

CALIFORNIA DEPARTMENT OF WATER RESOURCES SUSTAINABLE GROUNDWATER MANAGEMENT OFFICE

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February 27, 2025

Matt Parker Siskiyou County Flood Control and Water Conservation District GSA 1312 Fairlane Yreka, CA 96097 <u>mparker@co.siskiyou.ca.us</u>

RE: Approved Determination of the 2024 Groundwater Sustainability Plan Submitted for the Butte Valley Basin

Dear Matt Parker,

The Department of Water Resources (Department) has evaluated the 2024 groundwater sustainability plan (GSP) for the Butte Valley Basin in response to the Department's Incomplete Determination on January 18, 2024, 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 Butte Valley Basin GSP has taken sufficient action to correct deficiencies identified by the Department, 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 GSAs are required to submit their periodic evaluation of the Butte Valley Basin GSP no later than January 28, 2027.

Please contact Sustainable Groundwater Management staff by emailing <u>sgmps@water.ca.gov</u> 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 Determination of Approval of the Butte Valley Basin 2024 Groundwater Sustainability Plan

# STATE OF CALIFORNIA DEPARTMENT OF WATER RESOURCES

#### STATEMENT OF FINDINGS REGARDING THE APPROVAL OF THE BUTTE VALLEY BASIN 2024 GROUNDWATER SUSTAINABILITY PLAN

Under the Sustainable Groundwater Management Act (SGMA or Act), 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 SGMA, 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.<sup>1</sup> The Department is directed to issue an assessment of the Plan within two years of its submission.<sup>2</sup> If a Plan is determined to be Incomplete, the Department must identify deficiencies that preclude approval of the Plan and identify corrective actions required to make the Plan substantially compliant with SGMA and the GSP Regulations. The Groundwater Sustainability Agency (GSA or Agency) has up to 180 days from the date the Department issues its assessment to make the necessary corrections and submit a revised Plan.<sup>3</sup> When evaluating a revised GSP that was determined to be incomplete, the Department reviews the materials provided by the GSA (e.g., revised or amended GSP) to address the deficiencies by the submission deadline. Part of the Department's review focuses on how the Agency addressed the deficiencies that precluded approval of the Plan. The Department shall find a Plan previously determined to be incomplete to be either:

- 1. Approved, if the Department determines the Agency has sufficiently addressed those deficiencies, the Department may evaluate other components of the Plan, particularly to assess whether and, if so, how revisions to address deficiencies may have affected other components of a Plan or its likelihood of achieving sustainable groundwater management.
- 2. Inadequate if, after consultation with the State Water Resources Control Board, the Agency has not taken sufficient action to correct the deficiencies previously identified by the Department.

This Statement of Findings explains the Department's determination regarding the revised Plan for the Butte Valley Basin (Basin No. 1-003) by the Siskiyou County Flood

<sup>&</sup>lt;sup>1</sup> Water Code § 10733.

<sup>&</sup>lt;sup>2</sup> Water Code § 10733.4.

<sup>&</sup>lt;sup>3</sup> 23 CCR § 355.2(e)(2).

Control and Water Conservation District GSA (GSA or Agency) submitted on July 12, 2024 (referred to as the 2024 GSP or 2024 Plan).

Department management have discussed the 2024 Plan with Department staff and have reviewed the written assessment titled Sustainable Groundwater Management Program Assessment of Incomplete Groundwater Sustainability Plan 2025 Staff Report (Staff Report), attached as Exhibit A, which recommends approval of the 2024 GSP. Department management are satisfied that staff have conducted a thorough evaluation and assessment of the 2024 Plan and concur with staff's recommendations and all the recommended corrective actions. The Department therefore **APPROVES** the 2024 Plan and makes the following findings:

- A. On January 28, 2022, the GSA submitted a GSP (referred to as the 2022 GSP or 2022 Plan) for the Department's evaluation.
- B. On January 18, 2024, the Department issued a Staff Report (referred to as the 2024 Incomplete Determination) and Findings determining the 2022 GSP to be incomplete, because the 2022 GSP did not satisfy the requirements of SGMA, nor did it substantially comply with the GSP Regulations. The Department's 2024 Incomplete Determination identified the following deficiencies that precluded approval and provided the GSA with corrective actions that were intended to address the deficiencies.
  - 1. Deficiency 1: The 2022 GSP did not include a reasonable assessment of overdraft conditions and reasonable means to mitigate overdraft.
  - 2. Deficiency 2. The 2022 GSP did not establish sustainable management criteria for chronic lowering of groundwater levels in a manner substantially compliant with the GPS Regulations.

The Department provided the Agency with 180 days to address the deficiencies.<sup>4</sup>

- C. On July 12, 2024, the GSA submitted a revised Plan (the 2024 GSP) to the Department. After staff's thorough evaluation of the 2024 Plan, the Department finds:
  - 1. The Agency has taken sufficient actions to correct Deficiency 1 with the re-evaluation of the basin sustainable yield, setting it 10-15% below recent average groundwater pumping, and including new projects and management actions to mitigate additional overdraft, such that, at this time, the Department no longer finds this deficiency to preclude approval.
  - 2. The Agency has taken sufficient actions to correct Deficiency 2 by following the SGMA required process of: (1) describing undesirable results

<sup>&</sup>lt;sup>4</sup> 23 CCR § 355.2(e)(2).

for chronic lowering of groundwater levels, (2) establishing minimum thresholds to avoid undesirable results, and (3) evaluating the impacts to beneficial uses and users at the minimum thresholds. Specifically, the GSA included a well failure analysis that estimated how many wells would go dry at lower groundwater levels and specified how many wells the GSA could replace or mitigate. Next, the GSA set minimum thresholds at levels where they could financially cover the cost to mitigate the dry wells, and lastly, they did an analysis of the types of wells and locations of those wells that would be impacted. Therefore, at this time, the Department no longer finds this deficiency to preclude approval.

The 2024 Plan satisfies the required conditions as outlined in § 355.4(a) of the GSP Regulations<sup>5</sup>:

- 1. 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.<sup>6</sup>
- 2. The Plan, either on its own or in coordination with other Plans, appears to cover the entire Basin sufficient to warrant a thorough evaluation.<sup>7</sup>
- D. The general standards the Department applied in its evaluation and assessment of the Plan are: (1) "conformance" with the specified statutory requirements, (2) "substantial compliance" with the GSP Regulations, (3) whether the Plan is likely to achieve the sustainability goal for the Basin within 20 years of the implementation of the Plan, and (4) whether the Plan adversely affects the ability of an adjacent basin to implement its GSP or impedes achievement of sustainability goals in an adjacent basin.<sup>8</sup> 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 GSA 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

<sup>&</sup>lt;sup>5</sup> 23 CCR § 350 et seq.

<sup>&</sup>lt;sup>6</sup> 23 CCR § 355.4(a)(2).

<sup>&</sup>lt;sup>7</sup> 23 CCR § 355.4(a)(3).

<sup>&</sup>lt;sup>8</sup> Water Code § 10733.

that affording flexibility and discretion to local GSA 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<sup>9</sup>; 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.<sup>10</sup> The Department's final determination is made based on the entirety of the Plan's contents on a case-by-case basis, considering and weighing factors relevant to the particular Plan and Basin under review.

- E. In making these findings and Plan determination, the Department also recognized that: (1) the Department maintains continuing oversight and jurisdiction to ensure the Plan is adequately implemented; (2) the Legislature intended SGMA to be implemented over many years; (3) SGMA provides Plans 20 years of implementation to achieve the sustainability goal in a Basin (with the possibility that the Department may grant GSA an additional five years upon request if the GSA has made satisfactory progress toward sustainability); and, (4) local agencies acting as GSA are authorized, but not required, to address undesirable results that occurred prior to enactment of SGMA.<sup>11</sup>
- F. The Plan conforms with Water Code §§ 10727.2 and 10727.4, substantially complies with 23 CCR § 355.4, and appears likely to achieve the sustainability goal for the Basin. It does not appear at this time that the Plan will adversely affect the ability of adjacent basins to implement their GSPs or impede achievement of sustainability goals.
  - 1. The sustainable management criteria and the Plan's goal to manage groundwater resources in a way that best supports the continued and long-term health of the people, the environment, and the economy in Butte Valley for generations to come, 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 Basin is being managed sustainably in accordance with SGMA.<sup>12</sup>
  - 2. The Plan identifies addressing data gaps related to hydrogeological conceptual model, groundwater conditions, and water budgets, incorporating new information into the numerical model, and expanding monitoring networks as areas of improvement. Filling these known data

<sup>&</sup>lt;sup>9</sup> Water Code § 113.

<sup>&</sup>lt;sup>10</sup> Water Code § 10720.1(h).

<sup>&</sup>lt;sup>11</sup> Water Code §§ 10721(r); 10727.2(b); 10733(a); 10733.8.

<sup>&</sup>lt;sup>12</sup> 23 CCR § 355.4(b)(1).

gaps should increase GSA's understanding of the basin and will lead to refinement of the GSP's sustainable management criteria and water budget.<sup>13</sup>

- 3. The projects and management actions proposed are designed to track, manage, and arrest chronic lowering of groundwater levels and to mitigate dry wells caused by the lowering of groundwater levels. The projects and management actions are reasonable and commensurate with the level of understanding of the Basin setting. The projects and management actions described in the Plan provide a feasible approach to achieving the Basin's sustainability goal and should provide the GSA with greater versatility to adapt and respond to changing conditions and future challenges during GSP implementation.<sup>14</sup>
- 4. The Plan provides a detailed explanation of how the varied interests of groundwater uses and users in the Basin were considered in developing the sustainable management criteria and how those interests, including domestic wells, would be impacted by the chosen minimum thresholds.<sup>15</sup>
- 5. The Plan's projects and management actions appear feasible at this time and capable of preventing undesirable results and ensuring that the Basin is operated within its sustainable yield within 20 years. The Department will continue to monitor Plan implementation and reserves the right to change its determination if projects and management actions are not implemented or appear unlikely to prevent undesirable results or achieve sustainability within SGMA timeframes.<sup>16</sup>
- 6. The Plan includes a reasonable assessment of overdraft conditions and includes reasonable means to mitigate overdraft.<sup>17</sup>
- 7. At this time, it does not appear that the Plan will adversely affect the ability of nearby basins to implement GSPs or impede achievement of sustainability goals in nearby basins. Butte Valley Basin is not directly connected to another basin, however the Plan states it does share the larger, mostly volcanic groundwater system of the Upper Klamath Basin with nearby basins.<sup>18,19</sup>

<sup>13 23</sup> CCR § 355.4(b)(2).

<sup>&</sup>lt;sup>14</sup> 23 CCR § 355.4(b)(3).

<sup>&</sup>lt;sup>15</sup> 23 CCR § 355.4(b)(4).

<sup>&</sup>lt;sup>16</sup> 23 CCR § 355.4(b)(5).

<sup>&</sup>lt;sup>17</sup> 23 CCR § 355.4(b)(6).

<sup>&</sup>lt;sup>18</sup> 23 CCR § 355.4(b)(7).

<sup>&</sup>lt;sup>19</sup> 2024 Butte Valley GSP, Section 2.1.3.4, p. 64.

- 8. Because a single plan was submitted for the Subbasin, a coordination agreement was not required.<sup>20</sup>
- 9. The Siskiyou County Flood Control and Water Conservation District has historically monitored water and water quality in the Butte Valley Basin. The GSA's history of water management provide a reasonable level of confidence that the GSA has the legal authority and financial resources necessary to implement the Plan.<sup>21</sup>
- 10. Through review of the Plan and consideration of public comments, the Department determines that the GSA adequately responded to comments that raised credible technical or policy issues with the Plan, sufficient to warrant approval of the Plan at this time. The Department also notes that the recommended corrective actions included in the Staff Report are important to addressing certain technical or policy issues that were raised and, if not addressed before future, subsequent plan evaluations, may preclude approval of the Plan in those future evaluations.<sup>22</sup>
- G. In addition to the grounds listed above, DWR also finds that:
  - The Department developed its GSP Regulations consistent with and intending to further the State's human right to water policy through implementation of SGMA and the Regulations, primarily by achieving sustainable groundwater management in a basin. By ensuring substantial compliance with the GSP Regulations, the Department has considered the state policy regarding the human right to water in its evaluation of the Plan.<sup>23</sup>
  - 2. The Plan acknowledges and identifies interconnected surface waters within the Basin. The GSA proposes initial sustainable management criteria to manage this sustainability indicator and measures to improve understanding and management of interconnected surface water. The GSA acknowledges, and the Department agrees, many data gaps related to interconnected surface water exist. The GSA should continue filling data gaps, collecting additional monitoring data, and coordinating with resources agencies and interested parties to understand beneficial uses and users that may be impacted by depletions of interconnected surface water caused by groundwater pumping. Future periodic evaluations of the Plan and amendments to the Plan should aim to improve the initial sustainable

<sup>20 23</sup> CCR § 355.4(b)(8).

<sup>&</sup>lt;sup>21</sup> 23 CCR § 355.4(b)(9).

<sup>&</sup>lt;sup>22</sup> 23 CCR § 355.4(b)(10).

<sup>&</sup>lt;sup>23</sup> Water Code § 106.3; 23 CCR § 350.4(g).

management criteria as more information and improved methodology becomes available.

- 3. Projections of future Subbasin extractions are likely to stay within current and historic ranges, at least until the next periodic evaluation by the GSA and the Department. Subbasin groundwater levels and other SGMA sustainability indicators appear unlikely to substantially deteriorate while the GSA implements the Department's recommended corrective actions.
- 4. The California Environmental Quality Act<sup>24</sup> does not apply to the Department's evaluation and assessment of the Plan.

<sup>&</sup>lt;sup>24</sup> Public Resources Code § 21000 *et seq*.

Accordingly, the 2024 GSP submitted by the Agency for the Butte Valley Basin is hereby **APPROVED**. The recommended corrective actions identified in the Staff Report will assist the Department's future review of the Plan's implementation for consistency with SGMA and the Department therefore recommends the Agency address them in the next Periodic Evaluation, which is set to be submitted by January 28, 2027, as required by Water Code § 10733.8. Failure to address the Department's recommended corrective actions before future, subsequent plan evaluations, may lead to a Plan being determined incomplete or inadequate.

Signed:

karla Nemeth

Karla Nemeth, Director Date: February 27, 2025

Exhibit A: Groundwater Sustainability Plan Assessment Staff Report – Butte Valley Basin

# State of California Department of Water Resources Sustainable Groundwater Management Program Reassessment of Incomplete Groundwater Sustainability Plan 2025 Staff Report

Groundwater Basin Name:	Butte Valley Basin (No. 1-003)
Submitting Agency:	Siskiyou County Flood Control and Water Conservation District Groundwater Sustainability Agency
Submittal Type:	Revised Plan in Response to Incomplete Determination
Submittal Date:	July 12, 2024
Recommendation:	Approve
Date:	February 27, 2025

On July 12, 2024, the Siskiyou County Flood Control and Water Conservation District Groundwater Sustainability Agency (GSA or Agency) resubmitted the Butte Valley Groundwater Sustainability Plan (2024 Plan or 2024 GSP) for the Butte Valley Basin (Basin) to the Department of Water Resources (Department or DWR) for evaluation and assessment as required by the Sustainable Groundwater Management Act (SGMA)<sup>1</sup> and GSP Regulations.<sup>2</sup> This was in response to the Department's Incomplete Determination of the initial GSP (2022 GSP or 2022 Plan) on January 18, 2024.<sup>3</sup>

After evaluation and assessment, Department staff conclude the GSA has taken sufficient actions to correct deficiencies identified by the Department; however, Department staff have provided additional corrective actions which will be required to be addressed by the Plan's periodic evaluation.

Overall, Department staff believe the Plan contains the required components of a GSP, demonstrates a thorough understanding of the Basin based on what appears to be the best available science and information, sets well explained, supported, and reasonable sustainable management criteria to prevent undesirable results as defined in the Plan, and proposes a set of projects and management actions that, if successfully implemented, are likely to achieve the sustainability goal defined for the Basin.<sup>4</sup> Department staff will continue to monitor and evaluate the Basin's progress toward

<sup>&</sup>lt;sup>1</sup> Water Code § 10720 et seq.

