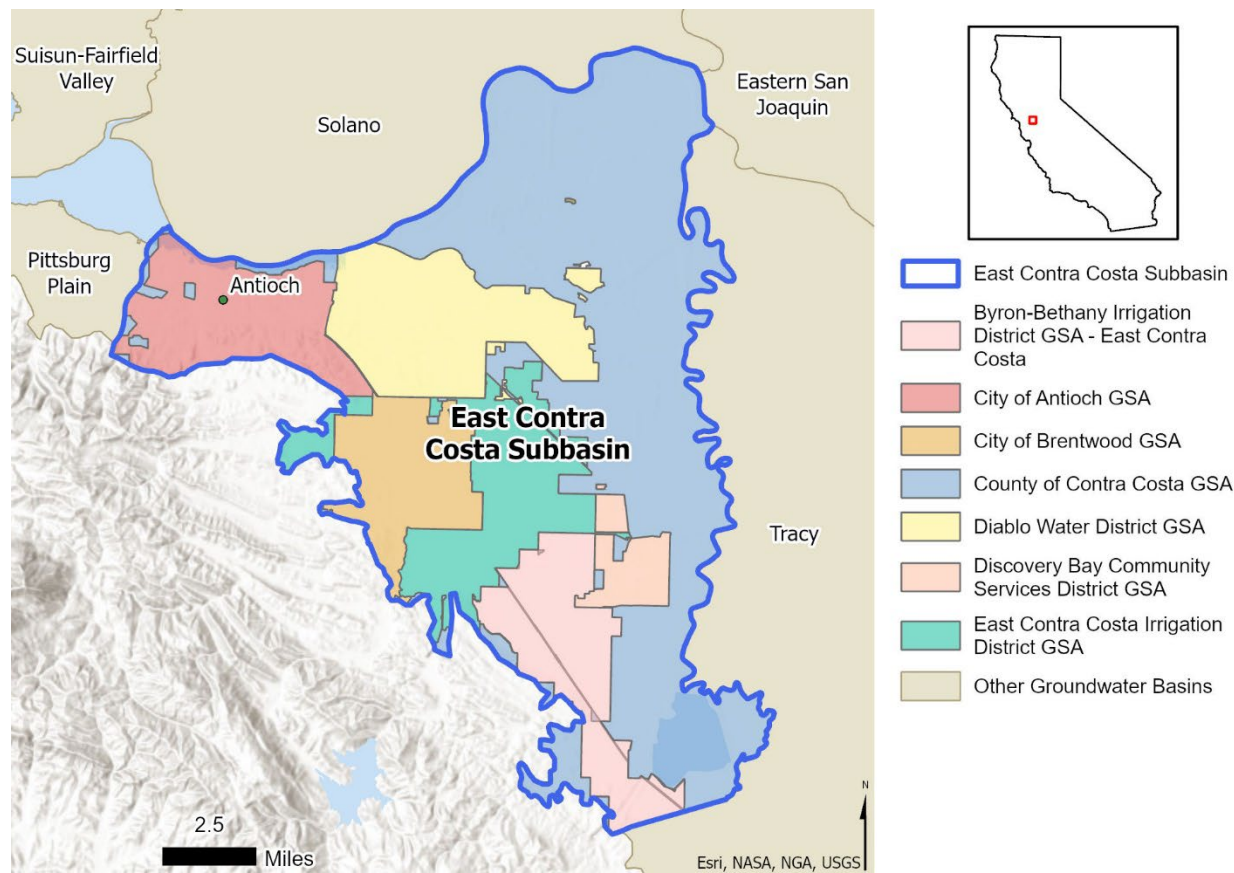


Figure 1: East Contra Costa Subbasin Location Map

Each of the seven GSAs (plus Contra Costa Water District) has its own organization and management structure. As a group, they meet monthly as a GSA Working Group to coordinate GSP development.⁴⁴ The GSAs individually provided their organization and person within the GSA responsible for the GSP implementation and representation on the GSP board. The GSP describes a Memorandum of Understanding (MOU) established between the agencies, which detailed how each agency would share the costs and management of the development of the GSP.⁴⁵ however, the MOU was terminated on 1/31/2022. The GSP does not further describe how various GSAs will coordinate during the implementation of the plan. Department staff encourage the GSAs to provide additional details on how the eight agencies intend to coordinate, their roles, and responsibilities during the implementation and ongoing activities during future periodic evaluation of the Plan.⁴⁶

The Plan’s discussion and presentation of administrative information covers the specific items listed in the GSP Regulations in an understandable format using appropriate data. Department staff are aware of no significant inconsistencies or contrary information

⁴⁴ East Contra Costa GSP, Section 1.2.3, p. 46.

⁴⁵ East Contra Costa GSP, Section 1.2.4.1, p. 48 and Appendix 1b, MOU, p. 428.

⁴⁶ 23 CCR § 354.6 (b) and § 354.6 (d).

presented in the Plan; however, the GSA should establish its process for interagency coordination while implementing the Plan as discussed above.

4.2 BASIN SETTING

GSP Regulations require information about the physical setting and characteristics of the basin and current conditions of the basin, including a hydrogeologic conceptual model; a description of historical and current groundwater conditions; and a water budget accounting for total annual volume of groundwater and surface water entering and leaving the basin, including historical, current, and projected water budget conditions.⁴⁷

4.2.1 Hydrogeologic Conceptual Model

The hydrogeologic conceptual model is a non-numerical model of the physical setting, characteristics, and processes that govern groundwater occurrence within a basin, and represents a local agency's understanding of the geology and hydrology of the basin that support the geologic assumptions used in developing mathematical models, such as those that allow for quantification of the water budget.⁴⁸ The GSP Regulations require a descriptive hydrogeologic conceptual model that includes a written description of geologic conditions, supported by cross sections and maps,⁴⁹ and includes a description of basin boundaries and the bottom of the basin,⁵⁰ principal aquifers and aquitards,⁵¹ and data gaps.⁵²

The Plan states that the Subbasin is located in the northwest corner of the San Joaquin Valley Groundwater Basin.⁵³ The Plan describes that the Subbasin was formed through periods of structural deformation and periods of marine and terrestrial deposition. The Plan also states that the primary freshwater-bearing units are Tertiary to Quaternary age non-marine deposits. Mesozoic to Tertiary age marine deposits underlie the non-marine deposits but are generally not a source of groundwater in the Subbasin due to their consolidated nature and the presence of saline water.⁵⁴

The Plan describes the lateral boundaries of the Subbasin as the Coast Range Diablo Mountains to the west, the San Joaquin River to the north, and the Old River to the east. In addition to being contiguous with the San Joaquin River and Old River, the Contra Costa County Line administrative boundary bounds the Subbasin to the south. The Plan

⁴⁷ 23 CCR § 354.12.

⁴⁸ DWR Best Management Practices for the Sustainable Management of Groundwater: Hydrogeologic Conceptual Model, December 2016: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/BMP-3-Hydrogeologic-Conceptual-Model_ay_19.pdf.

⁴⁹ 23 CCR §§ 354.14 (a), 354.14 (c).

⁵⁰ 23 CCR §§ 354.14 (b)(2-3).

⁵¹ 23 CCR § 354.14 (b)(4) *et seq.*

⁵² 23 CCR § 354.14 (b)(5).

⁵³ East Contra Costa GSP, Section 2.1.1, p. 54.

⁵⁴ East Contra Costa GSP, Section 3.2.1.3, p. 106.

states that the western Subbasin boundary along the Coast Ranges is considered a no-flow boundary with respect to groundwater flow.⁵⁵

The Plan states that two principal aquifers exist beneath the Subbasin, defined as the Shallow Zone and Deep Zone aquifers. The Shallow Zone aquifer is characterized as unconfined to semi-confined while the Deep Zone aquifer is semi-confined to confined.⁵⁶ Per the GSP, the primary groundwater-bearing units are Quaternary alluvium deposits that overlie Tertiary-Quaternary non-marine sediments.⁵⁷ The Shallow Zone's primary users include domestic wells and small community water systems and ranges in depth from ground surface to approximately 150 feet below ground surface.⁵⁸ The Deep Zone's primary users include municipal and aquicultural irrigation supply wells, and underlies the Shallow Zone and extends to the base of freshwater, up to 1200 feet below mean sea level.⁵⁹ The Plan indicates that there are no regionally extensive clay layers, such as the Corcoran Clay, present in the Subbasin; however, there are areas of the Subbasin where clay layers result in local confinement between the Shallow Zone and Deep Zone, particularly near Discovery Bay and Oakley.⁶⁰

Data gaps for lithology, water quality, and water level data relating to the hydrogeologic conceptual model were identified in areas with low well density, such as Antioch, Bethel Island, and areas west of the Clifton Court Forebay.⁶¹ The Plan states that the expansion of the monitoring network to these areas would benefit the development of the model.⁶² The Plan provides details describing steps that will be taken to address data gaps in the Monitoring Network section of the Plan.⁶³ In general, the Plan proposes to address these data gaps with the installation of nine new monitoring wells at four sites.

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

4.2.2 Groundwater Conditions

The GSP Regulations require a written description of historical and current groundwater conditions for each of the applicable sustainability indicators and groundwater dependent ecosystems that includes the following: groundwater elevation contour maps and

⁵⁵ East Contra Costa GSP, Section 3.2.1, p. 102 and Section 3.2.3, p. 108.

⁵⁶ East Contra Costa GSP, Section 3.2.5, p. 115.

⁵⁷ East Contra Costa GSP, Section 3.2.1.3, pp. 106-108.

⁵⁸ East Contra Costa GSP, Section 3.2.5, p. 115.

⁵⁹ East Contra Costa GSP, Section 3.2.5, p. 115.

⁶⁰ East Contra Costa GSP, Section 3.2.5, p. 115.

⁶¹ East Contra Costa GSP, Section 3.2.10, p. 127.

⁶² East Contra Costa GSP, Section 3.2.10, p. 127.

⁶³ East Contra Costa GSP, Section 6.2.2.5, p. 292.

hydrographs,⁶⁴ a graph depicting change in groundwater storage,⁶⁵ maps and cross-sections of the seawater intrusion front,⁶⁶ maps of groundwater contamination sites and plumes,⁶⁷ maps depicting total subsidence,⁶⁸ identification of interconnected surface water systems and an estimate of the quantity and timing of depletions of those systems,⁶⁹ and identification of groundwater dependent ecosystems.⁷⁰

The Plan provides 19 total hydrographs in the Groundwater Conditions section,⁷¹ with an additional 654 hydrographs provided in Appendix 3d,⁷² depicting current and historical groundwater level conditions from both the shallow and deep zone aquifers. Most hydrograph data is relatively recent, within the last 15 years, but a small subset of wells provides a longer period of record for water level monitoring extending as far back as the late 1950s. Long-term hydrographs show stable groundwater levels for both the shallow and deep principal aquifers subbasin-wide. Seasonal variations in groundwater level for the shallow aquifer are on the order of 1-3 feet, while seasonal variations for the deep aquifer range from 10-30 feet. Only one localized depression exists, in the southern portion of the shallow principal aquifer, showing a groundwater level decline of 5 feet over a 22-year period.⁷³ For the shallow principal aquifer, historical highs generally occur in the 1980s, while historical lows are found between 2009-2015. For the deep principal aquifer, historical highs typically occurred from 2016-2018 and historical lows occurred from 2012-2014.

The Plan estimates groundwater storage conditions utilizing two groundwater storage volumes: storage between the 2018 groundwater level contours and the base of the major production zone, and storage between the 2018 groundwater level contours and the base of freshwater within the Subbasin. The estimated storage to the base of the major production zone is between 1.5 million acre-feet (MAF) and 3.0 MAF, while the estimated storage to the base of freshwater is between 4.5 MAF and 9.0 MAF. The Plan states that the average change in storage between 1997 and 2018 is 70 acre-feet per year or 0.05% of the total groundwater inflows and outflows that comprise the groundwater budget.⁷⁴ The Plan states that groundwater storage has not changed between 1993 and 2019, however, data before 1997 is not included in the Plan.⁷⁵ The GSA should provide annual groundwater storage data demonstrating that groundwater storage has not changed from

⁶⁴ 23 CCR §§ 354.16 (a)(1-2).

⁶⁵ 23 CCR § 354.16 (b).

⁶⁶ 23 CCR § 354.16 (c).

⁶⁷ 23 CCR § 354.16 (d).

⁶⁸ 23 CCR § 354.16 (e).

⁶⁹ 23 CCR § 354.16 (f).

⁷⁰ 23 CCR § 354.16 (g).

⁷¹ East Contra Costa GSP, Figures 3-12a, 3-12b, pp. 131-132 and Figures 3-13a, 3-13b, pp. 134-135.

⁷² East Contra Costa GSP, Appendix 3d, pp. 617-782.

⁷³ East Contra Costa GSP, Section 3.3.1, p. 129.

⁷⁴ East Contra Costa GSP, Section 5.6.5, p. 239.

⁷⁵ East Contra Costa GSP, Section 3.3.3, p. 142.

1993 to 2019 and support the Plan's statements that extracted groundwater has historically not caused an undesirable result.

The Plan states that seawater intrusion in the Subbasin is not an issue at this time, as the Subbasin shares no borders with the Pacific Ocean, and chloride concentrations taken from monitoring wells within the Subbasin between 1957 and 2019 show no evidence of historic or existing seawater intrusion. Given the potential for future seawater intrusion from the migration of bay water into the Delta and the connected shallow zone aquifer, the Plan still considers seawater intrusion a relevant sustainability indicator for the Subbasin. Cross-sections outlining the areas of the Subbasin at risk of seawater intrusion are depicted in Figures 3-16a, 3-16b, and 3-16c, but maps and cross-sections displaying seawater intrusion conditions in the Subbasin were not provided due to limited data.⁷⁶ The lack of maps and cross-sections depicting chloride concentrations is a data gap that the Plan asserts will be updated through the installation of planned dedicated shallow zone monitoring wells, and chloride concentration contour maps are expected to be included in the initial annual report and each subsequent Periodic Evaluation.⁷⁷ Department staff encourage the GSA to include maps and cross-sections depicting chloride concentrations in Periodic Evaluations following the completion of the proposed actions intended to address seawater intrusion monitoring network data gaps.

The Plan includes a description of current and historical groundwater quality issues, along with the required maps, noted in both principal aquifers of the Subbasin, and has identified total dissolved solids (TDS), nitrate, chloride, arsenic, boron, and mercury as the water quality constituents of concern.⁷⁸ These constituents were identified as of concern because of their potential to influence sustainability in both principal aquifers as opposed to localized, site-specific contamination. The Plan states water quality data was compiled from several wells throughout the Subbasin from 1957 to 2019 while determining the constituents of concern. The Plan concludes that "... groundwater quality meets most water quality objectives and serves a variety of domestic and agricultural uses throughout the Subbasin."⁷⁹ The Plan notes that minor exceedances of salinity and nitrate within the Subbasin are attributed to naturally occurring or anthropogenic phenomena.⁸⁰

The GSP includes a description of current and historical land subsidence conditions in the Subbasin, with data ranging from 2005 to 2019.⁸¹ The Plan includes the extent, cumulative total, and annual rate of subsidence within the Subbasin.⁸²

⁷⁶ East Contra Costa GSP, Figures 3-16a 3-16b and 3-16c, pp. 144-145.

⁷⁷ East Contra Costa GSP, Section 3.3.4, p. 144.

⁷⁸ East Contra Costa GSP, Section 3.3.5, p. 147.

⁷⁹ East Contra Costa GSP, Section 3.3.5, p. 147.

⁸⁰ East Contra Costa GSP, Section 3.3.5, p. 156.

⁸¹ East Contra Costa GSP, Section 3.3.7, p. 162.

⁸² East Contra Costa GSP, Table 3-3, p. 162 and Figure 3-22, p. 162.

The Plan states the San Joaquin River and Old River are considered interconnected surface water and groundwater systems.⁸³ The Plan also indicates there are a few creeks in the western portion of the Subbasin that have the potential to be interconnected and specifically cites Marsh Creek. The Plan does not provide an estimate of the quantity and timing of the depletion of interconnected surface water occurring due to groundwater pumping because there is an incomplete understanding of the surface water-groundwater connection in the Subbasin. The Plan then states that despite the interconnection between surface water and groundwater along Old River and the San Joaquin River, surface water depletions have not occurred. The Plan does not contain any supporting information for the claim that surface water depletions have not occurred historically or currently along Old River and the San Joaquin River. Department staff encourage the GSA to update the plan with estimates of the quantity and timing of the depletion of interconnected surface water occurring due to groundwater pumping as more data becomes available.

The Plan includes a description of groundwater dependent ecosystems (GDEs) in the Subbasin, along with maps of GDEs, critical habitats, and Normalized Difference Vegetation Index (NDVI) values within the Subbasin. A total of 13,970 potential GDE acres were identified using the Natural Communities Commonly Associated with Groundwater (NCCAG) Dataset provided by the Department. Potential GDEs were further classified as either wetlands or vegetation, with a total of 11,985 acres and 4,304 acres, respectively. The Plan also includes specific details on vegetation species present in GDEs based on the NCCAG dataset.⁸⁴ Further analysis of GDEs was conducted by identifying where the depth to groundwater was greater than 30 feet, the average vegetation rooting depth. Any areas with a depth to water greater than 30 feet were thought to be eliminated as a potential GDE, however, as groundwater level monitoring is lacking in western areas of the subbasin, no potential GDE acreage was removed from the NCCAG dataset.⁸⁵ Lastly, the GDE Pulse dataset developed by The Nature Company was used to evaluate changes to GDE health throughout the Subbasin over time. Maps included in the Plan show NDVI values for vegetation in the Subbasin, which can then be classified as healthy or unhealthy.⁸⁶ The Plan does not state that additional studies, observations, or field-based data will be performed to confirm potential GDEs. Department staff encourage that field-based data should be collected to affirm the presence and characterization of groundwater dependent ecosystems.

The Plan sufficiently describes the historical and current groundwater conditions throughout the Subbasin, and the information included in the Plan substantially complies with the requirements outlined in the GSP Regulations.

⁸³ East Contra Costa GSP, Section 3.3.8, p. 166.

⁸⁴ East Contra Costa GSP, Table 3-4, p. 174.

⁸⁵ East Contra Costa GSP, Section 3.3.9, p. 168.

⁸⁶ East Contra Costa GSP, Figures 3-28a, 3-28b, 3-28c, 3-28d, 3-28e, pp. 177-181.