<sup>&</sup>lt;sup>2</sup> 23 CCR § 350 et seq.

<sup>&</sup>lt;sup>3</sup> Water Code § 10733.4(b); 23 CCR § 355.4(a)(4); <u>https://sgma.water.ca.gov/portal/gsp/assessments/88</u>.

<sup>&</sup>lt;sup>4</sup> 23 CCR § 354.24.

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

#### Based on the evaluation of the 2024 Plan, Department staff recommend the Plan be approved.

This assessment includes six sections:

- <u>Section 1 Summary</u>: Overview of the Department Staff's assessment and recommendation.
- <u>Section 2 Evaluation Criteria</u>: Describes the legislative requirements and the Department's evaluation criteria.
- <u>Section 3 Required Conditions</u>: Describes the submission requirements of an incomplete resubmittal to be evaluated by the Department.
- <u>Section 4 Deficiency Evaluation</u>: Provides an assessment of whether and how the contents included in the GSP resubmittal addressed the deficiencies identified by the Department in the initial incomplete determination.
- <u>Section 5 Plan Evaluation</u>: Provides a detailed assessment of the contents included in the GSP organized by each Subarticle outlined in the GSP Regulations.
- <u>Section 6 Staff Recommendation</u>: Includes the staff recommendation for the 2024 Plan.

# **1** SUMMARY

Department staff recommend **approval** of the 2024 Butte Valley GSP and have recommended corrective actions designed to address shortcomings of the Plan described in this Staff Report. In Section 4 of this report, Department staff reviewed how the 2022 Plan was updated in the 2024 Plan by comparing content from each plan in order to determine if sufficient action was taken in response to deficiencies identified in the 2022 Plan. In Section 5, Department staff reviewed content in the GSP for its substantial compliance with GSP Regulations, and have provided recommended corrective actions for components of the plan that need improvement to support substantial compliance with GSP Regulations and for Subbasin sustainability.

The GSA has identified areas for improvement of its Plan such as addressing data gaps related to the numerical Basin model, and installing monitoring well for interconnected surface waters and groundwater dependent ecosystems. Department staff concur that those items are important and recommend the GSA address them as soon as possible. Department staff have also identified additional recommended corrective actions that the GSA should consider for the first periodic evaluation of the Plan (see Section 6). Addressing these recommended corrective actions will be important to demonstrate, on an ongoing basis, that implementation of the Plan is likely to achieve the sustainability goal. The recommended corrective actions generally focus on the following:

- 1) Fully explain the groundwater allocation program and how it will be managed.
- 2) Report effectiveness of the voluntary demand management program, describe how pumping will be reduced to reach sustainable yield.
- 3) Provide rationale for selection of a single principal aquifer, describe interactions between geologic units, and fill hydrogeologic conceptual model data gaps.
- 4) Provide contour maps of groundwater elevations above mean sea level in addition to the provided depth to water contour maps for seasonal high and low measurements. Clearly indicate the month of data being presented.
- 5) Continue efforts to identify groundwater dependent ecosystems.
- 6) Revise sustainable management criteria for degraded water quality.
- 7) Revise sustainable management criteria for subsidence to comply with GSP Regulations.
- 8) Utilize Department guidance to guide development of sustainable management criteria for interconnected surface water.
- 9) Revise monitoring frequency for the degraded water quality monitoring network

# **2** EVALUATION CRITERIA

The Department evaluates whether a Plan conforms to the statutory requirements of SGMA<sup>5</sup> and is likely to achieve the basin's sustainability goal,<sup>6</sup> whether evaluating a basin's first Plan,<sup>7</sup> a Plan previously determined incomplete,<sup>8</sup> an amended Plan,<sup>9</sup> or a GSA's periodic evaluation to an approved Plan.<sup>10</sup> To achieve the sustainability goal, each version of the Plan must demonstrate that implementation 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.<sup>11</sup> The Department is also required to evaluate, on an ongoing basis, whether the Plan will adversely affect the ability of an adjacent basin to implement its groundwater sustainability program or achieve its sustainability goal.<sup>12</sup>

The Plan evaluated in this Staff Report was previously determined to be incomplete. An incomplete Plan is one which had one or more deficiencies that precluded its initial approval, may not have had supporting information that was sufficiently detailed or analyses that were sufficiently thorough and reasonable, or Department staff determined it was unlikely the GSAs in the basin could achieve the sustainability goal. After a GSA has been afforded up to 180 days to address the deficiencies and based on the GSA's efforts, the Department can either approve<sup>13</sup> the Plan or determine the Plan inadequate.<sup>14</sup>

The Department's evaluation and assessment of a Plan previously determined to be incomplete, as presented in this Staff Report, continues to follow Article 6 of the GSP Regulations<sup>15</sup> to determine whether the Plan, with revisions or additions prepared by the GSA, complies with SGMA and substantially complies with the GSP Regulations.<sup>16</sup> As stated in the GSP Regulations, "substantial compliance means that the supporting information is sufficiently detailed and the analyses sufficiently thorough and reasonable, in the judgment of the Department, to evaluate the Plan, and the Department determines that any discrepancy would not materially affect the ability of the Agency to achieve the sustainability goal for the basin, or the ability of the Department to evaluate the likelihood of the Plan to attain that goal."<sup>17</sup>

- <sup>9</sup> 23 CCR § 355.10.
- <sup>10</sup> 23 CCR § 355.6.
- <sup>11</sup> Water Code § 10721(v).
- <sup>12</sup> Water Code § 10733(c).
- <sup>13</sup> 23 CCR §§ 355.2(e)(1).
- <sup>14</sup> 23 CCR §§ 355.2(e)(3).
- <sup>15</sup> 23 CCR § 355 *et seq*.
- <sup>16</sup> 23 CCR § 350 *et seq*.
- <sup>17</sup> 23 CCR § 355.4(b).

<sup>&</sup>lt;sup>5</sup> Water Code §§ 10727.2, 10727.4, 10727.6.

<sup>&</sup>lt;sup>6</sup> Water Code § 10733; 23 CCR § 354.24.

<sup>&</sup>lt;sup>7</sup> Water Code § 10720.7.

<sup>&</sup>lt;sup>8</sup> 23 CCR § 355.2(e)(2).

The recommendation to approve a Plan previously determined to be incomplete does not signify that Department staff, were they to exercise the professional judgment required to develop a Plan for the basin, would make the same assumptions and interpretations as those contained in the revised Plan, but simply that Department staff have determined that the modified assumptions and interpretations relied upon by the submitting GSA(s) are supported by adequate, credible evidence, and are scientifically reasonable. The assessment of a Plan previously determined to be incomplete may involve the review of new information presented by the GSAs, including models and assumptions, and a reevaluation of that information based on scientific reasonableness. In conducting its assessment, Department staff does not recalculate or reevaluate technical information or perform their own geologic or engineering analysis of that information.

The recommendation to not approve a Plan previously determined to be incomplete and instead determine it to be inadequate signifies that the resubmitted Plan contains significant deficiencies based on one or more of the criteria identified in 23 CCR § 355.4(b), or the GSAs in the basin have not taken sufficient actions to correct the deficiencies previously identified by the Department when it found the Plan incomplete. The Department engages in consultation with the State Water Resources Control Board before finding a Plan inadequate. A Plan determined to be inadequate is subject to the state intervention provisions contained in Chapter 11 of SGMA.<sup>18</sup>

<sup>&</sup>lt;sup>18</sup> Water Code § 10735 *et seq*.

# **3 REQUIRED CONDITIONS**

For a Plan that the Department previously determined to be incomplete, the Department provided required corrective actions that address minor or potentially significant deficiencies that the Department identified in the initially submitted Plan. The GSA(s) in a basin, whether developing a single GSP covering the basin or multiple GSPs, must attempt to sufficiently address those required corrective actions within the time provided, not to exceed 180 days, for the Plan to be reevaluated by the Department and potentially approved.

## 3.1 INCOMPLETE RESUBMITTAL

GSP Regulations specify that the Department shall evaluate a resubmitted GSP in which the GSA has taken corrective actions within 180 days from the date the Department issued an incomplete determination to address deficiencies.<sup>19</sup>

The Department issued the incomplete determination on January 18, 2024. The GSA resubmitted the GSP to the Department on July 12, 2024, in compliance with the 180-day deadline.

The GSA has provided a redline/strikeout version of the resubmitted GSP. The redline/strikeout version highlights the changes made from the initial 2022 submission to the 2024 submission.<sup>20</sup>

<sup>&</sup>lt;sup>19</sup> 23 CCR § 355.4(a)(4).

<sup>&</sup>lt;sup>20</sup> <u>https://sgma.water.ca.gov/portal/service/gspdocument/download/10206</u>.

# 4 DEFICIENCY 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.

In its initial incomplete determination, the Department identified deficiencies in the Plan which precluded the Plan's approval in January 2024.<sup>21</sup> The GSA was given 180 days to take corrective actions to remedy the identified deficiencies. Consistent with the GSP Regulations, Department staff are providing an evaluation of the resubmitted Plan to determine if the GSAs have taken sufficient actions to correct the deficiencies identified in the 2022 Plan. For each deficiency, the corrective actions are repeated, the 2022 Plan content is summarized, the 2024 Plan is then described, followed by Department staff's evaluation.

# 4.1 DEFICIENCY 1. THE GSP DOES NOT INCLUDE A REASONABLE ASSESSMENT OF OVERDRAFT CONDITIONS AND REASONABLE MEANS TO MITIGATE OVERDRAFT.

#### 4.1.1 Corrective Action 1

The GSA must revise the GSP to provide a reasonable assessment of overdraft conditions and include a reasonable means to mitigate overdraft. Specifically, the Plan must be amended as follows:

- a) Reevaluate the assessment of overdraft conditions in the Basin. Specifically, the GSA should examine the assumptions that were used to develop the absence of historical and current overdraft and the projected overdraft estimates in the projected water budget considering the results vary greatly from the values reported in the recent annual report data. The assessment should include the latest information for the Basin to ensure the GSP includes the required projects and management actions to mitigate overdraft in the Basin.
- b) Provide a reasonable means to mitigate the overdraft that is continuing to occur in the Basin. Specifically, the GSA should describe feasible proposed management actions that are commensurate with the level of understanding of groundwater conditions of the Basin and with sufficient details and consideration for Department

<sup>&</sup>lt;sup>21</sup> <u>https://sgma.water.ca.gov/portal/gsp/assessments/88</u>.

staff to be able to clearly understand how the Plan's projects and management actions will mitigate overdraft in the Basin under different climate scenarios.

#### 4.1.2 Evaluation of Resubmitted Plan

#### 4.1.2.1 Corrective Action 1a – Reassess Overdraft Conditions

In response to the Department's Incomplete Determination, the GSA updated the Plan to include a new estimate of overdraft and removed language stating the Basin is not in overdraft.

The 2022 Plan stated the Basin was not experiencing overdraft condition, despite experiencing declining groundwater levels for decades.<sup>22</sup> This conclusion was based on the watershed scale representation of groundwater flow from the South and Southwest across the Basin to the North and Northeast.<sup>23</sup> The primary argument was the basin inflow and outflow are much larger than in-basin pumping and thus control groundwater elevations to a long-term dynamic equilibrium. Even if this concept were plausible, declining groundwater levels over the past 40 years show the system has not reached equilibrium and is still in decline.<sup>24</sup> Additionally, the modeling approach cited by the GSA covers a substantial area outside the Butte Valley Basin and may not accurately reflect Basin conditions.

The 2024 Plan responds to the Department's Incomplete Determination by providing a revised assessment of the overdraft conditions in the Basin. A new section was added to the Plan, Section 2.2.2.4, which uses a new direct analytical method to estimate change in groundwater storage.<sup>25</sup> The GSP provides average values for long-term storage changes in the Basin for different time periods. Notable periods include the Baseline Period (1990-2014, -4,143 acre-feet per year (AFY)) and the GSA Period (2017-2024, -5,374 AFY). For the GSA Period, individual years are provided with a range of +4,773 AFY to -17,622 AFY.<sup>26</sup>

Department staff believe the new analytical method used to estimate overdraft based on changes in groundwater levels is a substantial improvement from the initial modeling approach. This method, which relies on observed, empirical data, indicates the Basin has been experiencing overdraft over the Baseline and GSA Periods. This is an important update as the GSA's management strategy will aim to address this overdraft instead of the initial approach which allowed additional groundwater extraction despite decades of declining levels.

The 2024 GSP presents a revised the sustainable yield estimate for the Basin that has reduced the estimated sustainable yield from 83,000 AFY to 65,000 AFY.<sup>27</sup> The GSP

<sup>&</sup>lt;sup>22</sup> 2022 Butte Valley GSP, Section 2.2.3.2, p. 159, Section 3.4.1.1, p. 188.

<sup>&</sup>lt;sup>23</sup> 2022 Butte Valley GSP, Section 2.2.3.3, p. 162.

<sup>&</sup>lt;sup>24</sup> 2022 Butte Valley GSP, Figure 2.23, p. 113.

<sup>&</sup>lt;sup>25</sup> 2024 Butte Valley GSP, Section 2.2.2.4, p. 111.

<sup>&</sup>lt;sup>26</sup> 2024 Butte Valley GSP, Table 2.6, pp. 113-114.

<sup>&</sup>lt;sup>27</sup> 2024 Butte Valley GSP, Section 2.2.5.4, p. 179.

states the revised sustainable yield is based on the three new analyses using an analytical estimate assuming simple closed Basin conditions.<sup>28</sup> Department staff note this is a substantial change that directly affects the strategy of the GSA to manage the Basin. In the 2022 GSP, the sustainable yield was set at a value where declining groundwater levels were occurring which made Department staff question how maintaining this level of extraction could lead to a stabilization of groundwater levels. However, the lower sustainable yield estimate included in the 2024 GSP, is less than recent extraction volumes and may account for the overdraft the Basin has been experiencing. Since sustainable yield is an estimate, the GSA should evaluate extraction versus occurrence of undesirable results and continue to refine this value during plan implementation.

Department staff note that the 2024 Plan states the specific yield is hard to estimate and uses a value of 9.5% based on two specific yield tests by DWR as well as results from the GSA's Basin hydro-geologic model.<sup>29</sup> The two well tests performed by DWR returned values of 2% and 13%. Department staff recognize that an incorrect estimate of specific yield would result in a smaller or larger change in the revised overdraft estimate for a given change in groundwater elevation and could impact the success of plan implementation in the future. Department staff recommend the GSA work to understand the specific yield value for the Basin as it is filling data gaps related to the hydrogeologic conceptual model, which is discussed in Section 5.2.1.

Another important update included in the 2024 Plan is the removal of language stating the Basin is not in overdraft. These new estimates of average groundwater storage change, and specific recent years are consistent with chronic overdraft conditions observed in the long term well elevation data, especially apparent from 2000-2023. While the GSA does not explicitly state the Basin is in overdraft in the 2024 GSP, the data shows the Basin has experienced a negative change of groundwater storage historically that will be addressed during plan implementation.

Department staff believe the GSA has taken sufficient action to address this portion of the corrective action through the updated analysis to characterize the chronic overdraft in the Basin and revision of the sustainable yield value.

#### 4.1.2.2 Corrective Action 1b – Provide Reasonable Means to Mitigate Overdraft

In response to the Department's Incomplete Determination, the GSA updated the Plan to include new projects and management actions to address the revised overdraft estimate.

The 2022 Plan submitted by the GSA described three tiers of projects and management actions designed to maintain sustainable groundwater use and levels in the Basin as the GSA claimed the Basin was not in overdraft conditions. The three tiers were divided by implementation period with Tier 1 being ongoing activities, Tier 2 being implemented during the first evaluation period (2022-2027), and Tier 3 being future activities.<sup>30</sup> The

<sup>&</sup>lt;sup>28</sup> 2024 Butte Valley GSP, Section 2.2.5.4, p. 179.

<sup>&</sup>lt;sup>29</sup> 2024 Butte Valley GSP, Section 2.2.2.4, p. 110.

<sup>&</sup>lt;sup>30</sup> 2022 Butte Valley GSP, Section 4.1, p. 214.

Department's Incomplete Determination noted the projects and management actions were "underdeveloped and lack the details necessary to determine whether they will support the basin in achieving sustainability"<sup>31</sup> or address the chronic long-term declines in groundwater storage occurring in the Basin.

The 2024 Plan describes one revised and three new projects and management actions to address the chronic overdraft in the Basin. These are: 1) the City of Dorris Well Deepening and Pipeline Replacement Project, 2) Well Inventory and Well Mitigation Program, 3) Groundwater Demand Management Program, and 4) Preliminary Groundwater Allocation Program. The first project was revised to include details that have occurred since the 2022 GSP was submitted. The project titled Well Inventory and Mitigation Program is designed to fill data gaps and mitigate negative impacts of declining groundwater levels in the Basin. The other two new projects and management actions are designed to better understand, track, and prevent further declines in groundwater levels by the start of the second implementation period (2027-2032).

The City of Dorris Well Deepening and Pipeline Replacement Project and the Well Inventory and Well Mitigation Program are designed to understand where beneficial uses and users of groundwater are located and provide pathways to avoid undesirable results due to the lowering of groundwater levels that would lead to wells going dry. These projects will provide alternative sources of water to these beneficial uses and users as the GSA works to stabilize groundwater levels in the Basin. The Groundwater Demand Management Program and Preliminary Groundwater Allocation Program are intended to stabilize and likely reduce groundwater use in the Basin. Collectively, these new additions to the 2024 GSP are significant improvements.

The 2024 Plan's projects and management actions have been updated to include more information about timelines, expected benefits, estimated costs, and measurable objectives for each project and management action. Department staff believe the inclusion of these four additional projects and management actions and the expanded details are sufficient to indicate that the GSA has developed a feasible plan to accomplish its sustainability goal.

Department staff note there is some important information about these new projects and management actions that was not included in the 2024 GSP. Specifically, the Preliminary Groundwater Allocation Program does not include an estimate of the expected benefits. Instead, the Plan states the benefits will simply include mitigating groundwater declines and tracking changes in groundwater levels and measurements of groundwater demands. This management action appears to be the main mechanism for reducing current groundwater use to reach the Basin sustainable yield, however, there is no estimate for how much groundwater will be allocated or how much it will be reduced from current extraction levels. Department staff also note there is no discussion about enforcement

<sup>&</sup>lt;sup>31</sup> Incomplete Determination of the 2022 Groundwater Sustainability Plan for the Butte Valley Basin, Department of Water Resources, January 18, 2024. https://sgma.water.ca.gov/portal/service/gspdocument/download/10005, p. 15.

mechanisms or authority and view this as an important component to a successful groundwater allocation program. It is stated in the 2024 Plan that a working group for this management action will be created by December 2024, a draft water allocation program be written by December 2025, and a final draft adopted by December 2026. Department staff recommend the GSA provide updates on this program in annual reports and an estimate of the amount of groundwater pumping reductions that will be required to reach the sustainable yield of 65,000 acre-feet (AF) by 2027 as specified in the 2024 Plan as these details are developed (see <u>Recommended Corrective Action 1a</u>).

Important details about the demand management program are also lacking in the 2024 GSP. The 2024 GSP states the demand management program is ongoing and will include crop assessments, efforts to improve irrigation efficiency, and the groundwater allocation program.<sup>32</sup> Monitoring sites will be identified by 2025, and the program will be funded by grant funds. The 2024 Plan does not describe how this program will lead to actual demand management and reduction in groundwater extraction. The program appears to be a data collection effort that may lead to voluntary demand reduction without a mandatory component for demand management. Without a mandatory component for demand reduction, Department staff question the effectiveness of the program. The GSA should consider developing triggers for when different components of the demand management program will be implemented based on the results of the monitoring efforts. Department staff recommend the GSAs provide updates to the GSP in annual reports and the periodic evaluation about the demand management program. The GSA should provide enough information so that it will be evident that the GSA's implementation of projects and management actions are feasible and likely to prevent undesirable results.<sup>33</sup> Some examples of this kind of information would be tracking changes in cropping patterns, documented irrigation upgrades and the associated water savings generated, as well as documented field fallowing with associated groundwater use reductions. The GSA should report on the effectiveness of its voluntary demand management program in annual reports and periodic evaluations (see Recommended Corrective Action 1b).

Overall, Department staff believe the GSA will have taken sufficient action to provide the means to mitigate overdraft after the recommended corrective actions are addressed by explaining in detail how the groundwater allocation and groundwater demand programs will allow the GSA to mitigate overdraft.

#### 4.1.3 Conclusion

In conclusion, Department staff view the 2024 Plan to have adequately addressed corrective action 1a (reassess overdraft conditions) by removing language stating the Basin is not in overdraft and providing updated annual change in groundwater storage values showing long-term chronic overdraft exists. Department Staff also believe the GSA will have taken sufficient action to address corrective action 1b (provide reasonable means to mitigate overdraft) by adding two new management actions designed to reduce

<sup>&</sup>lt;sup>32</sup> 2024 Butte Valley Basin, Section 4.3, p. 245.

<sup>&</sup>lt;sup>33</sup> 23 CCR § 355.4(b)(5).

groundwater extraction and likely mitigate the amount of overdraft occurring today, once recommended corrective actions are addressed.

# 4.2 DEFICIENCY 2 THE GSP DOES NOT ESTABLISH SUSTAINABLE MANAGEMENT CRITERIA FOR CHRONIC LOWERING OF GROUNDWATER LEVELS IN A MANNER SUBSTANTIALLY COMPLIANT WITH THE GSP REGULATIONS.

#### 4.2.1 Corrective Action 2

The GSA must provide a more detailed explanation and justification regarding the selection of the sustainable management criteria for groundwater levels, particularly undesirable results and minimum thresholds, and the effects of those criteria on the interests of beneficial uses and users of groundwater. Department staff recommend the GSA consider and address the following:

- a) Describe the specific, quantitative undesirable results they aim to avoid through implementing the Plan. This must include a quantitative description of the negative effects to beneficial uses and users that would be experienced at undesirable result conditions. The GSA should fully disclose and describe and explain its rationale for determining the number of wells that may be dewatered and the level of impacts to groundwater dependent ecosystems that may occur without rising to significant and unreasonable levels constituting undesirable results. Lastly, the GSA should explain how well mitigation will be considered by the GSA during its management of the Basin in a project or management action as part of the GSP.
- b) Revise minimum thresholds to be set at the level where the depletion of supply across the Basin may lead to undesirable results. Provide the criteria used to establish and justify minimum thresholds. Consider and disclose how minimum thresholds may affect the interests of beneficial uses and users. Fully document the analysis and justifications performed to establish the criteria used to establish minimum thresholds. Clearly show each step of the analysis and provide supporting information used in the analysis.
- c) Provide an evaluation of how minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests. Identify the number and location of wells that may be negatively affected when minimum thresholds are reached. Compare well infrastructure for all well types in the Basin with minimum thresholds at nearby suitably representative monitoring sites. Document all assumptions and steps clearly so that it will be understood by readers of the GSP. Include maps of potentially affected well locations, identify the number of potentially affected wells by well type, and provide a supporting discussion of the effects. Also, provide an evaluation of how the proposed management may impact environmental users such as GDEs.

#### 4.2.2 Evaluation of Resubmitted Plan

#### *4.2.2.1* Corrective Action 2a – Describe Undesirable Results

The Department's Incomplete Determination<sup>34</sup> directed the GSA that the GSA should describe the specific quantitative undesirable results it plans to avoid.<sup>35</sup> In response, the GSA revised their definition of undesirable results and added a well mitigation management action to avoid undesirable results as groundwater levels decline under GSA management.

The 2022 GSP included a vague definition of undesirable results which called out wells going dry, increased pumping costs, and adverse impacts to environmental uses and users without providing quantitative impacts or connecting minimum thresholds to undesirable results.<sup>36</sup> The 2022 GSP also stated undesirable results may occur above minimum thresholds which is not in line with the GSP Regulations.

Department staff note that the 2022 GSP included an inappropriate well impact analysis that considered wells outside the Butte Valley Basin and thus outside the GSA's jurisdiction.<sup>37</sup> The 2022 GSP's analysis estimate that 9-24% of the approximately 1,000 wells (90-240 wells) would be dry at minimum thresholds.<sup>38</sup> The 2022 Plan did not provide analysis and discussion for each well type, nor provide figures showing the spatial location of the impacted wells. It provided graphics of each well type in various geologic formations as well as a combined figure showing the location of all wells.<sup>39</sup>

The 2024 GSP limits its well impact analysis to wells the GSA believed are within the Basin, and analyzes 443 wells estimates that 12% of domestic wells (up to 28 wells) would likely go dry at the 2024 Plan's minimum thresholds.<sup>40</sup> The analysis is further discussed in Section 4.2.2.3 of this report.

In the 2024 Plan, the GSA revises the definition of undesirable results using a stakeholder process with input from technical advisors and members of the public.<sup>41</sup> Undesirable results now include the number of domestic, public and agricultural wells going dry that cannot not be mitigated.<sup>42</sup> The spatial coverage and/or degradation in the health of interconnected surface waters and groundwater dependent ecosystem is also identified as a qualitative undesirable result.<sup>43</sup>

The 2024 GSP uses a financial analysis of the capacity of its members to mitigate dry wells to quantify the number of wells that could go dry and not have undesirable results.

<sup>&</sup>lt;sup>34</sup> https://sgma.water.ca.gov/portal/service/gspdocument/download/10005.

<sup>&</sup>lt;sup>35</sup> 23 CCR 354.28(b)(4).

<sup>&</sup>lt;sup>36</sup> 2022 Butte Valley GSP, Section 3.4.1.1, p. 188.

<sup>&</sup>lt;sup>37</sup> 2024 Butte Valley GSP, Appendix 3-C, pp. 621-622.

<sup>&</sup>lt;sup>38</sup> 2022 Butte Valley GSP, Appendix 3-C, p. 615.

<sup>&</sup>lt;sup>39</sup> 2022 Butte Valley GSP, Appendix 3-C, pp. 597-603.

<sup>&</sup>lt;sup>40</sup> 2024 Butte Valley GSP, Appendix 3-C, pp. 619-653.

<sup>&</sup>lt;sup>41</sup> 2024 Butte Valley GSP, Section 3.4.1.1, p. 200.

<sup>&</sup>lt;sup>42</sup> 2024 Butte Valley GSP, Section 3.4.1.1, pp. 200-201.

<sup>&</sup>lt;sup>43</sup> 2024 Butte Valley GSP, Section 3.4.1.1, p. 200.

From their analysis the GSA identified that it could mitigate approximately 20% of domestic wells (40-50 wells) over the SGMA implementation period (2022-2042). The 2024 GSP includes an updated well impact analysis in Appendix 3-C, which estimated that 12% of domestic wells (up to 28 wells) would likely go dry at the 2024 Plan's minimum thresholds.<sup>44</sup> Since the GSA believes it can mitigate more wells than the number of wells estimated to go dry, the GSA concludes that it can prevent undesirable results in the Basin.<sup>45</sup>

The 2024 GSP defines the quantitative definition of undesirable result for groundwater levels occur as the fall low water level observation (i.e., the minimum elevation in any given water year) in more than 25% (more than 3 wells with the current monitoring network) of the representative monitoring sites in the Basin fall below their respective minimum thresholds over two consecutive years.<sup>46</sup>

Department staff conclude that the proposal to establish a well mitigation program sufficiently explains how alternate supplies or mitigation will be considered. The GSA has provided a schedule for implementation, an estimated budget, and provided the number of wells anticipated to be mitigated. Department staff also note that the program is under development and look forward to seeing details about how the determination of whether impacts are related to groundwater management during the GSP implementation period will be made. Specifically, how will this analysis be conducted, and will all wells that go dry be mitigated, or only wells that meet certain criteria? What are those criteria? Department staff encourage a robust and public process for any evaluation steps.

Department staff conclude that changes made to the definition of undesirable results in the 2024 Plan satisfactorily address deficiencies identified by the Department in the 2022 GSP. The GSA now clearly identifies the number of dewatered wells that would be significant and unreasonable. Further, the GSA now proposes to include a well mitigation program to address any wells that go dry due to groundwater management by the GSA. The 2024 GSP includes an analysis showing the proposed well mitigation program can address more wells than are projected to go dry. Based on the changes to the 2024 GSP, it appears domestic wells that go dry due to proposed lowering of groundwater levels will be mitigated, which is a substantial improvement from the initial GSP.

*4.2.2.2 Corrective Action 2b – Set Minimum Thresholds to limit Undesirable Results* The Department's Incomplete Determination<sup>47</sup> directed the GSA that the GSA should revise its minimum thresholds to consider the depletion of supply across the Basin and disclose how minimum thresholds may affect the interests of beneficial uses and users.<sup>48</sup>

<sup>&</sup>lt;sup>44</sup> 2024 Butte Valley GSP, Appendix 3-C, pp. 619-653.

<sup>&</sup>lt;sup>45</sup> 2024 Butte Valley GSP, Section 3.4.1.1, p. 201.

<sup>&</sup>lt;sup>46</sup> 2024 Butte Valley GSP, Section 3.4.1.1, p. 201.

<sup>&</sup>lt;sup>47</sup> https://sgma.water.ca.gov/portal/service/gspdocument/download/10005.

<sup>48 23</sup> CCR 354.28(b)(4).

In response, the GSA revised their minimum thresholds to be based on a well impact analysis and connected them to undesirable results described above.

The 2022 Plan called for setting minimum thresholds by continued drawdown of groundwater levels until 2042 using a soft-landing trigger to prevent further drawdown.<sup>49</sup> Under this approach the well impact analysis estimated between 90-240 wells (inside and near the Butte Valley Basin) potentially going dry (up to 24% of total wells).<sup>50</sup> This would result in undesirable results that could not be mitigated by the GSA. This method was problematic because it did not tie the minimum thresholds to the undesirable results as required by SGMA.

The 2024 Plan revises the methodology by first defining undesirable results in a quantitative fashion and then sets minimum thresholds to prevent undesirable results. The 2024 GSP estimates the GSA can mitigate 40-50 dry domestic wells over the SGMA implementation period (2022-2042). Using this information and the well failure analysis, the GSA determined elevations in the monitoring wells that would correlate to approximately 28 wells going dry.<sup>51</sup>

Department staff conclude that this is sufficient action taken by the GSA to address the deficiency. The 2024 GSP's criteria used to establish the minimum thresholds considers impacts to well infrastructure and considers some beneficial uses and users due to the GSA's updated approach in setting minimum thresholds. The 2022 Plan methodology was unacceptable because it did not tie undesirable results to minimum thresholds.

# 4.2.2.3 Corrective Action 2c – Evaluate the impacts of Minimum Thresholds on Beneficial Uses and Users

The Department's Incomplete Determination<sup>52</sup> directed the GSA that the GSA should provide an evaluation of how minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests, including the number and location of wells that may be negatively affected.<sup>53</sup> In response, the GSA revised their well impact analysis by describing the potential impacts at minimum thresholds.

The 2022 GSP did not provide analysis and discussion for each well type, nor provide figures showing the spatial location of each well type for the impacted wells. The 2022 Plan states that between 9-24% of wells in the Basin (90 to 240 wells) were at risk of going dry at minimum thresholds.<sup>54</sup> In its conclusion paragraph, 2022 GSP's well failure analysis stated, "The number of wells affected by groundwater elevations at the Minimum Threshold is insignificant."<sup>55</sup>

<sup>&</sup>lt;sup>49</sup> 2022 Butte Valley GSP, Section 3.4.1.2, p. 190.