4.2.3 Water Budget

GSP Regulations require a water budget for the basin that provides an accounting and assessment of the total annual volume of groundwater and surface water entering and leaving the basin, including historical; current; and projected water budget conditions,⁸⁷ and the sustainable yield.⁸⁸

The Plan provides a historical water budget for the period of water years (WY) 1997 to 2018.⁸⁹ The Plan uses the East Contra Costa groundwater-surface water simulation model (ECCSim) for the historical water budget. ECCSim was refined from the Department's fine-grid version of the California Central Valley Groundwater-Surface Water Flow Model (C2VSim-FG Beta2) and calibrated to a diverse set of available historical data.⁹⁰ The historical water budget estimates 128,331 acre-feet per year of average annual inflows from the combination of surface water features, deep percolation, small watershed baseflow and percolation, and diversion recoverable losses.⁹¹ The Plan states that an average annual change in storage calculated from the inflows and outflows presented in Tables 5-6, 5-7, and 5-8 is a decrease of 1,457 acre-feet per year. Department staff note this average annual change in storage is different than the average annual change in storage in Table 5-6 (an increase of 66 acre-feet per year) and encourage the GSA to revise this inconsistency in the GSP.

The Plan provides a current water budget for water year 2015 and estimates 135,771 acre-feet inflows from the surrounding small watershed and recharge from the ground surface. The outflows are calculated to be 122,345 acre-feet. The 2015 change in storage is calculated as an increase of 13,411 acre-feet. The Plan provides the projected water budget for a 50-year period from water year 2019 through water year 2068. The base hydrology and water year types are repeated using existing base period model inputs from the historical period of 1964 to 2003.⁹² Six future scenarios are developed to estimate the projected water budget with various land use change, climate change, sea level rise adjustment following Department guidance or extreme climate change models. The dry climate change scenario, the least increase of groundwater storage of the six scenarios, was estimated to have 1,721 acre-feet per year more of groundwater storage compared to the historical water budget values.⁹³ The Plan estimates the overall projected Subbasin sustainable yield of 72,000 acre-feet per year.⁹⁴

Department staff conclude the historical, current, and projected water budgets included in the Plan substantially comply with the requirements outlined in the GSP Regulations. The GSP provides the required historical, current, and future accounting and assessment

⁸⁷ 23 CCR §§ 354.18 (a), 354.18 (c) *et seq.*

⁸⁸ 23 CCR § 354.18 (b)(7).

⁸⁹ East Contra Costa GSP, Section 5.1, p. 213.

⁹⁰ East Contra Costa GSP, Section 5.5.1, p. 217.

⁹¹ East Contra Costa GSP, Table 5-7, p. 235.

⁹² East Contra Costa GSP, Table 5-16, pp. 248-249.

⁹³ East Contra Costa GSP, Table 5-17, p. 257.

⁹⁴ East Contra Costa GSP, Section 5.9.1, p. 265.

of the total annual volume of groundwater and surface water entering and leaving the Subbasin including an estimate of the sustainable yield of the Subbasin and projected future water demands.

4.2.4 Management Areas

The GSP Regulations provide the option for one or more management areas to be defined within a basin if the GSA has determined that the creation of the management areas will facilitate implementation of the Plan. Management areas may define different minimum thresholds and be operated to different measurable objectives, provided that undesirable results are defined consistently throughout the basin.⁹⁵

There are no management areas proposed within the Plan area.

4.3 SUSTAINABLE MANAGEMENT CRITERIA

GSP Regulations require each Plan to include a sustainability goal for the basin and to characterize and establish undesirable results, minimum thresholds, and measurable objectives for each applicable sustainability indicator, as appropriate. The GSP Regulations require each Plan to define conditions that constitute sustainable groundwater management for the basin including the process by which the GSA characterizes undesirable results and establishes minimum thresholds and measurable objectives for each applicable sustainability indicator.⁹⁶

4.3.1 Sustainability Goal

GSP Regulations require that GSAs establish a sustainability goal for the basin. The sustainability goal should be based on information provided in the GSP's basin setting and should include an explanation of how the sustainability goal is likely to be achieved within 20 years of Plan implementation.⁹⁷

The Plan describes the sustainability goal as to “protect and maintain safe and reliable sources of groundwater for all beneficial uses and users; ensure current and future groundwater demands account for changing groundwater conditions due to climate change; establish and protect sustainable yield for the Subbasin by achieving measurable objectives set forth in this Plan in accordance with implementation and planning periods; and avoid undesirable results defined under Sustainable Groundwater Management Act.”⁹⁸

The Plan describes an approach to achieve the sustainability goal through collaboration with other water supply entities, implementation of various projects and management actions to strengthen overall water supply reliability within the region that directly and indirectly affect groundwater sustainability. The projects include a municipal desalination

⁹⁵ 23 CCR § 354.20.

⁹⁶ 23 CCR § 354.22 *et seq.*

⁹⁷ 23 CCR § 354.24.

⁹⁸ East Contra Costa GSP, Section 7.2.1, p. 317.

project, additional water and sewer facility installations, water distribution systems, recycled and alternative water supplies, and dry-year water sales.⁹⁹ Management actions include well spacing control, over of well construction, enhanced monitoring protocols, and pumping limits and fees to avoid undesirable results.¹⁰⁰ The Plan states that available data and model projections documented in the Basin Setting section of the Plan indicate that historic and current groundwater conditions are generally acceptable and do not indicate that undesirable results will occur during the 20-year Plan implementation period.¹⁰¹

In describing the measures to achieve the Subbasin's sustainability goal, the GSA intends to implement project and management actions described above to ensure that the Subbasin will continue to be managed sustainably during the planning and implementation horizon.¹⁰² The Plan references the section of the Plan that explains the projects and management actions in more detail and the stages of Plan implementation (i.e., Section 8 of the Plan) to the achievement of the sustainability goal.

4.3.2 Sustainability Indicators

Sustainability indicators are defined as any of the effects caused by groundwater conditions occurring throughout the basin that, when significant and unreasonable, cause undesirable results.¹⁰³ Sustainability indicators thus correspond with the six undesirable results – chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon, significant and unreasonable reduction of groundwater storage, significant and unreasonable seawater intrusion, significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies, land subsidence that substantially interferes with surface land uses, and depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water¹⁰⁴ – but refer to groundwater conditions that are not, in and of themselves, significant and unreasonable. Rather, sustainability indicators refer to the effects caused by changing groundwater conditions that are monitored, and for which criteria in the form of minimum thresholds are established by the agency to define when the effect becomes significant and unreasonable, producing an undesirable result.

GSP Regulations require that GSAs provide descriptions of undesirable results including defining what are significant and unreasonable potential effects to beneficial uses and users for each sustainability indicator.¹⁰⁵ GSP Regulations also require GSPs to provide the criteria used to define when and where the effects of the groundwater conditions cause undesirable results for each applicable sustainability indicator. The criteria shall be

⁹⁹ East Contra Costa GSP, Section 7.2.4.1, p. 319.

¹⁰⁰ East Contra Costa GSP, Section 7.2.4.2, p. 319.

¹⁰¹ East Contra Costa GSP, Section 7.2.4, pp. 318-319.

¹⁰² East Contra Costa GSP, Section 7.2.3, p. 318.

¹⁰³ 23 CCR § 351(ah).

¹⁰⁴ Water Code § 10721(x).

¹⁰⁵ 23 CCR §§ 354.26 (a), 354.26 (b)(c).

based on a quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the basin.¹⁰⁶

GSP Regulations require that the description of minimum thresholds include the information and criteria relied upon to establish and justify the minimum threshold for each sustainability indicator.¹⁰⁷ GSAs are required to describe how conditions at minimum thresholds may affect beneficial uses and users,¹⁰⁸ and the relationship between the minimum thresholds for each sustainability indicator, including an explanation for how the GSA has determined conditions at each minimum threshold will avoid causing undesirable results for other sustainability indicators.¹⁰⁹

GSP Regulations require that GSPs include a description of the criteria used to select measurable objectives, including interim milestones, to achieve the sustainability goal within 20 years.¹¹⁰ GSP Regulations also require that the measurable objectives be established based on the same metrics and monitoring sites as those used to define minimum thresholds.¹¹¹

The following subsections thus consolidate three facets of sustainable management criteria: undesirable results, minimum thresholds, and measurable objectives. Information, as presented in the Plan, pertaining to the processes and criteria relied upon to define undesirable results applicable to the Subbasin, as quantified through the establishment of minimum thresholds, are addressed for each applicable sustainability indicator. A submitting agency is not required to establish criteria for undesirable results that the agency can demonstrate are not present and are not likely to occur in a basin.¹¹²

4.3.2.1 *Chronic Lowering of Groundwater Levels*

In addition to components identified in 23 CCR §§ 354.28 (a-b), for the chronic lowering of groundwater, the GSP Regulations require the minimum threshold for chronic lowering of groundwater levels to be the groundwater elevation indicating a depletion of supply at a given location that may lead to undesirable results that is supported by information about groundwater elevation conditions and potential effects on other sustainability indicators.¹¹³

The sustainable management criteria for the chronic lowering of groundwater were developed around the goal of maintaining groundwater levels above historical lows while also accounting for future droughts and climate variability.¹¹⁴ The Plan describes the significant and unreasonable chronic lowering of groundwater levels as the following:

¹⁰⁶ 23 CCR § 354.26 (b)(2).

¹⁰⁷ 23 CCR § 354.28 (b)(1).

¹⁰⁸ 23 CCR § 354.28 (b)(4).

¹⁰⁹ 23 CCR § 354.28 (b)(2).

¹¹⁰ 23 CCR § 354.30 (a).

¹¹¹ 23 CCR § 354.30 (b).

¹¹² 23 CCR § 354.26 (d).

¹¹³ 23 CCR § 354.28(c)(1) *et seq.*

¹¹⁴ East Contra Costa GSP, Section 7.3.1.2, p. 320.

“unreasonable reduction or loss of water well capacity that cannot be mitigated; adverse economic impacts and burdens on local agricultural and commercial users; adverse economic impacts to existing well owners resulting the need to lower a well pump, replace a pump, and/or deepen or replace a well; loss of water source due to drop in groundwater levels; cause sustained water level impacts on neighboring wells; lack of prioritization of health and human safety over users such as landscape irrigation; and interference with other sustainability indicators.”¹¹⁵

The Plan states that an undesirable result would occur when groundwater levels in any representative monitoring site in either the shallow or deep aquifer zone exceed their respective minimum threshold over three consecutive years, indicative of a declining trend, and do not recover during normal to wet years.¹¹⁶ In setting the minimum thresholds, the Plan indicates up to 10% of the domestic wells could experience a drop below the top perforations in the wells in the vicinity of one or more representative monitoring wells.¹¹⁷ Department staff note while the exceedance of a minimum threshold does not necessarily cause a well to go dry in the first year, the continued decline below the minimum threshold at the representative monitoring wells over the required three dry years could result in dry wells. Additionally, the Plan does not indicate which measurements (fall, spring, both) would be used to indicate minimum threshold exceedance and ultimately the trend. Department staff recommend the GSA include additional discussion in the Plan on the impacts that could occur during the three years the Plan requires to determine a potential undesirable result.

The Plan describes the potential effects of undesirable results for chronic lowering of groundwater levels in the shallow aquifer zone as limiting groundwater availability to domestic well users and groundwater dependent ecosystems. Shallow zone undesirable results have the potential to impact property values, quality of life, and environment in the Subbasin. Potential effects of undesirable results for chronic lowering of groundwater levels in the deep aquifer zone are described as limiting groundwater supply reliability for large systems serving municipalities and increasing costs for consumers through the Subbasin.¹¹⁸

The Plan defines minimum thresholds for the chronic lowering of groundwater levels at three shallow zones and three deep zone representative monitoring sites. The Plan states that sustainability indicators will be established for additional representative monitoring sites (four in the shallow zone and two in the deep zone) once they are installed.¹¹⁹ Two shallow zone and two deep zone representative monitoring sites were installed in August 2021 and interim sustainability indicators were assigned to these locations. The Plan states that once additional data is available, the sustainability indicators for these

¹¹⁵ East Contra Costa GSP, Section 7.3.1.2, pp. 320-321.

¹¹⁶ East Contra Costa GSP, Section 7.3.1.5, p. 322.

¹¹⁷ East Contra Costa GSP, Section 7.3.1.6, p. 324.

¹¹⁸ East Contra Costa GSP, Section 7.3.1.4, p. 321.

¹¹⁹ East Contra Costa GSP, Section 7.3.1.5, Table 7-2, p. 323.

locations will be modified accordingly. The Plan explains the methodology to establish the minimum thresholds included evaluation of historical groundwater elevation data, depths and locations of existing wells, maps of current and historical groundwater elevation data, results from modeling future conditions, and input from stakeholders. The Plan further explains that the minimum thresholds set at each representative monitoring site are based on the evaluation of three criteria:

1. Identifying when each representative monitoring site's groundwater level would exceed the Subbasin's sustainable yield
2. When groundwater level declines do not exceed the sustainable yield, but otherwise cause undesirable results
3. For domestic wells, a minimum threshold which indicates that the 10th percentile of this category experiences a drop below the top perforations within the section where the RMS is located. This is considered protective of the water supply sustainability because it considers the most sensitive conditions of well operations.¹²⁰

The final established minimum threshold value for each representative monitoring site was based on modeling results and the minimum threshold value for each existing representative monitoring site is the lowest historical groundwater levels plus an additional 10 feet.¹²¹

The Plan states that the minimum thresholds protect beneficial uses and users based on the users' well depths compared to the minimum threshold groundwater levels. The Plan states that minimum thresholds were compared to potential domestic well depths within the Subbasin. The Plan estimates that if groundwater levels in all potential domestic wells reached minimum thresholds that less than 5 percent of domestic wells in the Subbasin would potentially go dry (i.e., the well will experience less than 10 feet of saturated screen).¹²² Department staff believe that further assessment of the selected minimum thresholds on domestic wells should be conducted when more data becomes available to ensure any potential impacts to beneficial uses and users are adequately discussed in the Plan. Staff recommend the GSAs consider potential impacts to supply wells, including domestic wells, at the selected minimum threshold for chronic lowering of groundwater levels. The GSA should consider the degree/extent of potential impacts including the percentage, number, and location of potentially impacted wells at the proposed minimum thresholds for chronic lowering of groundwater levels (see [Recommended Corrective Action 1](#)).

The Plan acknowledges that a data gap exists regarding minimum threshold impacts to environmental users of groundwater, such as GDEs. The GSP defines measurable objectives for the representative monitoring sites with historical groundwater elevations

¹²⁰ East Contra Costa GSP, Section 7.3.1.6, p. 324.

¹²¹ East Contra Costa GSP, Section 7.3.1.5, p. 322.

¹²² East Contra Costa GSP, Section 7.3.1.9, p. 327.

as the average spring groundwater elevations. The representative monitoring sites with water declines attributed to drought were excluded as outliers due to questionable field measurements. Staff considers the approach of excluding the water levels attributed to droughts from the average spring calculation as reasonable, however, referring to the drought measurements as questionable measurements causes confusion since measurements during droughts are not listed as questionable measurements in the monitoring protocols and questionable measurement codes used when providing data to the Department.¹²³ Additionally, Department staff recommend the GSA provide additional information and rationale for why “Questionable Data”¹²⁴ was not evaluated when establishing sustainable management criteria for chronic lowering of groundwater levels.

The measurable objectives for the additional representative monitoring sites will be set at the water levels measured at the time the well was drilled.¹²⁵ The GSP states that the interim milestones are based on recent and historical groundwater levels and are equivalent to the measurable objectives.¹²⁶

Department staff conclude that the sustainable management criteria for groundwater levels is commensurate with the understanding of current conditions, responsive to interested party feedback, and reasonably protective of the groundwater uses and users in the Subbasin. The approach to maintain stable groundwater level conditions in wells by preventing loss of water sources due to a drop in groundwater levels is a reasonable approach that will help avoid a significant and unreasonable depletion of supply in the Subbasin. The Plan provides a sufficient assessment of the impacts the minimum thresholds would have on domestic wells by evaluating the 10th percentile of wells that would drop below the top perforations at individual representative monitoring sites to establish the minimum thresholds. However, as highlighted in the recommended corrective actions above, the Plan should include additional supporting technical details that provides further description as to how the minimum thresholds will help the GSA achieve its sustainability goal and avoid undesirable results as identified in the recommended corrective actions.

4.3.2.2 Reduction of Groundwater Storage

In addition to components identified in 23 CCR §§ 354.28 (a-b), for the reduction of groundwater storage, the GSP Regulations require the minimum threshold for the reduction of groundwater storage to be a total volume of groundwater that can be withdrawn from the basin without causing conditions that may lead to undesirable results. Minimum thresholds for reduction of groundwater storage shall be supported by the

¹²³ East Contra Costa GSP, Appendix 6a, Section 1.1.1, p. 1110.

¹²⁴ East Contra Costa GSP, Figure 7-4, p. 329.

¹²⁵ East Contra Costa GSP, Section 7.3.1.12, p. 328.

¹²⁶ East Contra Costa GSP, Section 7.3.1.12, p. 328.

sustainable yield of the basin, calculated based on historical trends, water year type, and projected water use in the basin.¹²⁷

The Plan describes a significant and unreasonable reduction of groundwater storage as conditions that would result in: reduction in groundwater storage that restricts the quantity of supply to satisfy existing beneficial use or harms an existing category of groundwater user; any long-term reduction in available drawdown for pump operating margins that adversely affects available capacity or supply; degraded water quality as a result of changed groundwater flow conditions; or interference with other sustainability indicators.¹²⁸

The Plan proposes to utilize groundwater level representative monitoring sites as a proxy for groundwater storage sustainable management criteria.¹²⁹ The Plan justifies the use of this proxy because “modeling indicates that undesirable results are not anticipated to occur during the planning and implementation horizon” and “Stable groundwater levels from 1993 to 2019 indicate that historical pumping in the Subbasin has not depleted useable storage.”¹³⁰

The Plan states that an undesirable result for the reduction of groundwater storage will occur if in any of the representative monitoring sites in either the shallow aquifer zone or deep aquifer zone exceed their specific minimum threshold over three consecutive years, indicative of a declining trend, and do not recover during normal to wet years.¹³¹ Similar to the undesirable results definition for the chronic lowering of groundwater levels sustainability indicator, the Plan should provide additional discussion fully evaluating the impacts that could occur when groundwater storage minimum thresholds are exceeded during the three years required to achieve an undesirable result.