<sup>&</sup>lt;sup>50</sup> 2022 Butte Valley GSP, Appendix 3-C, p. 615.

<sup>&</sup>lt;sup>51</sup> 2024 Butte Valley GSP, Appendix 3-C, pp. 634-635.

<sup>&</sup>lt;sup>52</sup> https://sgma.water.ca.gov/portal/service/gspdocument/download/10005.

<sup>&</sup>lt;sup>53</sup> 23 CCR 354.28(b)(4).

<sup>&</sup>lt;sup>54</sup> 2022 Butte Valley GSP, Appendix 3-C, p. 615.

<sup>&</sup>lt;sup>55</sup> 2022 Butte Valley GSP, Appendix 3-C, p. 615.

The 2024 Plan provides a revised well failure analysis (found in Appendix 3-C) that limits analysis to wells that are present within the Basin.<sup>56</sup> Two approaches were used in the well failure analysis: a direct comparison of estimated water level depth with well depth, and a trend analysis using the slope of cumulative distribution of estimated wet water column depth compared to well depth. These two methods yielded similar results.<sup>57</sup> The 2024 GSP's analysis includes figures for each well type (domestic, agricultural, public wells),<sup>58</sup> The 2024 GSP also provides a figure showing the locations and number of dry wells at the minimum thresholds conditions.<sup>59</sup>

The 2024 Plan also provides a detailed discussion for each well infrastructure type on how beneficial users would be impacted by groundwater drawdown to minimum thresholds. The 2024 GSP indicates that there were no outages of public wells from 2015 to 2023 and the analysis indicates that zero public wells are expected to become dry at minimum thresholds.<sup>60</sup> The same analysis is done for agricultural wells and identified 10 agricultural wells were dry before 2023 and an additional 7 agricultural wells are estimated to become dry from current groundwater levels to the minimum threshold.<sup>61</sup> The 2024 GSP indicates that there were 14 outages of domestic wells from 2015 to 2023 and the analysis indicates that 14 additional domestic wells are expected to become dry at minimum thresholds (for a total of approximately 28 wells).<sup>62</sup> As discussed in Section 4.2.2.1, the GSA plans to establish a mitigation program with capacity to address every dry well that may occur at minimum thresholds.<sup>63</sup>

Department staff conclude the GSA has taken sufficient action to remedy corrective action 2c. Department staff note that the 2024 GSP includes substantial revisions in the well failure analysis and the inclusion of updated and complete figures that separate each well infrastructure type. The 2024 Plan did an acceptable job describing the impacts on the beneficial uses and users for current conditions as well as conditions at minimum thresholds.

#### 4.2.3 Conclusion

In conclusion, Department staff conclude that the GSA has taken sufficient action by updating the 2024 Plan. The 2024 GSP describes undesirable results by identifying the number of wells the GSA believes it can mitigate. The 2024 GSP revises minimum thresholds by setting new minimum thresholds in accordance with the undesirable results. And lastly, the 2024 GSP describes the impacts to beneficial uses and users by providing a robust well failure analysis that met the requirements for providing separate analysis for

<sup>&</sup>lt;sup>56</sup> 2024 Butte Valley GSP, Appendix 3-C, pp. 621-622.

<sup>&</sup>lt;sup>57</sup> 2024 Butte Valley GSP, Appendix 3-C, pp. 634-635.

<sup>&</sup>lt;sup>58</sup> 2024 Butte Valley GSP, Appendix 3-C, Figures 1 and 2, pp. 623 and 624.

<sup>&</sup>lt;sup>59</sup> 2024 Butte Valley GSP, Appendix 3-C, Figure 11, p. 642.

<sup>&</sup>lt;sup>60</sup> 2024 Butte Valley GSP, Appendix 3-C, p. 645.

<sup>&</sup>lt;sup>61</sup> 2024 Butte Valley GSP, Appendix 3-C, p. 645.

<sup>&</sup>lt;sup>62</sup> 2024 Butte Valley GSP, Appendix 3-C, p 634.

<sup>&</sup>lt;sup>63</sup> 2024 Butte Valley GSP, Appendix 3-C, p. 647.

all well infrastructure types and providing figures locating potential dry wells in the basin under current and minimum threshold conditions.

# **5** PLAN EVALUATION

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

The Department staff's evaluation of the likelihood of the Plan to attain the sustainability goal for the Basin is provided below. Department staff consider the information presented in the Plan to satisfy the general requirements of the GSP Regulations.

# 5.1 Administrative Information

The GSP Regulations require each Plan to include administrative information identifying the submitting Agency, its decision-making process, and its legal authority;<sup>64</sup> a description of the Plan area and identification of beneficial uses and users in the Plan area;<sup>65</sup> and a description of the ability of the submitting Agency to develop and implement a Plan for that area.<sup>66</sup>

The 2024 GSP describes the GSA, discusses its decision-making process, and provides its legal authority. The 2024 GSP identifies the Siskiyou County Flood Control and Water Conservation District as the sole GSA for the Basin. The Siskiyou County Flood Control and Water Conservation District was established in 1959 of limited powers that could provide flood protection, water conservation, recreation and aesthetic enhancement within its boundaries.<sup>67</sup> The Siskiyou County Flood Control and Water Conservation District is governed by a Board of Directions, which is composed of the Siskiyou County Board of Supervisors, and its decision-making process is completed pursuant to a majority vote by the District Board.<sup>68</sup> The Siskiyou County Flood Control and Water Conservation District remains a separate legal entity from the County.<sup>69</sup> Legal authority for the Siskiyou County Flood Control and Scott River Valleys, was approved on April 4, 2017 by Siskiyou County Resolution FLD17-01.<sup>70</sup>

<sup>&</sup>lt;sup>64</sup> 23 CCR § 354.6 et seq.

<sup>&</sup>lt;sup>65</sup> 23 CCR § 354.8 *et seq*.

<sup>&</sup>lt;sup>66</sup> 23 CCR § 354.6(e).

<sup>&</sup>lt;sup>67</sup> 2024 Butte Valley GSP, Section 1.3.2, p. 39.

<sup>&</sup>lt;sup>68</sup> 2024 Butte Valley GSP, Section 1.4.2, p. 40.

<sup>&</sup>lt;sup>69</sup> 2024 Butte Valley GSP, Section 1.3.2, p. 39.

<sup>&</sup>lt;sup>70</sup> 2024 Butte Valley GSP, Section 1.3.3, p. 39.

The 2024 GSP provides a description of the plan area. The Butte Valley Basin is a medium-priority basin with an area of 79,900 acres (125 square miles), located within Siskiyou County in Northern California. The Butte Valley Basin (Figure 1) is surrounded by several mountain ranges: the Cascade Mountains in the north, south, and west, and the Mahogany Mountain ridge in the east and Sheep Mountain and Red Rock Valley in the southeast. The major water features in the Basin are Meiss Lake and several streams, the largest being Butte Creek.<sup>71</sup>

The 2024 GSP states that the Basin has "three notable population centers: City of Dorris (Population: 962), Macdoel (Population: 155) and Mount Hebron (Population: 81)."<sup>72</sup> All three communities are identified as severely disadvantaged communities and rely on groundwater as their sole source of drinking water, using a combination of municipal water district, small water suppliers, and domestic wells.<sup>73</sup> The GSP states that the Basin and watershed do not contain any tribal lands or tribal interests.<sup>74</sup> However, Department staff note that this statement appears to be inconsistent with information presented in Appendix 1-A stating that a representative for the Shasta Indian Nation was appointed to the Butte Valley Stakeholder Advisory Committee.<sup>75</sup> The 2024 GSP states that the Basin has no adjudicated areas and contains one irrigation district, one water district, and four small water suppliers.<sup>76</sup> Land use categories, area in acres, and percentages of Basin area are provided in Table 2.1 of the GSP.<sup>77</sup> As of 2010, the primary land uses (and percentages) are: (1) Alfalfa pasture (18.6%); (2) Grain and Hay (9.3%); and (3) Riparian Vegetation including managed wetlands (5.7%).<sup>78</sup>

- <sup>73</sup> 2024 Butte Valley GSP, Section 2.1.1.1, p. 46.
- <sup>74</sup> 2024 Butte Valley GSP, Section 2.1.1.1, p. 46.
- <sup>75</sup> 2024 Butte Valley GSP, Appendix 1-A, p. 295.
- <sup>76</sup> 2024 Butte Valley GSP, Section 2.1.1.1, p. 47.

<sup>&</sup>lt;sup>71</sup> 2024 Butte Valley GSP, Section 2.1.1, p. 46.

<sup>&</sup>lt;sup>72</sup> 2024 Butte Valley GSP, Section 2.1.1.1, p. 46.

<sup>&</sup>lt;sup>77</sup> 2024 Butte Valley GSP, Table 2.1, p. 52.

<sup>&</sup>lt;sup>78</sup> 2024 Butte Valley GSP, Table 2.1, p. 52.

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Figure 1: Butte Valley Basin Location Map.

The 2024 GSP states that locations of existing wells were accessed via the DWR Online System for Well Completion Reports, and that the dataset may include abandoned or destroyed wells.<sup>79</sup> A total of 443 wells were identified as in or near Butte Valley and included in the Butte Valley geologic model, with 163 domestic wells, 148 agricultural production wells, 6 public/municipal wells, 2 industrial wells, 22 monitoring wells, 10 stock water wells, 14 testing wells, and 78 wells with no specified planned use.<sup>80</sup>

The 2024 GSP provides discussion of the beneficial users and users of groundwater in the Basin. The beneficial users of the Basin have been identified as agricultural users, such as farmers, ranchers, and dairy professionals; rural agricultural and domestic well owners; municipal well operators; public water systems; local land use planning agencies; environmental users and users of groundwater, including but not limited to habitat that supports fish, birds, animals, and insects; endangered species protection; protection of beneficial habitat for recreation and other societal benefits; surface water users; recreational users; Tribal governments; and disadvantaged communities.<sup>81</sup>

<sup>&</sup>lt;sup>79</sup> 2024 Butte Valley GSP, Section 2.1.1.2, p. 54.

<sup>&</sup>lt;sup>80</sup> 2024 Butte Valley GSP, Section 2.1.1.2, pp. 54-55.

<sup>&</sup>lt;sup>81</sup> 2024 Butte Valley GSP, Section 1.4.3.2, p. 42.

The 2024 GSP describes the GSA's ability to develop and implement the GSP<sup>82</sup> and the implementation schedule.<sup>83</sup> The estimated annual cost of GSP implementation over the 20-year planning period (2022 to 2042) is projected between \$165,000 and \$260,000, which is an increase from the projected cost of \$120,000 to \$210,000 per year summarized in Table 5-2.<sup>84</sup> The purpose of this increase is "to account for potential well mitigation costs expected over the GSP implementation period." <sup>85</sup> The 2024 GSP discusses potential funding sources and mechanisms which includes feepayers, general funds or capital improvement funds, special taxes, assessments, user fees, bonds, grants, and the Disadvantaged Community (DAC) Involvement Program. <sup>86</sup> The information presented in the 2024 GSP related to the GSA's authority and financial plan to implement the Plan provides a reasonable level of confidence that the Agency can manage groundwater to progress towards the sustainability goal in the Basin.

The administrative information section included in the 2024 GSP is substantially compliant with the requirements outlined in the GSP Regulations. Department staff consider the information presented in the Plan to satisfy the general requirements of the GSP Regulations for administrative information.<sup>87</sup>

# 5.2 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.<sup>88</sup>

## 5.2.1 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.<sup>89</sup> The GSP Regulations require a descriptive hydrogeologic conceptual model that includes a written description of geologic conditions, supported by cross sections and maps,<sup>90</sup> and includes a description of basin

<sup>&</sup>lt;sup>82</sup> 2024 Butte Valley GSP, Section 5.1, pp. 264-273.

<sup>&</sup>lt;sup>83</sup> 2024 Butte Valley GSP, Section 5.3, pp. 275-276.

<sup>&</sup>lt;sup>84</sup> 2024 Butte Valley GSP, Table 5-2, p. 274.

<sup>&</sup>lt;sup>85</sup> 2024 Butte Valley GSP, Section 5.2, pp. 273-274.

<sup>&</sup>lt;sup>86</sup> 2024 Butte Valley GSP, Section 5.4, pp. 277-278.

<sup>&</sup>lt;sup>87</sup> 23 CCR § 354.2 et seq.

<sup>88 23</sup> CCR § 354.12 et seq.

<sup>&</sup>lt;sup>89</sup> DWR Best Management Practices for the Sustainable Management of Groundwater: Hydrogeologic Conceptual Model, December 2016: <u>https://water.ca.gov/-/media/DWR-Website/Web-</u>

Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/BMP-3-Hydrogeologic-Conceptual-Model\_ay\_19.pdf. <sup>90</sup> 23 CCR §§ 354.14(a), 354.14(c).

boundaries and the bottom of the basin,<sup>91</sup> principal aquifers and aquitards,<sup>92</sup> and data daps.93

The 2024 GSP provides a description of the hydrogeologic conceptual model based on technical studies and maps that characterize the groundwater systems of the Basin.<sup>94</sup>

The 2024 GSP describes the regional and structural setting of the Butte Valley Basin as "a topographically closed internally drained basin at the boundary between the western Modoc Plateau and eastern Cascade Range geomorphic provinces, near the western and northwestern border of the Medicine Lake Highlands."95 The 2024 GSP provides a generalized geologic map<sup>96</sup> of the Basin and the surrounding watershed, displaying major fault zones and the locations of the three cross-sections provided,<sup>97</sup> and a summary of the Basin's geologic units.<sup>98</sup> During the Pleistocene, extensional block faulting of the older cascade volcanic rock formed a structural depression that filled with sediment, forming Butte Valley.<sup>99</sup> Butte Valley is bordered on all sides by the Cedar Mountain fault system, a complex group of generally north- to north-northwest-striking normal faults along the boundary between the Cascade Ranges and the Modoc Plateau can act as both a flow barrier and very transmissive conduit for groundwater flow.<sup>100</sup>

GSP Regulations require the description of principal aquifers, including the formation names in each principal aquifer, physical properties of the aquifers, and the structural properties of the Basin that restrict groundwater flow in principal aguifers.<sup>101</sup> The GSP did not explicitly identify principal aguifers within the Plan; however, the GSP does identify water-bearing formations that include Lake Deposits, Butte Valley Basalt, and High Cascade Volcanics geologic formations based on their specific yields and their estimated storage.<sup>102</sup> The Butte Valley Basalt and High Cascade Volcanics water bearing formations are overlain and confined by the Lake Deposits in most parts of the Basin.<sup>103</sup> In addition to the three principal water bearing formations, the 2024 GSP identifies Alluvial Fan Deposits and Pyroclastic Rocks as minor water bearing formations.<sup>104</sup> Appendix 1-D indicates that the 2024 GSP identifies one principal aguifer in the plan content table,<sup>105</sup> however the basin settings section of the GSP does not state this. Department staff note that throughout the 2024 GSP the three principal water bearing formations are used when

- 95 2024 Butte Valley GSP, Section 2.2.1, p. 67.
- <sup>96</sup> 2024 Butte Valley GSP, Figure 2.13, p. 76.
- <sup>97</sup> 2024 Butte Valley GSP, Figures 2.14 to 2.16, pp. 79-81.
- <sup>98</sup> 2024 Butte Valley GSP, Section 2.2.1.4, pp. 82-85.
- <sup>99</sup> 2024 Butte Valley GSP, Section 2.2.1.3, p. 75.
- <sup>100</sup> 2024 Butte Valley GSP, Section 2.2.1.5, pp. 85-86.
- <sup>101</sup> 23 CCR §§ 354.14(b)(4)(A-E).

<sup>103</sup> 2024 Butte Valley GSP, Section 2.2.1.6, pp. 86-87.

<sup>91 23</sup> CCR §§ 354.14(b)(2-3).

 <sup>&</sup>lt;sup>92</sup> 23 CCR § 354.14(b)(4) *et seq.* <sup>93</sup> 23 CCR § 354.14(b)(5).