The Plan explains that the effects of the reduction of storage minimum thresholds on beneficial uses and users are equivalent to the potential effects caused by the chronic lowering of groundwater levels, as described above.

The measurable objective for the change in storage sustainability indicator was defined using groundwater levels as a proxy.¹³² Thus, the change in storage measurable objective is equivalent to the chronic lowering of the groundwater level’s measurable objective. While groundwater levels are used as a proxy instead of using the total volume of groundwater extracted, as required by SGMA regulations, the measurable objectives will require that groundwater levels either increase or are maintained at their current levels.

¹²⁷ 23 CCR § 354.28(c)(2).

¹²⁸ East Contra Costa GSP, Section 7.3.2.2, p. 330.

¹²⁹ East Contra Costa GSP, Section 7.3.2.5, p. 331.

¹³⁰ East Contra Costa GSP, Section 7.3.2.1, p. 330.

¹³¹ East Contra Costa GSP, Section 7.3.1.5, p. 322.

¹³² East Contra Costa GSP, Section 7.3.2.6, p. 331.

Based on review of the materials referenced in the Plan, Department staff note that the Plan's discussion and presentation of information on measurable objectives covers the specific items listed in the regulations in an understandable format using appropriate data.

4.3.2.3 *Seawater Intrusion*

In addition to components identified in 23 CCR §§ 354.28 (a-b), for seawater intrusion, the GSP Regulations require the minimum threshold for seawater intrusion to be defined by a chloride concentration isocontour for each principal aquifer where seawater intrusion may lead to undesirable results.¹³³

The Plan states that there is no historical evidence of seawater intrusion within the Subbasin. However, the Subbasin potential seawater intrusion may occur as a result of sea-level rise, unsustainable levels of groundwater extraction, or changes in Bay-Delta water quality and flow requirements by the State Water Board.¹³⁴ The Plan considers any inland saline bay water migration that adversely reduces groundwater availability through degraded water quality as an undesirable condition. The Plan states that an undesirable result would occur if "... a bayside monitoring well has a chloride concentration above 250 mg/L over three consecutive years and is causally related to groundwater sustainable management in the Subbasin."¹³⁵ The GSA states that periodic evaluations used the Subbasin's groundwater flow model will be used to assess the potential causes and onset of undesirable results for this sustainability indicator. Based on the contents of the Plan, Department staff conclude the Plan adequately describes the potential causes of seawater intrusion undesirable results, and the possible effects on beneficial uses and users.

The Plan establishes the minimum threshold for seawater intrusion at the 250 mg/L chloride isocontour for representative monitoring sites located adjacent to the Bay-Delta.¹³⁶ The minimum threshold intends to be protective of beneficial uses and users. The Plan describes the methodology used to develop the 250 mg/L isocontour and relates the minimum threshold to other sustainability indicators and beneficial uses and users. The Plan also states that understanding the potential impacts resulting from climate change (i.e., sea level rise) will be incorporated into filling data gaps associated with seawater intrusion.

The measurable objective and interim milestones for seawater intrusion are defined as the average chloride concentrations observed from 2013 to 2017. The interim milestones are described as stable conditions being that the measurable objective is set at the current chloride isocontour.¹³⁷ The Plan states that six additional monitoring wells will be added

¹³³ 23 CCR § 354.28(c)(3).

¹³⁴ East Contra Costa GSP, Section 7.3.3, p. 331.

¹³⁵ East Contra Costa GSP, Section 7.3.3.2, p. 332.

¹³⁶ East Contra Costa GSP, Section 7.3.3.5, p. 333.

¹³⁷ East Contra Costa GSP, Section 7.3.3.12, p. 335.

to the proposed monitoring network and will have measurable objectives and interim milestones set at the concentrations of the initial monitoring results.

Based on review of the GSP's discussion of the establish sustainable management criteria, Department staff find that the GSP's discussion and presentation of information on seawater intrusion covers the specific items listed in the regulations in an understandable format using appropriate data. As appropriate, Department staff encourage the GSA to refine their measurable objectives in future updates to the Plan as new data and information are acquired.

4.3.2.4 *Degraded Water Quality*

In addition to components identified in 23 CCR §§ 354.28 (a-b), for degraded water quality, the GSP Regulations require the minimum threshold for degraded water quality to be the degradation of water quality, including the migration of contaminant plumes that impair water supplies or other indicator of water quality as determined by the Agency that may lead to undesirable results. The minimum threshold shall be based on the number of supply wells, a volume of water, or a location of an isocontour that exceeds concentrations of constituents determined by the Agency to be of concern for the basin. In setting minimum thresholds for degraded water quality, the Agency shall consider local, state, and federal water quality standards applicable to the basin.¹³⁸

The Plan states that significant and unreasonable conditions for degraded water quality would occur in the event of the following:

- Increases in concentrations of key groundwater quality constituents above drinking water maximum contaminant limits (MCLs) that reduce groundwater availability for domestic, agricultural, municipal, or environmental beneficial uses.
- Changes in water quality that cause economic burdens placed on users to treat or replace sources of groundwater supply including but not limited to increased treatment costs to mitigate elevated mineral content such as hardness.
- Adverse impacts to agricultural crop production, yield, and/or quality.
- Migration of contaminants to domestic or agricultural sources of supply, including but not limited to unregulated discharges of hazardous substances, and from oil and gas wells.
- Movement or increases in currently unregulated chemical constituents that adversely impact¹³⁹

The Plan explains that an undesirable result for degraded water quality occurs when a single minimum threshold is exceeded during the implementation of the Plan as a result of groundwater management activities.¹⁴⁰ The Plan outlines potential causes of undesirable results, including: changes in the locations and rates of groundwater

¹³⁸ 23 CCR § 354.28(c)(4).

¹³⁹ East Contra Costa GSP, Section 7.3.4.1, p. 336.

¹⁴⁰ East Contra Costa GSP, Section 7.3.4.2, p. 336.

extraction implemented under the Plan; active recharge or captured runoff dynamics; recharge of groundwater with elevated constituent of concern concentrations; and the exceedance of an undesirable result for other sustainability indicators may lead to an undesirable result for degraded water quality.¹⁴¹

The Plan discusses the effects of undesirable results related to degraded water quality on beneficial uses and users. Degraded water quality would diminish drinking water supply due to the exceedance of drinking water standards and impact domestic well users, irrigation well users, and public water supply users.

The Plan establishes minimum thresholds based on any representative monitoring site exceeding the water quality standard for the applicable constituents of concern. The constituent of concern data will be compared against the MCL for nitrate, arsenic, boron, and mercury and the secondary maximum contaminant level (SMCL) for total dissolved solids and chloride, which are the quantitative minimum thresholds for each monitoring site.¹⁴² The Plan proposes six additional representative monitoring sites, four in the shallow zone and two in the deep zone. However, these monitoring locations are not clearly discussed in Section 6 Monitoring Network in the Plan. Tables 6-8 and 7-4 appear to refer to the same monitoring well names; however, these appear to be mislabeled. If these wells are intended to be unique, Table 6-8 should be updated with the representative monitoring sites presented in Table 7-4. If these wells are the same, Table 6-8 or Table 7-4 be updated to reflect the correct well names.

The Plan also explains the minimum thresholds' relationship with the other sustainability indicators, the possible effects on neighboring basins, and the effects on each beneficial use and user in the Subbasin. The Plan states that the minimum thresholds for degraded water quality will not negatively impact neighboring basins due to the interpreted groundwater flow direction away from or lack of hydraulic connection between the Subbasin and neighboring basins.¹⁴³ The Plan discusses the effect of the minimum thresholds on beneficial uses and users, including agricultural land, urban land, domestic land, and ecological land uses and users.

The Plan states that the measurable objectives for the degraded water quality sustainability indicator are based on maintaining current water quality within the Subbasin. The measurable objectives are the average concentrations observed between 2014 to 2017 for each representative monitoring site.¹⁴⁴ The Plan states that interim milestones for degraded water quality are identical to measurable objectives being that the measurable objectives are set at recent conditions.¹⁴⁵ The measurable objectives and interim milestones for the six additional monitoring sites will be established at the

¹⁴¹ East Contra Costa GSP, Section 7.3.4.3, p. 337.

¹⁴² East Contra Costa GSP, Section 7.3.4.7, Table 7-3, p. 338.

¹⁴³ East Contra Costa GSP, Section 7.3.4.9, p. 339.

¹⁴⁴ East Contra Costa GSP, Section 7.3.4.13, p. 340.

¹⁴⁵ East Contra Costa GSP, Section 7.3.4.13, p. 340.

concentrations from the initial monitoring event. Based on the Plan, it appears that the average constituent of concern concentration (i.e., measurable objective/interim milestone) may exceed the minimum threshold in the additional monitoring sites as observed at well BG-1 for nitrate. Department staff note a measurable objective is supposed to be indicative of a basin achieving sustainability while a minimum threshold indicates the potential for the occurrence of an undesirable result. A measurable objective exceeding the minimum threshold and existing regulatory standards conflicts with the intent of SGMA and the sustainable management criteria for degraded water quality. Department staff recommend the GSA reevaluate the measurable objective for BG-1 to align with the existing regulatory standards (see [Recommended Corrective Action 2](#)).¹⁴⁶

Based on the review of the Plan's discussion of the establish sustainable management criteria, Department staff find that the Plan's discussion and presentation of information on degradation of water quality requires additional evaluations and revisions in order for the Subbasin to achieve sustainability.

4.3.2.5 Land Subsidence

In addition to components identified in 23 CCR §§ 354.28 (a-b), the GSP Regulations require the minimum threshold for land subsidence to be the rate and extent of subsidence that substantially interferes with surface land uses and may lead to undesirable results.¹⁴⁷ Minimum thresholds for land subsidence shall be supported by identification of land uses and property interests that have been affected or are likely to be affected by land subsidence in the basin, including an explanation of how the Agency has determined and considered those uses and interests, and the Agency's rationale for establishing minimum thresholds in light of those effects and maps and graphs showing the extent and rate of land subsidence in the basin that defines the minimum thresholds and measurable objectives.¹⁴⁸

The Plan states that there is no historic evidence of inelastic land surface subsidence due to groundwater extraction within the Subbasin, in part or wholly due to the lack of geologic formations susceptible to subsidence mechanisms. The Plan defines significant and unreasonable subsidence as any unreasonable impacts to roads and structures, water conveyances, and flood control facilities caused by groundwater pumping.¹⁴⁹

The Plan states that a land subsidence undesirable result will occur if the minimum threshold is exceeded for three consecutive years and is associated with verified groundwater extraction.¹⁵⁰

The Plan states that the GSA will use historical subsidence measurements from the P256 UNAVCO station, groundwater modeling results for future groundwater elevations, and

¹⁴⁶ East Contra Costa GSP, Table 7-4, p. 341.

¹⁴⁷ 23 CCR § 354.28(c)(5).

¹⁴⁸ 23 CCR §§ 354.28(c)(5)(A-B).

¹⁴⁹ East Contra Costa GSP, Section 7.3.5.2, p. 342.

¹⁵⁰ East Contra Costa GSP, Section 7.3.5.6, p. 343.

InSAR data to determine whether total subsidence is correlated to groundwater level declines caused by extraction.¹⁵¹

The Plan establishes the minimum threshold for inelastic land subsidence at 1 inch per year, not including the historical elastic range (approximately 0.8 inches) over a three-year period as exhibited at the UNAVCO site P256.¹⁵²

The Plan states that the land subsidence minimum threshold has no impact on the other sustainability indicators. The Plan also states that the land subsidence minimum threshold is designed to prevent any inelastic subsidence and will not impact neighboring basins. Additionally, the Plan describes that the land subsidence minimum threshold is designed to avoid negative impacts on infrastructure within the Subbasin, including infrastructure utilized by beneficial uses and users.¹⁵³

The Plan defines the measurable objectives and interim milestones for land subsidence in the Subbasin as the seasonal elastic range of observed land deformation from UNAVCO site P256, which is set at 0.6 vertical inches.¹⁵⁴ The Plan states that any deviations from the measurable objectives over three or more years may indicate the occurrence of inelastic subsidence.

Department staff conclude that the Plan adequately describes the sustainable management criteria and approach to managing land subsidence as required by the GSP Regulations. It appears the Agency uses the best information and science available at the time of Plan development to develop the criteria.

4.3.2.6 Depletions of Interconnected Surface Water

SGMA defines undesirable results for the depletion of interconnected surface water as those that have significant and unreasonable adverse impacts on beneficial uses of surface water and are caused by groundwater conditions occurring throughout the basin.¹⁵⁵ The GSP Regulations require that a Plan identify the presence of interconnected surface water systems in the basin and estimate the quantity and timing of depletions of those systems.¹⁵⁶ The GSP Regulations further require that minimum thresholds be set based on the rate or volume of surface water depletions caused by groundwater use, supported by information including the location, quantity, and timing of depletions, that adversely impact beneficial uses of the surface water and may lead to undesirable results.¹⁵⁷

¹⁵¹ East Contra Costa GSP, Section 7.3.5.6, p. 343.

¹⁵² East Contra Costa GSP, Section 7.3.5.5, p. 343.

¹⁵³ East Contra Costa GSP, Section 7.3.5.9, p. 344.

¹⁵⁴ East Contra Costa GSP, Section 7.3.5.12, p. 345.

¹⁵⁵ Water Code § 10721(x)(6).

¹⁵⁶ 23 CCR § 354.16 (f).

¹⁵⁷ 23 CCR § 354.28 (c)(6).

The Plan acknowledges the presence of interconnected surface waters in the Subbasin including the Old River, San Joaquin River, and portion of the western creeks.¹⁵⁸ The GSA utilizes a comparison of the depth to water in shallow wells measured in 2018 to a digital elevation model to identify areas of interconnectivity in the Subbasin.¹⁵⁹ The Plan includes a map of the likely interconnected surface water bodies within the Subbasin.¹⁶⁰ However, the GSP states the hydraulic connections between groundwater and surface water at these interconnected surface water bodies have not been definitively characterized and that there is an incomplete understanding of the surface water and groundwater connection.¹⁶¹ The Plan states that through the Bay-Delta Plan, the State Water Board is responsible for water quality and flow regulations at the San Joaquin River and Old River as water supply concerns for this area. Thus, the surface water interconnections in this area are not controlled locally or by the GSA.¹⁶² The Plan explains that the historical record provides limited information correlating interconnected surface water depletions occurring in the Subbasin with groundwater levels, and therefore, the direct linkage between depletions and groundwater use under the jurisdiction of the GSA is not well known. The GSA acknowledges uncertainties and data gaps in the assessment of the presence of interconnected surface waters and states that the assessment will be reevaluated upon additional data and information collection and present a plan to address them.¹⁶³ Based on the information presented within the Plan, Department staff believe the GSAs have reasonably identified the location of interconnected surface waters in the Subbasin.

At this time, the GSP does not quantify the rate or volume of surface water depletions due to groundwater pumping as the sustainable management criteria as required by the GSP Regulations.¹⁶⁴ Instead, the Plan establishes initial sustainable management criteria based on the ECCSim model. The model was used as a comparative tool to evaluate whether groundwater pumping within the Subbasin would cause undesirable results related to surface water depletion. The GSP sets an interim minimum threshold for the depletion of interconnected surface water as a value corresponding to a 42 percent reduction in surface water which equates to a basin-wide pumping volume of 66,000 acre-feet per year.¹⁶⁵ Department staff note the proposed methodology utilized by the GSA does not quantify the rate or volume of surface water depletions due to groundwater pumping as required by the GSP Regulations.

The Plan describes an unreasonable condition for the depletion of interconnected surface water as “Depletions that result in reductions in flow or stage of major rivers and streams that are hydrologically connected to groundwater in the Subbasin, and which cause

¹⁵⁸ East Contra Costa GSP, Section 3.3.8, pp. 167-168.

¹⁵⁹ East Contra Costa GSP, Section 3.3.8, p. 168.

¹⁶⁰ East Contra Costa, GSP, Figure 3-25b, p. 170.

¹⁶¹ East Contra Costa GSP, Section 3.3.8, Section 7.3.6, pp. 168, 345.

¹⁶² East Contra Costa GSP, Section 7.3.6, p. 345.

¹⁶³ East Contra Costa GSP, Section 3.3.8, p. 166.

¹⁶⁴ 23 CCR § 354.28 (c)(6).

¹⁶⁵ East Contra Costa GSP, Section 7.3.6.2, p. 347.

significant and unreasonable impacts on beneficial uses and users of surface water and the environment.”¹⁶⁶ The Plan states that there is no evidence of historic or present significant or unreasonable interconnected surface water depletions within the Subbasin. The GSP states potential causes of depletion of interconnected surface water include the following¹⁶⁷:

- New large-scale pumping or diversions from shallow wells.
- New localized pumping from Deep Zone wells in locations that are vertically connected to the Shallow Zone and surface water.
- Interception or reduction of natural patterns of groundwater discharge to surface water.

The Plan establishes the minimum threshold for the depletion of interconnected surface water using a modeling approach. The Plan utilizes the rate and volume of flow in and out of surface water that was quantified through budget modeling scenarios. The model simulated a “Base Period” of average groundwater inflow of 18,560 acre-feet per year from all surface water features from 1997 to 2018. The model simulated multiple scenarios where surface water deliveries were reduced and were able to correlate these reductions to increased groundwater extractions to meet various demands. The GSP states that the results of the modeling estimated that there were no significant changes in water budget components that might induce undesirable results if 50 percent of surface water deliveries were reduced. The model estimated that approximately 135 percent of surface water reductions would need to take place for an undesirable result to occur, which is approximately double the historical average that has occurred within the Subbasin.¹⁶⁸

The Plan establishes the minimum threshold for the depletion of interconnected surface water at a value corresponding to a 42 percent groundwater extraction increase from the Base Period. This value corresponds to 66,000 acre-feet per year of surface water depletions from groundwater extraction. The Plan states that the minimum threshold will be evaluated for greater precision and accuracy by using shallow zone groundwater elevations as a proxy, which would be complemented by the stream stage monitoring network discussed in Section 6.¹⁶⁹

The measurable objectives for the depletion of interconnected surface water were established to represent achievable target groundwater elevations near streams that allow for operational flexibility over a range of climate and hydrologic variability. The measurable objectives were established as the average annual groundwater extraction

¹⁶⁶ East Contra Costa GSP, Section 7.3.6.2, p. 346.

¹⁶⁷ East Contra Costa GSP, Section 7.3.6.5, p. 346.

¹⁶⁸ East Contra Costa GSP, Section 7.3.6.5, p. 347.