<sup>&</sup>lt;sup>94</sup> 2024 Butte Valley GSP, Section 2.2.1 to 2.2.2, pp. 67-148.

<sup>&</sup>lt;sup>102</sup> 2024 Butte Valley GSP, Section 2.2.1.6, p. 86.

<sup>&</sup>lt;sup>104</sup> 2024 Butte Valley GSP, Section 2.2.1.6, p. 86.

<sup>&</sup>lt;sup>105</sup> 2024 Butte Valley GSP, Appendix 1-D, p. 393.

referring to the aquifer, i.e., in the monitoring section,<sup>106</sup> which leads Department staff to infer that these formations are considered a single principal aquifer.

The 2024 GSP describes the Basin's hydraulic conductivity, structural properties that restrict groundwater flow,<sup>107</sup> and primary use of the principal water bearing formations within the Basin.<sup>108</sup> Storativity estimates are provided for the unconfined units: Butte Valley Basalt, Pyroclastic Rocks, and Lake Deposits; however, the estimate of storativity for the confined units (such as the High Cascade Volcanic formation) are not provided. Instead, the GSA calculates the Basin's groundwater storage by multiplying the average Basin specific yield of the unconfined units (9.5%) and the total change in volume of water within a specified period of time, usually between two specified years or seasons.<sup>109</sup>

The 2024 GSP identifies three data gaps within the hydrogeologic conceptual model: the presence of a rainfall gradient,<sup>110</sup> the lateral extent of the Butte Valley Basalt formation,<sup>111</sup> and the total depth of the alluvial deposits (Lake Deposits, etc.) within the Basin.<sup>112</sup> Additionally, the GSP states that the depth and lateral extent of the High Cascades Volcanics subprovince, the main formation for both recharge and storage in the Basin, are poorly defined.<sup>113</sup> Earlier attempts with seismic studies were inconclusive concerning the contact between the High Cascades Volcanic subprovince and Western Cascades subprovince.<sup>114</sup> This results in the GSA being unable to define the bottom of the Basin as required by GSP Regulations.<sup>115</sup> On-going studies like DWR's Airborne Electromagnetic (AEM) survey in the Basin may help in locating the bottom of the High Cascades Volcanic subprovince and ultimately the bottom of the Basin. Provided the vague descriptions of the principal aguifer and the many data gaps regarding the properties of several geologic units as noted above, Department staff are concerned that the principal aquifer identified in the 2024 GSP is not representative of the physical conditions in the Basin. The presence of confined and unconfined groundwater conditions is not well-defined due to data gaps with respect to Basin stratigraphy and hydrogeologic properties as mentioned above. Department staff note that adjacent GSPs (specifically, Tule Lake) identify multiple principal aquifers. Department staff recommend the GSA provide additional rationale to support the identification of one principal aguifer; or provide any plans or studies toward investigations into the Basin's aguifer to better define it. The GSA should provide updates on this topic in future annual reports and the 5-year periodic evaluations to clarify the aguifer's characteristics, including the lateral extent, total depth, and interactions between geologic formations (see Recommended Corrective Action 2a).

<sup>&</sup>lt;sup>106</sup> 2024 Butte Valley GSP, Section 3.3, p. 190.

<sup>&</sup>lt;sup>107</sup> 2024 Butte Valley GSP, Section 2.2.1.6, pp. 86-89.

<sup>&</sup>lt;sup>108</sup> 2024 Butte Valley GSP, Sections 2.2.2.1 and 2.2.2.2, pp. 98-103.

<sup>&</sup>lt;sup>109</sup> 2024 Butte Valley GSP, Section 2.2.2.4, pp. 110-114.

<sup>&</sup>lt;sup>110</sup> 2024 Butte Valley GSP, Appendix 3-A, p. 585.

<sup>&</sup>lt;sup>111</sup> 2024 Butte Valley GSP, Appendix 3-A, p. 586.

<sup>&</sup>lt;sup>112</sup> 2024 Butte Valley GSP, Appendix 3-A, p. 586.

<sup>&</sup>lt;sup>113</sup> 2024 Butte Valley GSP, Section 2.2.2.4, p. 110.

<sup>&</sup>lt;sup>114</sup> 2024 Butte Valley GSP, Section 2.2.1.4, p. 82.

<sup>&</sup>lt;sup>115</sup> 23 CCR § 354.14(b)(3).

The 2024 GSP does not provide a priority or plans for any of the three listed data gaps within the hydrogeologic conceptual model.<sup>116</sup> GSP Regulations require GSAs to identify the steps that will be taken to fill data gaps prior to the next periodic evaluation.<sup>117</sup> Department staff recommend the GSA propose a project or management action and a schedule to address the hydrogeologic conceptual model's data gaps, especially to better define the principal aquifers and understand the potential interconnectivity between them (see Recommended Corrective Action 2b).

Department staff consider the hydrogeologic conceptual model section included in the 2024 GSP will be considered substantially compliant with the requirements outlined in the GSP Regulations, <sup>118</sup> once the GSA has adequately addressed the recommended corrective actions identified for this section.

#### 5.2.2 Groundwater Conditions

The GSP Regulations require a written description of historical and current groundwater conditions for each of the applicable sustainability indicators and groundwater dependent ecosystems that includes the following: groundwater elevation contour maps and hydrographs,<sup>119</sup> a graph depicting change in groundwater storage,<sup>120</sup> maps and crosssections of the seawater intrusion front, <sup>121</sup> maps of groundwater contamination sites and plumes,<sup>122</sup> maps depicting total subsidence,<sup>123</sup> identification of interconnected surface water systems and an estimate of the quantity and timing of depletions of those systems,<sup>124</sup> and identification of groundwater dependent ecosystems.<sup>125</sup>

The 2024 GSP provides a description of current (1979 to 2020)<sup>126</sup> and historical (1880 to 1979) <sup>127</sup> groundwater conditions within the Basin. <sup>128</sup> The 2024 GSP provides groundwater elevation contour maps for spring and fall of years 1979, 2015, and 2018; and for spring of years 1986, 1991, 2008, 2016, 2017, and 2019.<sup>129</sup> The maps do not cover the entire Basin, and the approximate month associated with the Basin's seasonal high and low measurements are not specified. The groundwater elevation contour maps display the groundwater potentiometric surface in units depicting depth below ground surface,<sup>130</sup> whereas GSP Regulations require the groundwater elevation contour maps

- 124 23 CCR § 354.16(f).
- 125 23 CCR § 354.16(g).

<sup>&</sup>lt;sup>116</sup> 2024 Butte Valley GSP, Appendix 3-A, Table 2 pp. 592-593.

<sup>&</sup>lt;sup>117</sup> 23 CCR § 354.38(d). <sup>118</sup> 23 CCR § 354.14 *et seq*.

<sup>&</sup>lt;sup>119</sup> 23 CCR §§ 354.16(a)(1-2).

<sup>&</sup>lt;sup>120</sup> 23 CCR § 354.16(b).

<sup>&</sup>lt;sup>121</sup> 23 CCR § 354.16(c).

<sup>&</sup>lt;sup>122</sup> 23 CCR § 354.16(d).

<sup>&</sup>lt;sup>123</sup> 23 CCR § 354.16(e).

<sup>&</sup>lt;sup>126</sup> 2024 Butte Valley GSP, Section 2.2.2.3, p. 105.

<sup>&</sup>lt;sup>127</sup> 2024 Butte Valley GSP, Section 2.2.2.3, pp. 104-105.

<sup>&</sup>lt;sup>128</sup> 2024 Butte Valley GSP, Section 2.2.2.3, p. 103-110.

<sup>&</sup>lt;sup>129</sup> 2024 Butte Valley GSP, Figures 9-20, pp. 423-434.

<sup>&</sup>lt;sup>130</sup> 2024 Butte Valley GSP, Figures 9-20, pp. 423-434.

display the potentiometric surface in groundwater elevation above mean sea level.<sup>131</sup> Department staff recommend the GSA provide groundwater contour maps in in both groundwater elevation and depth below ground surface (see <u>Recommended Corrective</u> <u>Action 3</u>).

Long-term groundwater elevations are provided in a combined hydrograph with data from five wells over the late 1950s to the early 2020s period, where it is observed that groundwater levels have lowered by approximately 30 feet from 1979 to 2015.<sup>132</sup> The 2024 GSP provides hydrographs for each representative monitoring site depicting the upper and lower measurable objectives, minimum threshold, and water year type.<sup>133</sup> Department staff note all wells show a declining trend with ten of the thirteen displaying the most recent measurement to be near or below the lower measurable objective.

The 2024 GSP includes a graph depicting the annual and cumulative change in groundwater storage from 1989 to 2018, including annual groundwater use and water year type.<sup>134</sup> The graph displays the change in groundwater storage between seasonal low groundwater conditions, whereas the Department recommends the graph show the change in volume of groundwater in storage between seasonal high conditions.<sup>135</sup> Specific yield and storage capacity estimates are provided for the unconfined Lake Deposits, pyroclastic rocks, and Butte Valley Basalt. The weighted average specific yield for these units is 9.5%, with total storage capacity being 2,560,000.<sup>136</sup> The GSP does not provide an estimate of the change in groundwater storage for the underlying volcanic aquifer, citing issues with the complexity of the Basin's aquifer system and its varied lithology.<sup>137</sup> Department staff note the GSA has identified the extent and properties of the volcanic aquifer as a data gap.<sup>138</sup>

The 2024 GSP states that the Basin is located far from coastal areas and seawater intrusion is not a relevant sustainability indicator for the Basin.<sup>139</sup> Given the geographic setting of the Basin, Department staff regard the reasoning of the 2024 GSP as sufficient to demonstrate that sea water intrusion is not present in the Basin and is not likely to occur in the future.

The 2024 GSP states that the Basin's groundwater quality is adequate to meet local needs for municipal, domestic, and agricultural uses, with exceedances caused by localized conditions rather than regional water quality issues.<sup>140</sup> The 2024 GSP includes a description and map of groundwater qualities issues in the Basin, with historical

<sup>&</sup>lt;sup>131</sup> 23 CCR § 354.16(a)(1).

<sup>&</sup>lt;sup>132</sup> 2024 Butte Valley GSP, Figure 2.26, p. 110, Section 2.2.2.1, pp. 105-107.

<sup>&</sup>lt;sup>133</sup> 2024 Butte Valley GSP, Appendix 3-C, pp. 604-618.

<sup>&</sup>lt;sup>134</sup> 2024 Butte Valley GSP, Figure 2.39, p. 152.

<sup>135 23</sup> CCR § 354.16(b).

<sup>&</sup>lt;sup>136</sup> 2024 Butte Valley GSP, Section 2.2.2.4, p. 110.

<sup>&</sup>lt;sup>137</sup> 2024 Butte Valley GSP, Section 2.2.2.4, p. 110.

<sup>&</sup>lt;sup>138</sup> 2024 Butte Valley GSP, Appendix 3-A, p. 586.

<sup>&</sup>lt;sup>139</sup> 2024 Butte Valley GSP, Section 2.2.2.6, p. 123.

<sup>&</sup>lt;sup>140</sup> 2024 Butte Valley GSP, Section 2.2.2.5, p. 115.

groundwater quality issues including locally high arsenic, iron, manganese, boron, total dissolved solids (TDS), sodium, calcium, ammonia, hydrogen, sulfide, phosphorus, and electrical conductivity.<sup>141</sup> The 2024 GSP notes that ongoing monitoring programs show some constituents, including benzene, 1,2 dibromoethane (EDB), arsenic, and boron exceed water quality standards in parts of the Basin. High TDS and sodium have been found in shallow wells in hydraulic communication with Meiss Lake, where irrigation return flows concentrate and produce salts. Additionally, water supply wells perforated in the Basin's lake deposits have been found to have arsenic levels exceeding the 1962 drinking water standard (0.05 parts per million), which may be a result of industrial contamination.<sup>142</sup> A summary of the data and methods employed to come to this conclusion is included in the 2024 GSP as Appendix 2-B.<sup>143</sup> The 2024 GSP defines constituents of concern to include arsenic, nitrate, specific conductivity, 1,2 Dibromoethane, and benzene as chemicals to monitor during the SGMA implementation period.<sup>144</sup>

The 2024 GSP uses Interferometric Synthetic Aperture Radar (InSAR) to determine if subsidence has occurred within the Basin. The 2024 GSP concludes that the majority of the vertical displacement values in the Basin are mostly near-zero, with consideration of the range of 0.1 to -0.1 feet of estimated error for the data.<sup>145</sup> The GSP states that land subsidence is not known to be historically or currently significant. A map is provided showing displacements between June 2015 and September 2019.<sup>146</sup>

The 2024 GSP indicates that the limited extent of surface water features in the Basin are due to the high infiltration capacity of the volcanic soils of the surrounding watershed,<sup>147</sup> and that these surface water features are interconnected, possibly providing some recharge to the Basin.<sup>148</sup> The 2024 GSP does indicate that Meiss Lake and five creeks do lie within the Basin boundary. However, the 2024 GSP states these creeks terminate at the BVWA perimeter canal, and only short stretches of the creeks exist in the Basin that are dry in the summer and fall. The nearest wells to Meiss Lake and four of the five creeks (Ikes, Harris, Muskgrave, and Prather) indicate that groundwater levels are more than 25 feet below ground surface.<sup>149</sup> The 2024 GSP considers Butte Creek as an interconnected surface water that provides recharge to the Basin's aquifer when there are flows in the Basin, and notes that Butte Creek studies upstream of the Basin suggest that the surface water body is a losing stream.<sup>150</sup> The 2024 GSP indicates that the dynamics of

<sup>&</sup>lt;sup>141</sup> 2024 Butte Valley GSP, Section 2.2.2.5, pp. 114-123, Figure 2.28, p. 122.

<sup>&</sup>lt;sup>142</sup> 2024 Butte Valley GSP, Section 2.2.2.5, pp. 114-115.

<sup>&</sup>lt;sup>143</sup> 2024 Butte Valley GSP, Appendix 2-B, pp. 437-475.

<sup>&</sup>lt;sup>144</sup> 2024 Butte Valley GSP, Section 3.4.3, p. 216.

<sup>&</sup>lt;sup>145</sup> 2024 Butte Valley GSP, Section 2.2.2.7, pp. 123-124.

<sup>&</sup>lt;sup>146</sup> 2024 Butte Valley GSP, Figure 2.29, p. 127.

<sup>&</sup>lt;sup>147</sup> 2024 Butte Valley GSP, Section 2.2.3.1, pp. 156-158.

<sup>&</sup>lt;sup>148</sup> 2024 Butte Valley GSP, Section 2.2.2.8, pp. 124-125.

<sup>&</sup>lt;sup>149</sup> 2024 Butte Valley GSP, Section 2.2.2.8, p. 125.

<sup>&</sup>lt;sup>150</sup> 2024 Butte Valley GSP, Section 2.2.2.8, pp. 124-125.

potentially interconnected surface waters. <sup>151</sup> Sustainable management criteria for interconnected surface water is discussed in Section 5.3.2.6 of this report, and the discussion of the Interconnected Surface Water Monitoring Network in Section 5.4.6.

The 2024 GSP includes a description of Groundwater Dependent Ecosystems (GDEs) in the Basin with maps. <sup>152</sup> The Natural Communities Commonly Associated with Groundwater dataset was the primary resource used to establish the spatial extent of the mapped GDEs. The 2024 GSP references Freshwater Aquatic, Wetland, and Riparian as potential GDEs.<sup>153</sup> The 2024 GSP maps vegetation types commonly associated with sub-surface groundwater.<sup>154</sup> The 2024 GSP states that unreliable or outdated habitat maps have resulted in data gaps related to GDEs.<sup>155</sup> Since the submittal of the 2022 GSP, the GSA has worked on filling data gaps related to GDEs.