¹⁶⁹ East Contra Costa GSP, Section 7.3.6.5, p. 347.

during the Base Period of 46,455 acre-feet per year. Interim milestones for the depletions of interconnected surface water were not presented in the Plan.¹⁷⁰

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

The Department will continue to support GSAs in this regard by providing, as appropriate, financial and technical assistance to GSAs, including the development of guidance describing appropriate methods and approaches to evaluate the rate, timing, and volume of depletions of interconnected surface water caused by groundwater extractions. Once the Department's guidance related to depletions of interconnected surface water is publicly available, the GSA, where applicable, should consider incorporating appropriate guidance approaches into their future periodic updates to the GSP (See [Recommended Corrective Action 3a](#)). GSAs should consider availing themselves of the Department's financial or technical assistance, but in any event must continue to fill data gaps, collect additional monitoring data, and implement strategies to better understand and manage depletions of interconnected surface water caused by groundwater extractions and define segments of interconnectivity and timing within their jurisdictional area (See [Recommended Corrective Action 3b](#)). Furthermore, GSAs should coordinate with local, state, and federal resources agencies as well as interested parties to better understand the full suite of beneficial uses and users that may be impacted by pumping induced surface water depletion (See [Recommended Corrective Action 3c](#)).

4.4 MONITORING NETWORK

The GSP Regulations describe the monitoring network that must be developed for each sustainability indicator including monitoring objectives, monitoring protocols, and data reporting requirements. Collecting monitoring data of a sufficient quality and quantity is necessary for the successful implementation of a groundwater sustainability plan. The GSP Regulations require a monitoring network of sufficient quality, frequency, and distribution to characterize groundwater and related surface water conditions in the basin and evaluate changing conditions that occur through implementation of the Plan.¹⁷¹

¹⁷⁰ East Contra Costa GSP, Section 7.3.6.12, p. 349.

¹⁷¹ 23 CCR § 354.32.

Specifically, a monitoring network must be able to monitor impacts to beneficial uses and users,¹⁷² monitor changes in groundwater conditions relative to measurable objectives and minimum thresholds,¹⁷³ capture seasonal low and high conditions,¹⁷⁴ include required information such as location and well construction and include maps and tables clearly showing the monitoring site type, location, and frequency.¹⁷⁵ Department staff encourage GSAs to collect monitoring data as specified in the GSP, follow SGMA data and reporting standards,¹⁷⁶ fill data gaps identified in the GSP prior to the first periodic evaluation,¹⁷⁷ update monitoring network information as needed, follow monitoring best management practices,¹⁷⁸ and submit all monitoring data to the Department's Monitoring Network Module immediately after collection including any additional groundwater monitoring data that is collected within the Plan area that is used for groundwater management decisions. Department staff note that if GSAs do not fill their identified data gaps, the GSA's basin understanding may not represent the best available science for use to monitor basin conditions.

The Plan identifies 55 monitoring wells to include in the monitoring network for the chronic lowering of groundwater levels sustainability indicator.¹⁷⁹ Twelve of the monitoring wells are used as representative monitoring sites in the Subbasin.¹⁸⁰ The Plan states that of the 55 monitoring wells in the monitoring network: 31 wells are exclusively screened in the shallow zone principal aquifer; 19 wells are exclusively screened in the deep zone principal aquifer; and six wells are multi-completion monitoring wells.¹⁸¹

The Plan proposes to use the groundwater level monitoring network as a proxy for the groundwater storage monitoring network because changes in groundwater storage are directly dependent on changes in groundwater levels.¹⁸²

The Plan also establishes a dedicated seawater intrusion monitoring network for the Subbasin to proactively address a mechanism, identified in Section 3.3.4, where Delta Bay water could migrate initially into the shallow zone principal aquifer, then vertically into the deep zone principal aquifer.¹⁸³ The Plan identifies four monitoring wells for inclusion in the seawater intrusion monitoring network.¹⁸⁴ The Plan states that four proposed

¹⁷² 23 CCR § 354.34(b)(2).

¹⁷³ 23 CCR § 354.34(b)(3).

¹⁷⁴ 23 CCR § 354.34(c)(1)(B).

¹⁷⁵ 23 CCR §§ 354.34(g-h).

¹⁷⁶ 23 CCR § 352.4 *et seq.*

¹⁷⁷ 23 CCR § 354.38(d).

¹⁷⁸ Department of Water Resources, 2016, [Best Management Practices and Guidance Documents](#).

¹⁷⁹ East Contra Costa GSP, Section 6.2.2.1, p. 284 and Table 6-3, pp. 287-288.

¹⁸⁰ East Contra Costa GSP, Section 6.2.2.1, p. 284 and p. 289, Table 6-3, pp. 287-288.

¹⁸¹ East Contra Costa GSP, Section 6.2.2.1, p. 284 and Table 6-3, pp. 287-288.

¹⁸² East Contra Costa GSP, Table 6-1, p. 282 and Section 7.3.2, pp. 330-336.

¹⁸³ East Contra Costa GSP, Section 3.3.4, p. 134 and Section 6.2.4, p. 299.

¹⁸⁴ East Contra Costa GSP, Section 6.2.4, p. 299, Figure 6-4, p. 298, Table 6-8, pp. 296-297.

monitoring wells will be screened within the shallow zone, analyzed for chloride concentrations, and have an annual proposed monitoring frequency.¹⁸⁵

The Plan has identified 22 monitoring wells to include in the monitoring network for the degraded water quality sustainability indicator.¹⁸⁶ Seventeen of the wells are screened in the deep zone principal aquifer and the remaining five wells are screened in the shallow zone principal aquifer.¹⁸⁷ All five sites in the shallow zone have annual monitoring frequencies, 15 of the 17 sites in the deep zone have variable frequencies, and the remaining two sites in the deep zone have annual monitoring frequencies.¹⁸⁸ It is unclear if all constituents of concern discussed in the Plan will be sampled for at each monitoring point, or exclusively at representative monitoring points. Department staff recommend the GSA identify the constituents of concern that will be collected at each site and the monitoring schedule for the degraded water quality monitoring network (see [Recommended Corrective Action 4](#)).

The Plan states that four Plate Boundary Observatory (PBO) stations and Interferometric Synthetic Aperture Radar (InSAR) data are a part of the existing subsidence monitoring network. PBO Station 256 is located within the Subbasin and the remaining three stations (P230, P248, P257) are located outside the Subbasin but within the same region. The Plan states that the representative monitoring network for land subsidence consists of data collected from PBO Station 256. The Plan explains that this monitoring location is sufficient in monitoring for land subsidence within the Subbasin based on the lack of historical inelastic subsidence and lithologies associated with pumping-induced subsidence.¹⁸⁹

The Plan identifies 15 shallow zone monitoring wells within the groundwater level monitoring network for the depletions of interconnected surface water sustainability indicator.¹⁹⁰ The Plan states that the 15 selected wells are adjacent to creeks, rivers, GDEs, and surface water flow monitoring stations.¹⁹¹ The Plan proposes that three monitoring wells will have a daily monitoring frequency, and 12 of the monitoring wells will have monthly monitoring frequencies.¹⁹² The Plan states that the monitoring network includes 19 surface water flow measurement stations¹⁹³; 14 of the 21 surface water flow measurement stations are monitored on a 15-minute frequency and the remaining seven stations are monitored on an hourly frequency.¹⁹⁴

¹⁸⁵ East Contra Costa GSP, Section 6.2.4, p. 299, Table 6-8, pp. 296-297.

¹⁸⁶ East Contra Costa GSP, Section 6.2.3.1, p. 295.

¹⁸⁷ East Contra Costa GSP, Section 6.2.3.1, p. 295.

¹⁸⁸ East Contra Costa GSP, Table 6-8, pp. 296-297.

¹⁸⁹ East Contra Costa GSP, Section 6.3.5, p. 301 and Figure 6-6, p. 302.

¹⁹⁰ East Contra Costa GSP, Section 6.2.6, p. 303, Table 6-3, pp. 287-288, Figure 6-7, p. 304.

¹⁹¹ East Contra Costa GSP, Section 6.2.6, p. 303.

¹⁹² East Contra Costa GSP, Section 6.2.6, p. 303, Table 6-3, pp. 287-288, Figure 6-7, p. 304.

¹⁹³ East Contra Costa GSP, Section 6.2.6, p. 303, Figure 6-7, p. 304, Table 6-9, p. 305.

¹⁹⁴ East Contra Costa GSP, Table 6-9, p. 305.

Although the proposed density of groundwater level monitoring wells exceeds the range (2 – 10 wells per 100 square miles) recommended by the Department’s Best Management Practices, Department staff have determined that the proposed density in the shallow zone groundwater level monitoring network may not allow the GSA to monitor impacts to beneficial uses and users of groundwater in areas with coverage gaps. Department staff note coverage gaps appear to exist in the majority of disadvantaged communities (DACs)¹⁹⁵, several domestic wells¹⁹⁶, and the Antioch, Bridgehead, Oakley, Sand Hill, Knightsen, Bethel Island, Arbor, and Bixler areas within the Subbasin.