The 2024 GSP reports that new monitoring sites, rain and stream gages, and groundwater level monitoring sites have been added in areas near potential GDEs to fill these data gaps as shown in Figure 2.36.<sup>156</sup> Department staff recommend continuing this effort by expanding on the results in Appendix 2-C to firm up estimates of the number of acres that contain GDEs for current conditions and to clearly describe how the level of impacts to potential GDEs relates to declining groundwater levels and minimum thresholds. Department staff also ask the GSA to complete the time series analysis of impacts on GDEs which the 2024 Plan discusses, i.e., using the predominate vegetation types and setting a threshold for the number of Spring and Fall periods where the vegetation rooting depths would reach the estimated groundwater table.<sup>157</sup> Please provide maps and descriptions with these discussions. Department staff recommend the GSA includes a discussion considering impacts to GDEs as part of the next periodic evaluation of the GSP (see <u>Recommended Corrective Action 4</u>).

The groundwater conditions section included in the 2024 GSP will be considered substantially compliant with the requirements outlined in the GSP Regulations once the recommended corrective actions are addressed.<sup>158</sup>

#### 5.2.3 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

<sup>&</sup>lt;sup>151</sup> 2024 Butte Valley GSP, Section 2.2.2.8, p. 124-125.

<sup>&</sup>lt;sup>152</sup> 2024 Butte Valley GSP, Section 2.2.2.9, pp. 130-148, Figures 2.32-2.33, pp. 139-140.

<sup>&</sup>lt;sup>153</sup> 2024 Butte Valley GSP, Section 2.2.2.9, pp. 138-141.

<sup>&</sup>lt;sup>154</sup> 2024 Butte Valley GSP, Figure 2.32, p 139.

<sup>&</sup>lt;sup>155</sup> 2024 Butte Valley GSP, Section 2.2.2.9, p. 130.

<sup>&</sup>lt;sup>156</sup> 2024 Butte Valley GSP, Section 2.2.2.9, p. 146, Figure 2.36, p. 148.

<sup>&</sup>lt;sup>157</sup> 2024 Butte Valley GSP, Section 2.2.2.9, p. 145.

<sup>&</sup>lt;sup>158</sup> 23 CCR § 354.16 *et seq*.

leaving the basin, including historical; current; and projected water budget conditions,<sup>159</sup> and the sustainable yield.<sup>160</sup>

The 2024 GSP includes a historical water budget for water years 1990 through 2018 estimated by utilizing the Butte Valley Integrated Hydrologic Model (BVIHM), which has been reevaluated since the 2022 GSP and recalibrated for the 2024 GSP. The GSA will fully recalibrate the model ahead of the 2027 GSP periodic evaluation.<sup>161</sup> The historical water budget information is provided in tabular<sup>162</sup> and graphical<sup>163</sup> form. The 2024 GSP does not include the current water budget as required by GSP Regulations.<sup>164</sup> However, Department staff note that the GSA has provided assurances that this will be part of the 2027 GSP periodic evaluation.

The 2024 GSP developed a projected water budget using 50 years of historical hydrology (1991 to 2011), incorporating four climate change scenarios (Near, Far, Wet, and Dry), and utilizing the BVIHM to simulate the projected water budget for the 50-year period of water years 2022 to 2071.<sup>165</sup> The projected water budget information is provided in tabular <sup>166</sup> and graphical <sup>167</sup> form. There is little to no visible difference between the graphically projected water budgets for the 2030, 2070, 2070DEW, and 2070WMW scenarios. Based on the tables, it appears there should be some differences. Department staff note these figures should be checked and corrected, if necessary.

The 2024 GSP provides a description of the methodology used to estimate the sustainable yield.<sup>168</sup> The 2024 GSP uses the uncalibrated BVHIM to estimate the Basin's sustainable yield as 65,000 AFY. The 2024 GSP indicates that this model includes groundwater pumping for Meiss Lake riparian vegetation/wetlands.<sup>169</sup> The sustainable yield will be reassessed at least every five years with the periodic evaluation and can be refined. <sup>170</sup> Department staff note that sustainability estimated by an uncalibrated groundwater model may be subject to significant errors. Department staff recommend that if the GSA is unable to accurately estimate significant yield, the GSA should consider trends in groundwater elevation to guide its implementation of projects and management actions rather than rely on the estimates from an incomplete model.

Department staff note potential discrepancies between the water budget values presented in the 2024 GSP and the most recent annual report.<sup>171</sup> The 2024 GSP

- <sup>163</sup> 2024 Butte Valley GSP, Figures 2.37 and 2.39, pp. 150-152.
- <sup>164</sup> 23 CCR §§ 354.18(a-e).

<sup>&</sup>lt;sup>159</sup> 23 CCR §§ 354.18(a), 354.18(c) *et seq*.

<sup>&</sup>lt;sup>160</sup> 23 CCR § 354.18(b)(7).

<sup>&</sup>lt;sup>161</sup> 2024 Butte Valley GSP, Section 2.2.3, p. 149.

<sup>&</sup>lt;sup>162</sup> 2024 Butte Valley GSP, Tables 2.15 and 2.16, p. 156, Appendix 2-D, pp. 540-544.

<sup>&</sup>lt;sup>165</sup> 2024 Butte Valley GSP, Section 2.2.4, pp. 167-169.

<sup>&</sup>lt;sup>166</sup> 2024 Butte Valley GSP, Appendix 2-D, Tables 11-15, pp. 548-554.

<sup>&</sup>lt;sup>167</sup> 2024 Butte Valley GSP, Appendix 2-D, Figures 17-21, pp. 546-548.

<sup>&</sup>lt;sup>168</sup> 2024 Butte Valley GSP, Section 2.2.5, pp. 170-179.

<sup>&</sup>lt;sup>169</sup> 2024 Butte Valley GSP, Sections 2.2.5.3 and 2.2.5.4, p.179.

<sup>&</sup>lt;sup>170</sup> 2024 Butte Valley GSP, Section 2.2.5.4, p. 179.

<sup>&</sup>lt;sup>171</sup> 2023 Butte Valley Annual Report, Section 2.5, p. 35.

calculated change in storage using empirical data.<sup>172</sup> The 2024 GSP reported an average reduction in storage of -4,725 acre feet per year over the 2014 to 2024 time period.<sup>173</sup> The 2023 annual report estimated change in storage by using the BVIHM "based on historical data" and indicates that change in storage was an increase of water in storage of 16,000 acre-feet. Department staff note that this recharge amount is higher than any previous year in the modeling record going back to 1990,<sup>174</sup> and any of the empirically calculated years, which include years wetter than the 2022-2023 year.<sup>175</sup> The Annual Report gives a precipitation amount for the 2022-2023 estimate of 11.9 inches per year which is slightly above the average of 10.5 inches per year. Department staff are concerned that large uncertainty or using different parameters or techniques to estimate change in storage in the GSP versus Annual Reports will produce erroneous results that may limit the GSA's ability to select and implement appropriate projects and management actions to reach their sustainability goals in the Basin. Department staff note the method in the 2024 GSP uses empirical data which may more accurately reflect conditions based on recent declines in groundwater levels. As conditions within the Basin continue to change, the GSA should continue to reevaluate overdraft and groundwater conditions to inform the implementation of projects and management actions in the Basin as the GSA works to achieve sustainability.

The water budget section included in the 2024 GSP is substantially compliant with the requirements outlined in the GSP Regulations.<sup>176</sup>

## 5.2.4 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.<sup>177</sup>

The 2024 GSP does not use management areas.

## 5.3 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

<sup>&</sup>lt;sup>172</sup> 2024 Butte Valley GSP, Section 2.2.2.4, p. 113.

<sup>&</sup>lt;sup>173</sup> 2024 Butte Valley GSP, Table 2.6, p. 113.

<sup>&</sup>lt;sup>174</sup> 2023 Butte Valley Annual Report, Section 2.5, p. 35. And Figure 2.10, p. 35.

<sup>&</sup>lt;sup>175</sup> 2024 Butte Valley GSP, Table 2.6, p. 114.

<sup>&</sup>lt;sup>176</sup> 23 CCR § 354.16 et seq.

<sup>&</sup>lt;sup>177</sup> 23 CCR § 354.20.

characterizes undesirable results and establishes minimum thresholds and measurable objectives for each applicable sustainability indicator.<sup>178</sup>

#### 5.3.1 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.<sup>179</sup>

The sustainability goal for the Butte Valley Basin is "to maintain groundwater resources" in ways that best support the continued and long-term health of the people, the environment, and the economy in the Basin for generations to come." 180 The GSP explains that this goal includes managing groundwater conditions for each of the applicable sustainability indicators in the Basin so that groundwater elevations and groundwater storage do not decline below the historically experienced range, interconnected surface water and groundwater dependent ecosystems are protected, suitable groundwater quality is maintained, and significant and unreasonable land subsidence is prevented.<sup>181</sup>

To achieve the sustainability goal, the GSA has developed multiple projects for implementation. Department staff note that the GSA has improved its portfolio of projects and management actions in the 2024 resubmittal of the GSP and provides feasible means to mitigate overdraft as described in Section 4.1.2.2, above.

Department staff conclude that the sustainability goal section included in the 2024 GSP is substantially compliant with the requirements outlined in the GSP Regulations.<sup>182</sup>

#### 5.3.2 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.<sup>183</sup> Sustainability indicators thus correspond with the six undesirable results – chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon, significant and unreasonable reduction of groundwater storage, significant and unreasonable seawater intrusion, significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies, land subsidence that substantially interferes with surface land uses, and depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water<sup>184</sup> – but refer to groundwater conditions that are not, in and of themselves,

<sup>180</sup> 2024 Butte Valley GSP, Section 1.2, p. 38.

<sup>&</sup>lt;sup>178</sup> 23 CCR § 354.22 et seq.

<sup>&</sup>lt;sup>179</sup> 23 CCR § 354.24.

<sup>&</sup>lt;sup>181</sup> 2024 Butte Valley GSP, Section 3.2, p. 182.

<sup>&</sup>lt;sup>182</sup> 23 CCR § 354.16 *et seq*.
<sup>183</sup> 23 CCR § 351(ah).

<sup>&</sup>lt;sup>184</sup> Water Code § 10721(x).

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.<sup>185</sup> GSP Regulations also require GSPs provide the criteria used to define when and where the effects of the groundwater conditions cause undesirable results for each applicable sustainability indicator. The criteria shall be based on a quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the Basin.<sup>186</sup>

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.<sup>187</sup> GSAs are required to describe how conditions at minimum thresholds may affect beneficial uses and users,<sup>188</sup> 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.<sup>189</sup>

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.<sup>190</sup> 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.<sup>191</sup>

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 basin, as quantified through the establishment of minimum thresholds, are addressed for each applicable sustainability indicator. A submitting agency is not required to establish criteria for undesirable results that the agency can demonstrate are not present and are not likely to occur in a basin.<sup>192</sup>

#### 5.3.2.1 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

- <sup>187</sup> 23 CCR § 354.28(b)(1).
- <sup>188</sup> 23 CCR § 354.28(b)(4).
- <sup>189</sup> 23 CCR § 354.28(b)(2).
- <sup>190</sup> 23 CCR § 354.30(a).
- <sup>191</sup> 23 CCR § 354.30(b).

<sup>&</sup>lt;sup>185</sup> 23 CCR §§ 354.26(a), 354.26(b)(c).

<sup>&</sup>lt;sup>186</sup> 23 CCR § 354.26(b)(2).

<sup>&</sup>lt;sup>192</sup> 23 CCR § 354.26(d).

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.<sup>193</sup>

The 2024 GSP includes many revisions related to the sustainable management criteria for the chronic lowering of groundwater levels in response to Deficiency 2 identified with the 2022 GSP. For more information related to undesirable results, minimum thresholds, and impacts to beneficial uses and users please refer to the discussion in Section 4.2.

The 2024 GSP establishes measurable objectives as a range of water levels by well, with consideration for historical groundwater level data, for the chronic lowering of groundwater levels to "provide an indication of desired levels that are sufficiently protective of beneficial uses and users."<sup>194</sup> The upper and lower measurable objective values are the highest and lowest observed water levels at a site during the period of 1991 to 2014, respectively, without regard to which season the value was observed during. <sup>195</sup> The interim milestones are "set simply to remain within the [measurable objectives] for each [representative monitoring point]."<sup>196</sup> The GSA states that they will evaluate interim milestones in future five-year assessments based on the observed groundwater conditions.<sup>197</sup> The measurable objectives are displayed in Table 3.4<sup>198</sup> and in Tables 3.5<sup>199</sup> with the interim milestones for years 2027, 2032, and 2037.

Overall, the 2024 GSP addresses the concerns found in Deficiency 2 and does an appropriate analysis for chronic lowering of groundwater levels in this resubmitted GSP. They follow the process of defining Basin specific issues for undesirable results, setting minimum thresholds to avoid the undesirable results, and analyzed the impacts to beneficial uses and users.

#### 5.3.2.2 Reduction of Groundwater Storage

In addition to components identified in 23 CCR §§ 354.28 (a-b), for the reduction of groundwater storage, the GSP Regulations require the minimum threshold for the reduction of groundwater storage to be a total volume of groundwater that can be withdrawn from the basin without causing conditions that may lead to undesirable results. Minimum thresholds for reduction of groundwater storage shall be supported by the sustainable yield of the basin, calculated based on historical trends, water year type, and projected water use in the basin.<sup>200</sup>

- <sup>195</sup> 2024 Butte Valley GSP, Section 3.4.1.3, p. 209.
- <sup>196</sup> 2024 Butte Valley GSP, Section 3.4.1.4, p. 213.

<sup>&</sup>lt;sup>193</sup> 23 CCR § 354.28(c)(1) et seq.

<sup>&</sup>lt;sup>194</sup> 2024 Butte Valley GSP, Section 3.4.1.3, p. 209.

<sup>&</sup>lt;sup>197</sup> 2024 Butte Valley GSP, Section 3.4.1.4, p. 213.

<sup>&</sup>lt;sup>198</sup> 2024 Butte Valley GSP, Table 3.4, p. 208.

<sup>&</sup>lt;sup>199</sup> 2024 Butte Valley GSP, Table 3.5, p. 209.

<sup>&</sup>lt;sup>200</sup> 23 CCR § 354.28(c)(2).

The 2024 GSP defines an undesirable result from reduction in groundwater storage as a condition that interferes with beneficial uses of groundwater in the Basin.<sup>201</sup> It ties basin storage to groundwater levels through known and estimated hydrogeologic properties and justifies the use of groundwater levels as a proxy to measuring and tracking storage changes. The GSA applies this approach for setting minimum thresholds and measurable objectives.

The GSA's approach to use groundwater levels as a proxy for groundwater storage is sufficient because the GSA uses a standard approach with a specific yield equation combined with monitoring wells to assess changes in groundwater storage.<sup>202</sup> Department staff note the GSA comment regarding the uncertainty in the specific yield coefficient (as mentioned in Section 5.2.2) and ask the GSA to continue to evaluate this term with their Basin wide groundwater model as well as observations of actual groundwater pumping and groundwater levels to make sure it accurately reflects conditions in the Basin.

#### 5.3.2.3 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.<sup>203</sup>

The 2024 GSP identifies that seawater intrusion is not an applicable sustainability indicator for the Basin. The 2024 GSP states the distance between the Butte Valley and the Pacific Ocean is large and no evidence of seawater intrusion exists.<sup>204</sup> Department staff agree with the GSA's rationale for not setting sustainable management criteria for seawater intrusion in the Basin.

#### 5.3.2.4 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.<sup>205</sup>

<sup>&</sup>lt;sup>201</sup> 2024 Butte Valley GSP, Section 3.4.2, p. 215.

<sup>&</sup>lt;sup>202</sup> 2024 Butte Valley GSP, Section 2.2.2.4, p. 111.

<sup>&</sup>lt;sup>203</sup> 23 CCR § 354.28(c)(3).

 <sup>&</sup>lt;sup>204</sup> 2024 Butte Valley GSP, Section 2.2.2.6, p. 123.
 <sup>205</sup> 23 CCR § 354.28(c)(4).

The 2024 GSP defines undesirable results as degraded water quality of concentrations above the limits set by existing State and Federal water quality regulations.<sup>206</sup> The plan states that these existing regulations consider undesirable impacts on beneficial uses and users. The 2024 Plan lists the constituents of concern, their regulatory basis, and the water quality threshold assigned by the relevant agency.<sup>207</sup> The 2024 GSP defines constituents of concern to include arsenic, nitrate, specific conductivity, 1,2 Dibromoethane, and benzene as chemicals to monitor during the SGMA implementation period.<sup>208</sup>

The 2024 GSP provides a method to quantify the concentrations of these constituents at monitoring wells. The method is a statistical analysis to determine a ten-year linear trend.<sup>209</sup>The 2024 GSP provides an equation the GSA plans to use to calculate the 10-year trend that considers a two-year average and considers a 75<sup>th</sup> percentile of the distribution.<sup>210</sup> The undesirable result is quantitatively defined as when the calculation value is greater than zero.<sup>211</sup>

While Department staff recognize the GSA's attempt to utilize an alternative method to define an undesirable result for degraded water quality, the GSP Regulations require that an undesirable result be based on a quantitative description of the combination of minimum threshold exceedances.<sup>212</sup> Department staff note that a 10-year average and statistical analysis is not a combination of minimum threshold exceedances. Department staff note that the description of undesirable results in the 2024 GSP does not mention minimum thresholds, (or 'maximum thresholds' as the 2024 GSP refers to groundwater quality thresholds).<sup>213</sup> Department staff recommend the GSA redefine their undesirable results for degraded water quality to be consistent with the GSP Regulations to be based on criteria used to define when and where the effects of the groundwater conditions cause undesirable results, based on a quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the Basin (see <u>Recommended Corrective Action 5a</u>).

The 2024 GSP describes minimum thresholds for degraded water quality, that it refers to as 'maximum thresholds'.<sup>214</sup> The 2024 GSP establishes minimum thresholds for arsenic, nitrate, and specific conductivity, and does not establish sustainable management criteria for 1,2 Dibromoethane and benzene, explaining that 1,2 Dibromoethane and benzene are

<sup>&</sup>lt;sup>206</sup> 2024 Butte Valley GSP, Section 3.4.3, p. 216.

<sup>&</sup>lt;sup>207</sup> 2024 Butte Valley GSP, Section 2.2.2.5, table 2.7, p. 118.

<sup>&</sup>lt;sup>208</sup> 2024 Butte Valley GSP, Section 3.4.3, p. 216.

<sup>&</sup>lt;sup>209</sup> 2024 Butte Valley GSP, Section 3.4.3.1, p. 216.

<sup>&</sup>lt;sup>210</sup> 2024 Butte Valley GSP, Section 3.4.3.1, p. 217.

<sup>&</sup>lt;sup>211</sup> 2024 Butte Valley GSP, Section 3.4.3.1, p. 217.

<sup>&</sup>lt;sup>212</sup> 23 CCR § 354.26 (b)(2).

<sup>&</sup>lt;sup>213</sup> 2024 Butte Valley GSP, Section 3.4.3.1, pp 216-219.

<sup>&</sup>lt;sup>214</sup> 2024 Butte Valley GSP, Section 3.4.3.2, pp. 219-220.

adequately managed by remediation projects associated with leaking underground storage tanks.<sup>215</sup>

The 2024 GSP establishes minimum thresholds, the GSP refers to as 'maximum thresholds' using a value as a trigger, then applying a "15 percent average increase per year over 10 years in no more than 25 percent of wells."<sup>216</sup> The 2024 GSP selects 5 micrograms per liter ( $\mu$ g/L) as the "trigger only  $\mu$ g/L, trigger only  $\mu$ g/L, MT" (sic)<sup>217</sup> for arsenic limited to wells near Dorris, which is not clearly defined, and 5 milligrams per liter (mg/L) as the "trigger only mg/L, MT" (sic)<sup>218</sup> for nitrate. The 2024 GSP establishes two trigger levels for specific conductivity (250 micromhos and 500 micromhos) and a minimum threshold of 900 micromhos.<sup>219</sup> The 2024 GSP outlines "triggers" or intermediate concentrations that will cause the GSA to take preventative actions.<sup>220</sup> If a trigger is reached, the GSA plans to investigate the cause and source and implement management actions as appropriate to prevent the contaminant from reaching the minimum threshold level.

Department staff note that GSP Regulations require minimum thresholds for degraded water quality to 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.<sup>221</sup> The proposed management of allowing an increasing average value does not appear to be allowable within the GSP Regulations. Department staff recommend the GSA refine its minimum thresholds for degraded water quality to 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 (see Recommended Corrective Action 5b).

The GSP defined measurable objectives for degraded water quality using the same metrics as minimum thresholds by maintaining concentrations within the range of water quality measurements within the 1990-2020 time period.<sup>222</sup> Interim milestones are set equivalent to the measurable objectives with the goal of maintaining water quality within the historical range of values.<sup>223</sup>

Department staff conclude that the Plan's approach of using arsenic, nitrate as N and specific conductivity for its water quality sustainable management criteria is generally reasonable and consistent with the GSP Regulations. Department staff recognize that GSAs are not responsible for improving existing degraded water quality conditions. GSAs are required; however, to manage future groundwater extraction to ensure that

<sup>&</sup>lt;sup>215</sup> 2024 Butte Valley GSP, Section 3.4.3.2, p. 219.

<sup>&</sup>lt;sup>216</sup> 2024 Butte Valley GSP, Section 3.4.3.2, p. 220, Table 3.7, p. 220.

<sup>&</sup>lt;sup>217</sup> 2024 Butte Valley GSP, Table 3.7, p. 220

<sup>&</sup>lt;sup>218</sup> 2024 Butte Valley GSP, Table 3.7, p. 220

<sup>&</sup>lt;sup>219</sup> 2024 Butte Valley GSP, Table 3.7, p. 220.

<sup>&</sup>lt;sup>220</sup> 2024 Butte Valley GSP, Section 3.4.3.2, pp. 219-221.

<sup>&</sup>lt;sup>221</sup> 23 CCR § 354.28(c)(4).

<sup>&</sup>lt;sup>222</sup> 2024 Butte Valley GSP, Section 3.4.3.3, p. 221.

<sup>&</sup>lt;sup>223</sup> 2024 Butte Valley GSP, Section 3.4.3.4, p. 223.

groundwater use subject to its jurisdiction does not significantly and unreasonably exacerbate existing degraded water quality conditions. Where natural and other human factors are contributing to water quality degradation, the GSA may have to confront complex technical and scientific issues regarding the causal role of groundwater extraction and other groundwater management activities, as opposed to other factors, in any continued degradation; but the analysis should be on whether groundwater extraction is causing the degradation in contrast to only looking at whether a specific project or management activity results in water quality degradation. Department staff recommend that the GSA coordinate with the appropriate water quality regulatory programs and agencies in the Basin to understand and develop a process for determining when groundwater management and extraction is resulting in degraded water quality in the Basin (see <u>Recommended Corrective Action 5c</u>).

Overall, Department staff consider the sustainable management criteria for degraded water quality to be commensurate with the level of understanding of the Basin based on water quality information presented in the Plan's Basin settings. Department staff note that groundwater quality in the Basin is generally not at risk of short-term degradation, and the GSA should revise undesirable results and minimum thresholds according to GSP Regulations (as indicated in the recommended corrective actions) by the next 5-year GSP evaluation.

#### 5.3.2.5 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.<sup>224</sup> 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.<sup>225</sup>

The 2024 GSP defines an undesirable result for land subsidence as a condition that would interfere with the beneficial uses of groundwater and land uses in the Basin. This includes damage to critical infrastructure such as canals, pipes, or other water conveyance facilities.<sup>226</sup> The 2024 GSP declares that any measurable land subsidence caused by the chronic lowering of groundwater levels occurring in the Basin would be considered an unreasonable amount and therefore sets the minimum threshold of 0.1 feet per year as the limit. This is considered zero subsidence by the GSA, accounting for measurement

<sup>&</sup>lt;sup>224</sup> 23 CCR § 354.28(c)(5).

<sup>&</sup>lt;sup>225</sup> 23 CCR §§ 354.28(c)(5)(A-B).

<sup>&</sup>lt;sup>226</sup> 2024 Butte Valley GSP, Section 3.4.4.1, p. 225.

error.<sup>227</sup> Based on the provided InSAR map that shows the total land subsidence in the Basin between June 2015 and September 2019,<sup>228</sup> Department staff observe that the northern area near Parcel Dorris displays land subsidence of 0.15 feet, which is similarly noted in the 2024 GSP to potentially indicate "subsidence that may be of a magnitude above the potential instrument error."<sup>229</sup> Department staff note that the GSP does not identify the quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the basin, <sup>230</sup> and therefore note that it appears that the 2024 GSP identifies an existing undesirable result as the subsidence measured near Dorris exceeds 0.1 feet in any given year. Department staff recommend the GSA provide the criteria used to define when and where the effects of the groundwater conditions cause undesirable results using a quantitative description of the combination of minimum threshold exceedances <sup>231</sup> as required by GSP Regulations (see <u>Recommended Corrective Action 6</u>).

The 2024 GSP establishes a minimum threshold for land subsidence in the Basin as no more than 0.1 feet in any single year, resulting in no long-term permanent subsidence.<sup>232</sup> The GSP states the criteria for this minimum threshold is that it is the same magnitude of estimated error as may be present in InSAR data, which is the only tool available for measuring subsidence in the Basin.<sup>233</sup>

The 2024 GSP establish a measurable objective for land subsidence in the Basin as maintenance of current ground surface elevations.<sup>234</sup> Department staff interpret this to mean the measurable objective is zero land subsidence. The criteria used for this selection were historical conditions of zero land subsidence and to provide a small margin of safety based on historical conditions.

The 2024 GSP states that "[I]and subsidence in the Basin is expected to be managed through the implementation period via the sustainable management of groundwater pumping through the groundwater level [measurable objectives], [minimum thresholds], and interim milestones".<sup>235</sup> Department staff interpret this statement to mean that the GSA expects its management of groundwater levels under the 2024 GSP's chronic lowering of groundwater levels sustainable management criteria, to avoid or minimize subsidence.

The sustainable management criteria for land subsidence section included in the 2024 GSP will be considered substantially compliant with the requirements outlined in the GSP

<sup>&</sup>lt;sup>227</sup> 2024 Butte Valley GSP, Section 3.4.4.1, p. 225.

<sup>&</sup>lt;sup>228</sup> 2024 Butte Valley GSP, Figure 2.29, p. 127.

<sup>&</sup>lt;sup>229</sup> 2024 Butte Valley GSP, Section 2.2.2.7, p. 124.

<sup>&</sup>lt;sup>230</sup> 23 CCR § 354.26(b)(2).

<sup>&</sup>lt;sup>231</sup> 23 CCR § 354.26(b)(2).

<sup>&</sup>lt;sup>232</sup> 2024 Butte Valley GSP, Section 3.4.4.2, p. 226.

<sup>&</sup>lt;sup>233</sup> 2024 Butte Valley GSP, Section 3.4.4.2, p. 226.

<sup>&</sup>lt;sup>234</sup> 2024 Butte Valley GSP, Section 3.4.4.3, p. 226.

<sup>&</sup>lt;sup>235</sup> 2024 Butte Valley GSP, Section 3.4.4.3, p. 226.

Regulations, once the GSA has adequately addressed the recommended corrective action identified for this section.

#### 5.3.2.6 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.<sup>236</sup> 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.<sup>237</sup> 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.<sup>238</sup>

The 2024 Plan acknowledges the presence of interconnected surface waters in the Basin including Meiss Lake and five creeks: Butte, Prather, Ikes, Harris, and Muskgrave which originate outside the Basin and terminate inside the Basin.<sup>239</sup> The GSA identifies data gaps in the depth to groundwater levels near these surface waters and estimates, using modeling contour estimates, that 30-50 feet separates the surface water bodies from their respective groundwater.<sup>240</sup> The 2024 GSP states that sustainable management criteria cannot be set until data gaps are addressed, and they commit to doing so by the 5 year GSP evaluation.<sup>241</sup>

As an interim measure, the 2024 GSP proposes managing interconnected surface water by using groundwater levels as a proxy. The 2024 GSP states that an undesirable result for interconnected surface water "is currently defined to occur with the occurrence of undesirable results for the groundwater level sustainability indicator and is quantitively defined in the same way."<sup>242</sup> The 2024 GSP also indicates minimum thresholds and measurable objectives for interconnected surface water will "rely on sustainable management criteria set for the groundwater level sustainability indicator."<sup>243</sup> Department staff note that the GSA has selected to use levels as a proxy due to identified data gaps in the GSA's understanding of interconnected surface water.

The 2024 GSP does not describe the potential effects on the beneficial uses and users of groundwater, nor other potential effects that may occur or are occurring from undesirable results, which is required by GSP Regulations. Department staff recommend the GSAs define and describe what conditions constitute undesirable results including the

<sup>&</sup>lt;sup>236</sup> Water Code § 10721(x)(6).

<sup>&</sup>lt;sup>237</sup> 23 CCR § 354.16(f).

<sup>238 23</sup> CCR § 354.28(c)(6).

<sup>&</sup>lt;sup>239</sup> 2024 Butte Valley GSP, Section 2.2.2.8, p. 125.

<sup>&</sup>lt;sup>240</sup> 2024 Butte Valley GSP, Section 2.2.2.8, p. 125.

<sup>&</sup>lt;sup>241</sup> 2024 Butte Valley GSP, Appendix 3-A, p. 590.

<sup>&</sup>lt;sup>242</sup> 2024 Butte Valley GSP, Section 3.4.5.2, p. 227.

<sup>&</sup>lt;sup>243</sup> 2024 Butte Valley GSP, Section 3.4.5.2, p. 227.

effects on beneficial uses and users for the depletion of interconnected surface water in the Basin (see <u>Recommended Corrective Action 7a</u>).

Department staff encourage the GSA continue to improve the understanding of interconnectivity and timing of stream segments by filling data gaps prior to the next periodic evaluation as required by GSP Regulations.<sup>244</sup>

The GSP does not currently quantify the rate or volume of surface water depletions due to groundwater pumping as the sustainable management criteria as required by the GSP Regulations.<sup>245</sup> Therefore, Department staff recommend GSAs should quantify the volume, location, and timing of depletions of interconnected surface water (see <u>Recommended Corrective Action 7b</u>).

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, Department 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 evaluations to the GSP (see Recommended Corrective Action 7c). 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 7d). 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 7e).

<sup>&</sup>lt;sup>244</sup> 23 CCR § 354.38(d).

<sup>&</sup>lt;sup>245</sup> 23 CCR § 354.28(c)(6).

# 5.4 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 guality and guantity 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.<sup>246</sup> Specifically, a monitoring network must be able to monitor impacts to beneficial uses and users,<sup>247</sup> monitor changes in groundwater conditions relative to measurable objectives and minimum thresholds, <sup>248</sup> capture seasonal low and high conditions, <sup>249</sup> include required information such as location and well construction and include maps and tables clearly showing the monitoring site type, location, and frequency.<sup>250</sup> Department staff encourage GSAs to collect monitoring data as specified in the GSP, follow SGMA data and reporting standards,<sup>251</sup> fill data gaps identified in the GSP prior to the first periodic evaluation,<sup>252</sup> update monitoring network information as needed, follow monitoring best management practices,<sup>253</sup> 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 the GSA does 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 2024 GSP includes monitoring networks for the chronic lowering of groundwater levels, degraded water quality, and land subsidence sustainability indicators. The 2024 GSP uses the groundwater level monitoring network as a proxy for the reduction of groundwater in storage and depletion of interconnected surface water sustainability indicators.

The 2024 GSP identifies 13 monitoring wells as Representative Monitoring Points (RMPs) for the chronic lowering of groundwater levels sustainability indicator.<sup>254</sup> Water elevation measurements will be collected twice per year in an effort to capture the fall-low and spring-high water levels.<sup>255</sup> The 2024 GSP states that the recommended basin-wide

- <sup>248</sup> 23 CCR § 354.34(b)(3).
- <sup>249</sup> 23 CCR § 354.34(c)(1)(B).
- <sup>250</sup> 23 CCR §§ 354.34(g-h).
- <sup>251</sup> 23 CCR § 352.4 et seq.