The Plan provides well information for all the wells within the Plan in Appendix 3c, however, the Plan does not include all the required information outlined in the data and reporting standards.¹⁹⁷ Appendix 3c does not include borehole depth, well completion reports, and geophysical logs for all wells within the Subbasin and should be revised to include all the required information outlined in the data and reporting standards as stated in 23 CCR § 352.4 (b) and 23 CCR § 352.4 (c).¹⁹⁸

The Plan describes data gaps for the chronic lowering of groundwater levels and degraded groundwater quality monitoring networks but did not provide descriptions for the remaining monitoring networks. The Plan describes the plan to address data gaps for the chronic lowering of groundwater levels sustainability indicator but did not provide descriptions for the remaining monitoring networks. The Plan does not include a description of identified data gaps as well as a plan to address data gaps for the remaining monitoring networks.

Despite the identification of a recommended corrective action, the description of the monitoring network included in the Plan substantially complies with the requirements outlined in the GSP Regulations. Overall, the Plan describes in sufficient detail a monitoring network that promotes the collection of data of sufficient quality, frequency, and distribution to characterize groundwater and related surface water conditions in the Subbasin and evaluate changing conditions that occur through Plan implementation. The GSP provides a good explanation for the conclusion that the monitoring network is supported by the best available information and data and is designed to ensure adequate coverage of sustainability indicators. Department staff consider the information presented in the Plan to satisfy the general requirements of the GSP Regulations regarding monitoring networks.

4.5 PROJECTS AND MANAGEMENT ACTIONS

The GSP Regulations require a description of the projects and management actions the submitting Agency has determined will achieve the sustainability goal for the basin,

¹⁹⁵ East Contra Costa GSP, Figure 6-3, p. 293.

¹⁹⁶ East Contra Costa GSP, Figure 6-3, p. 293.

¹⁹⁷ 23 CCR § 352.4 (b) and 23 CCR § 352.4 (c).

¹⁹⁸ East Contra Costa GSP, Appendix 3c, pp. 586-616.

including projects and management actions to respond to changing conditions in the basin.¹⁹⁹ Each Plan's description of projects and management actions must include details such as: how projects and management actions in the GSP will achieve sustainability, the implementation process and expected benefits, and prioritization and criteria used to initiate projects and management actions.²⁰⁰

The GSP includes a variety of projects and management actions, split between three groups of planned projects and five management actions requiring additional assessment. Group 1 projects include in-lieu recharge, water quality, and recycled water projects that were completed before the adoption of the Plan.²⁰¹ Expected benefits from the implementation of Group 1 projects include preventing undesirable results for the chronic lowering of groundwater levels, groundwater storage, water quality, and depletion of interconnected surface water sustainability indicators within the Subbasin. Group 2 projects include in-lieu recharge and recycled water projects that under construction and are expected to be completed shortly after the adoption of the Plan.²⁰² Expected benefits from the implementation of Group 2 projects include preventing undesirable results for the chronic lowering of groundwater levels, groundwater storage, and depletion of interconnected surface water sustainability indicators within the Subbasin. Group 3 projects include in-lieu recharge, recycled water, and water quality projects are in the process of being designed and funded prior to adoption of the Plan.²⁰³ Expected benefits from the implementation of Group 3 projects include preventing undesirable results for the chronic lowering of groundwater levels, groundwater storage, water quality, and depletion of interconnected surface water sustainability indicators within the Subbasin.

Group 4 is comprised of management actions that the GSA may elect to implement as a method for maintaining sustainability in the Subbasin. These management actions include: well spacing control²⁰⁴; oversight of well construction features²⁰⁵; well metering, monitoring, and reporting²⁰⁶; demand management program²⁰⁷; and state programs for domestic well users.²⁰⁸ Expected benefits from the implementation of Group 4 actions include preventing undesirable results for the chronic lowering of groundwater levels, groundwater storage, seawater intrusion, water quality, land subsidence, and depletion of interconnected surface water sustainability indicators within the Subbasin.²⁰⁹

¹⁹⁹ 23 CCR § 354.44 (a).

²⁰⁰ 23 CCR § 354.44 (b) *et seq.*

²⁰¹ East Contra Costa GSP, Section 8.1.3.1, pp. 360-361, Section 8.1.3.2, pp. 361-363, Section 8.1.3.3, pp. 363-365.

²⁰² East Contra Costa GSP, Section 8.1.4.1, pp. 365-367 and Section 8.1.4.2, pp. 367-369.

²⁰³ East Contra Costa GSP, Section 8.1.5.1, pp. 370-371 and Section 8.1.5.2, pp. 371-373.

²⁰⁴ East Contra Costa GSP, Section 8.2.1.3, pp. 375-377.

²⁰⁵ East Contra Costa GSP, Section 8.2.1.4, pp. 377-379.

²⁰⁶ East Contra Costa GSP, Section 8.2.1.5, pp. 378-379.

²⁰⁷ East Contra Costa GSP, Section 8.2.1.6, pp. 379-382.

²⁰⁸ East Contra Costa GSP, Section 8.2.1.7, pp. 382-383.

²⁰⁹ East Contra Costa GSP, Section 8.2.1, pp. 374-383.

Each project or management action includes a description, timetable for implementation, expected quantitative benefits, associated public noticing, overview of any permitting or regulatory process, estimated costs with a funding plan, and legal authority required for implementation.

The Plan adequately describes proposed projects and management actions in a manner that is generally consistent and substantially complies with the GSP Regulations. The projects and management actions, which focus largely on conservation and efficiency; stormwater efforts; increasing groundwater in storage through recharge; and increasing non-groundwater water supply, are directly related to the sustainable management criteria and present a generally feasible approach to achieving the sustainability goal of the Subbasin.

4.6 CONSIDERATION OF ADJACENT BASINS/SUBBASINS

SGMA requires the Department to "...evaluate whether a groundwater sustainability plan adversely affects the ability of an adjacent basin to implement their groundwater sustainability plan or impedes achievement of sustainability goals in an adjacent basin."²¹⁰ Furthermore, the GSP Regulations state that minimum thresholds defined in each GSP be designed to avoid causing undesirable results in adjacent basins or affecting the ability of adjacent basins to achieve sustainability goals.²¹¹

The East Contra Costa Subbasin has four adjacent basins/subbasins: Pittsburg Plain Basin, Solano Subbasin, Eastern San Joaquin Subbasin, and Tracy Subbasin. The Pittsburg Plain Basin is designated as a very-low priority basin and is not required to be managed under a GSP. The Plan includes an analysis of potential impacts to adjacent basins with the defined minimum thresholds for each sustainability indicator. The Plan does not anticipate any impacts to adjacent basins resulting from the minimum thresholds in the Plan.

Department staff will continue to review periodic updates to the Plan to assess whether the implementation of the East Contra Costa Subbasin GSP is potentially impacting adjacent subbasins.

4.7 CONSIDERATION OF CLIMATE CHANGE AND FUTURE CONDITIONS

The GSP Regulations require a GSA to consider future conditions and project how future water use may change due to multiple factors including climate change.²¹²

Since the GSP was adopted and submitted, climate change conditions have advanced faster and more dramatically. It is anticipated that the hotter, drier conditions will result in a loss of 10% of California's water supply. As California adapts to a hotter, drier climate,

²¹⁰ Water Code § 10733(c).

²¹¹ 23 CCR § 354.28(b)(3).

²¹² 23 CCR § 354.18.

GSAAs should be preparing for these changing conditions as they work to sustainably manage groundwater within their jurisdictional areas. Specifically, the Department encourages GSAAs to:

1. Explore how their proposed groundwater level thresholds have been established in consideration of groundwater level conditions in the basin based on current and future drought conditions.
2. Explore how groundwater level data from the existing monitoring network will be used to make progress towards sustainable management of the basin given increasing aridification and effects of climate change, such as prolonged drought.
3. Take into consideration changes to surface water reliability and that impact on groundwater conditions.
4. Evaluate updated watershed studies that may modify assumed frequency and magnitude of recharge projects, if applicable, and
5. Continually coordinate with the appropriate groundwater users, including but not limited to domestic well owners and state small water systems, and the appropriate overlying county jurisdictions developing drought plans and establishing local drought task forces²¹³ to evaluate how their Plan's groundwater management strategy aligns with drought planning, response, and mitigation efforts within the basin.

²¹³ Water Code § 10609.50.

5 STAFF RECOMMENDATION

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

The recommended corrective actions include:

RECOMMENDED CORRECTIVE ACTION 1

Provide more information about how the proposed minimum thresholds for the chronic lowering of groundwater levels may impact beneficial uses and users. Specifically, consider the impact of the selected minimum threshold levels on supply wells. The consideration should identify the degree/extent of potential impact including the percentage, number, and location of potentially impacted wells at the proposed minimum thresholds for chronic lowering of groundwater levels.

RECOMMENDED CORRECTIVE ACTION 2

Reevaluate the measurable objective for BG-1 to align with existing regulatory standards established for water quality.

RECOMMENDED CORRECTIVE ACTION 3

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

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

- a. Consider utilizing the interconnected surface water guidance, as appropriate, when issued by the Department to establish quantifiable minimum thresholds, measurable objectives, and management actions.
- b. Continue to fill data gaps, collect additional monitoring data, and implement the current strategy to manage depletions of interconnected surface water and define segments of interconnectivity and timing.
- c. Prioritize collaborating and coordinating with local, state, and federal regulatory agencies as well as interested parties to better understand the full suite of beneficial uses and users that may be impacted by pumping induced surface water depletion within the GSA's jurisdictional area.

RECOMMENDED CORRECTIVE ACTION 4

Identify the constituents of concern that will be collected at each site and the monitoring schedule for the degraded water quality monitoring network.