<sup>254</sup> 2024 Butte Valley GSP, Tables 3.1 and 3.2, pp. 183 and 193, Figures 3.1 and 3.2, pp. 185 and 188.
 <sup>255</sup> 2024 Butte Valley GSP, Section 3.3.1.1, pp. 191-192.

<sup>&</sup>lt;sup>246</sup> 23 CCR § 354.32.

<sup>&</sup>lt;sup>247</sup> 23 CCR § 354.34(b)(2).

<sup>&</sup>lt;sup>252</sup> 23 CCR § 354.38(d).

<sup>&</sup>lt;sup>253</sup> Department of Water Resources, 2016, <u>Best Management Practices and Guidance Documents</u>.

density of monitoring wells is 0.2 to 10 wells per 100 square miles;<sup>256</sup> thus, based on the Basin's area of 125 square miles, the spatial density should be 1 to 13 wells evenly spaced.<sup>257</sup> The 2024 GSP provides a map showing the general locations of domestic wells and the locations of the RMPs in the chronic lowering of groundwater levels network.<sup>258</sup> Department staff note that the distribution of RMPs sufficiently monitors for impacts to domestic wells.

Department staff observe, and the GSA acknowledges, <sup>259</sup> that the representative monitoring network for the chronic lowering of groundwater levels sustainability indicator, as shown in Figure 3.1,<sup>260</sup> does not appear to monitor impacts to all beneficial uses and users of groundwater as required by GSP Regulations.<sup>261</sup> Specifically, the monitoring network does not cover groundwater levels near groundwater dependent ecosystems.<sup>262</sup> The 2024 GSP states that the GSA is making progress to fill this data gap and has added groundwater level and surface water flow monitoring locations, and provides a table listing the existing and planned sites for the groundwater level monitoring network.<sup>263</sup>. Department staff recommend that the GSA continues to expand the monitoring network so the GSA can monitor for impacts to all beneficial uses and users in the basin, including GDEs.

Potential monitoring well sites, identified as a data gap in the monitoring network, focus on the adequacy of the number of sites, frequency of measurement, and spatial distribution of sites.<sup>264</sup> The 2024 Plan states that the monitoring network is designed to demonstrate trends related to impacts to beneficial users of groundwater, but it does not adequately demonstrate how the groundwater elevation monitoring sites achieve this component of the monitoring network design.

The 2024 GSP proposes to use the groundwater level monitoring network as a proxy for the groundwater storage monitoring network because changes in groundwater storage are directly dependent on changes in groundwater levels.<sup>265</sup> Department staff conclude that the utilization of the groundwater level monitoring network as a proxy for the groundwater storage network is reasonable.

<sup>256</sup> DWR Best Management Practices for the Sustainable Management of Groundwater: Monitoring Networks and Identification of Data Gaps, December 2016: <u>https://water.ca.gov/-/media/DWR-</u> Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/BMP-2-Monitoring-Networks-and-Identificationof-Data-Gaps ay 19.pdf.

<sup>&</sup>lt;sup>257</sup> 2024 Butte Valley GSP, Section 3.3.1.1, p. 191.

<sup>&</sup>lt;sup>258</sup> 2024 Butte Valley GSP, Figure 3.1, p. 185.

<sup>&</sup>lt;sup>259</sup> 2024 Butte Valley GSP, Section 3.3.1.2, p. 194.

<sup>&</sup>lt;sup>260</sup> 2024 Butte Valley GSP, Figure 3.1, p. 185.

<sup>&</sup>lt;sup>261</sup> 23 CCR § 354.34(b)(2).

<sup>&</sup>lt;sup>262</sup> 2024 Butte Valley GSP, Section 3.3.1.2, p.194.

<sup>&</sup>lt;sup>263</sup> 2024 Butte Valley GSP, Table 3.2, p. 193.

<sup>&</sup>lt;sup>264</sup> 2024 Butte Valley GSP, Section 3.3, p. 184.

<sup>&</sup>lt;sup>265</sup> 2024 Butte Valley GSP, Table 3.1, p. 183, Section 3.3.2, pp. 194-196.

The 2024 Plan states the groundwater storage monitoring network provides reasonable coverage of the major water-bearing formations in the Basin and includes municipal and agricultural shallow and deep wells, but the well types and depths of monitoring wells are not identified in the Plan.<sup>266</sup> Department staff ask the GSA to provide this information in future annual reports and periodic evaluations.

The 2024 GSP states the seawater intrusion sustainability indicator is not applicable to this Basin; therefore, no monitoring network is proposed.<sup>267</sup> Department staff agree the sustainability indicator for seawater intrusion is not present in this Basin and therefore, the monitoring of seawater intrusion is not required.

The 2024 GSP provides an overview of the existing water quality using available information from the California Groundwater Ambient Monitoring and Assessment Program Database, and data provided by California Department of Fish and Wildlife.<sup>268</sup> There are 7 existing sites, with a minimum of 3 more planned.<sup>269</sup> The 2024 GSP acknowledges that existing wells do not cover the entire Basin, and that areas such as Sam's Neck and the middle of the basin are data gaps.<sup>270</sup> The 2024 GSP states that an assessment and expansion of the monitoring network is planned for within the first five years of GSP implementation through the addition of suitable existing wells or constructing new wells.<sup>271</sup>

The 2024 GSP presents information about the frequency of groundwater quality sampling. The 2024 GSP indicates in the groundwater quality monitoring network section that the initial network will rely on existing programs that are sampled as part of existing monitoring programs<sup>272</sup> and indicates the monitoring schedule in a table.<sup>273</sup> The table indicates that some well and constituent combinations are listed as only being monitored every 9 years, while others have no official monitoring schedule.<sup>274</sup> The 2024 GSP indicates that expansion of the quality network indents to conduct groundwater quality sampling once every two years.<sup>275</sup>

GSP Regulations require GSAs to establish monitoring networks so that they will accomplish monitoring for impacts to beneficial uses and users of groundwater.<sup>276</sup> The 2024 GSP does not indicate how monitoring for groundwater quality on a 9-year period or without a planned schedule sufficiently monitors for impacts to beneficial uses and users. Department staff recommend the GSA revise its monitoring frequency for

<sup>&</sup>lt;sup>266</sup> 2024 Butte Valley GSP, Section 3.3.2, p. 194.

<sup>&</sup>lt;sup>267</sup> 2024 Butte Valley GSP, Section 3.3, pp. 182-183.

<sup>&</sup>lt;sup>268</sup> 2024 Butte Valley GSP, Section 3.3.3.1, p. 196, Section 5.1.2, p. 267.

<sup>&</sup>lt;sup>269</sup> 2024 Butte Valley GSP, Table 3.3, p. 197.

<sup>&</sup>lt;sup>270</sup> 2024 Butte Valley GSP, Sections 3.3.3.1 and 3.3.3.2, pp. 196-198.

<sup>&</sup>lt;sup>271</sup> 2024 Butte Valley GSP, Section 3.3.3.2, p. 197.

<sup>&</sup>lt;sup>272</sup> 2024 Butte Valley GSP, Section 3.3.3.1, p. 196.

<sup>&</sup>lt;sup>273</sup> 2024 Butte Valley GSP, Table 3.3, p. 197.

<sup>&</sup>lt;sup>274</sup> 2024 Butte Valley GSP, Table 3.3, p. 197.

<sup>&</sup>lt;sup>275</sup> 2024 Butte Valley GSP, Table 5.1, p. 269.

<sup>&</sup>lt;sup>276</sup> 23 CCR § 354.34(b)(2).

degradation of groundwater quality so that it monitors sufficiently for impacts to beneficial uses and users (see <u>Recommended Corrective Action 8</u>).

The 2024 GSP states that DWR's InSAR data is the best available science and is therefore used to monitor and measure subsidence occurring within the Basin.<sup>277</sup> The GSA will monitor subsidence data annually, and if additional data become available, they will be incorporated into the GSP.<sup>278</sup> There are currently no continuous global positioning system stations in the Basin, which is noted as a data gap in the 2024 GSP.<sup>279</sup> The 2024 GSP provides an InSAR map depicting the total subsidence in the Basin between June 2015 and September 2019.<sup>280</sup>

The 2024 GSP proposes the use of the groundwater level monitoring network as a proxy for the depletions of interconnected surface water monitoring network because changes in the depletions of interconnected surface water are directly dependent on changes in groundwater levels.<sup>281</sup>

As detailed in this determination's review of sustainable management criteria for depletions of interconnected surface water in Section 5.3.2.6, Department staff recommend the GSA follow the Department's future guidance to develop methods and approaches to evaluate the location, quantity, and timing of depletions of interconnected surface water.

Lastly, the GSP Regulations require GSPs to provide specific information about each monitoring site per the data and reporting standards.<sup>282</sup> It is imperative the GSA work to ensure the information defining the monitoring network is consistent within the GSP, consistent with the Department's Monitoring Network Module, and follow the data and reporting standards. Department staff recommend there be a reconciliation between the details of the monitoring network provided in the GSP with the requirements of the data and reporting standards in the GSP Regulations.

Once the GSA has sufficiently responded to recommended corrective actions for this section, the 2024 GSP will have demonstrated substantial compliance with the GSP Regulations.

## 5.5 **PROJECTS AND MANAGEMENT ACTIONS**

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

<sup>&</sup>lt;sup>277</sup> 2024 Butte Valley GSP, Section 3.3.4.1, p. 199.

<sup>&</sup>lt;sup>278</sup> 2024 Butte Valley GSP, Sections 3.3.4.2 and 3.3.4.3, pp. 199-200.

<sup>&</sup>lt;sup>279</sup> 2024 Butte Valley GSP, Section 3.3.4.2, p. 199.

<sup>&</sup>lt;sup>280</sup> 2024 Butte Valley GSP, Figure 2.29, p. 127.

<sup>&</sup>lt;sup>281</sup> 2024 Butte Valley GSP, Section 3.3.5, p. 200.

<sup>&</sup>lt;sup>282</sup> 23 CCR § 352.4 et seq.

basin.<sup>283</sup> 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.<sup>284</sup>

The 2024 GSP includes projects and management actions that are described in three tiers based on the timeline of implementation – ongoing, near term, and future. These are labeled Tier 1, Tier 2, Tier 3, respectively. Tier 1 is existing or commenced prior to 2022, Tier 2 is defined as implemented in years 2022-2027 and Tier 3 is characterized as "may be implemented" based on future needs and would be scheduled from 2028-2042. These tiers cover topics like demand management, supply augmentation, habitat improvement and groundwater recharge. Table 4.1 in the 2024 GSP describes all the projects and management actions for Butte Valley and is broken down by tier.<sup>285</sup> The table provides a summary with descriptions, lead agencies, and anticipated time frames, but does not include quantitative benefits from each project and management action, such as acrefeet of water conserved, or acres of habitat protected.

Tier 2 projects and management actions, as discussed above in corrective action 1b (Section 4.1.2.2), have been updated to include a demand management program as well as a road map to implement the Preliminary Groundwater Allocation Program by the start of the second GSP implementation period (2028-2033). The 2024 GSP relies upon these two projects and management actions to be a backstop to reach the sustainability goals the GSA has set for itself and will track progress on these items as well as the other projects and management actions provided by the GSA.

From the list of projects and management actions, the most important and challenging to implement is the Tier 2 Preliminary Groundwater Allocation Program discussed in Section 4.3.<sup>286</sup> Without significant contribution from other projects and management actions, the Preliminary Groundwater Allocation Program will be required to do most of the heavy lifting to reach the sustainable yield in the Basin. The 2024 GSP has presented a reasonable timeline and estimates of cost for this project and management action to be successful, so if the GSA follows the plan it should be able to achieve the sustainable yield in the Basin.

Overall, the 2024 GSP provides acceptable projects and management actions to address sustainability in the Basin and to mitigate negative impacts of chronic lowering of groundwater levels in accordance with SGMA Regulations. Department staff will review and follow up with the GSA on the implementation and timelines established in the 2024 Plan during implementation of the GSP.

<sup>&</sup>lt;sup>283</sup> 23 CCR § 354.44(a).

<sup>&</sup>lt;sup>284</sup> 23 CCR § 354.44(b) et seq.

<sup>&</sup>lt;sup>285</sup> 2024 Butte Valley GSP, Table 4.1, pp. 234-238.

<sup>&</sup>lt;sup>286</sup> 2024 Butte Valley GSP, Section 4.3, pp. 243-244.

## 5.6 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."<sup>287</sup> 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.<sup>288</sup>

The 2024 GSP states, "the Butte Valley groundwater basin has several neighbors that may affect the ability of the GSA to achieve sustainable groundwater management: Tule Lake, Lower Klamath, Red Rock Valley, and groundwater basins to the northeast in adjacent Oregon are, with Butte Valley, part of the larger, mostly volcanic groundwater system of the Upper Klamath Basin."<sup>289</sup>

However, the GSP does not attempt to estimate or make claim to undesirable results caused by nearby basins. For the purposes of SGMA, the Butte Valley basin is managed independently of other basins in the larger Klamath Basin.

## 5.7 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.<sup>290</sup>

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

- 1) Explore how their proposed groundwater level thresholds have been established in consideration of groundwater level conditions in the basin based on current and future drought conditions.
- 2) Explore how groundwater level data from the existing monitoring network will be used to make progress towards sustainable management of the basin given increasing aridification and effects of climate change, such as prolonged drought.
- 3) Take into consideration changes to surface water reliability and that impact on groundwater conditions.

<sup>&</sup>lt;sup>287</sup> Water Code § 10733(c).

<sup>&</sup>lt;sup>288</sup> 23 CCR § 354.28(b)(3).

<sup>&</sup>lt;sup>289</sup> 2024 Butte Valley GSP, Section 2.1.3.4, p. 64.

- 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 forces to evaluate how their Plan's groundwater management strategy aligns with drought planning, response, and mitigation efforts within the basin.

# **6** STAFF RECOMMENDATION

Department staff believe that sufficient action has been taken by the GSAs to address the deficiencies identified. Department staff recommend **APPROVAL** of the Plan with the required and recommended corrective actions listed below. The Plan conforms with Water Code Sections 10727.2 and 10727.4 of SGMA and substantially complies with the GSP Regulations. Implementation of the Plan will likely achieve the sustainability goal for the Butte Valley Basin. The GSA have identified several areas for improvement of its Plan and Department staff concur that those items are important and should be addressed as soon as possible. Department staff have also identified additional recommended corrective actions that should be considered by the GSA for the periodic evaluation of its GSP. Addressing these recommended corrective actions will be important to demonstrate that implementation of the Plan is likely to achieve the sustainability goal. The recommended corrective actions include:

# **RECOMMENDED CORRECTIVE ACTION 1**

Provide more information on the two new management actions as follows:

- a) Provide additional information about the reduction in pumping volume required to reach the sustainable yield value under the Preliminary Groundwater Allocation Program. Additionally, the GSA should provide details on how allocations will be assigned, who will monitor the program, and what will happen if pumpers exceed their allocations.
- b) Provide updates to the GSP in annual reports and the periodic evaluation about the demand management program. The GSA should provide enough information so that it will be evident that the GSA's implementation of projects and management actions are feasible and likely to prevent undesirable results.<sup>291</sup> The GSA should report on the effectiveness of its voluntary demand management program and whether additional mandatory demand management will be required.

# **RECOMMENDED CORRECTIVE ACTION 2**

The GSA should update its hydrogeologic model and should:

a) Provide more information on the presence of confined and unconfined groundwater conditions with respect to Basin stratigraphy and hydrogeologic properties. Provide additional rationale to support the identification of one principal aquifer; or provide any plans or studies toward investigations into the Basin's aquifer to better define it. The GSA should provide updates on this topic in future annual reports and the 5-year evaluation to clarify the aquifer's characteristics,

<sup>&</sup>lt;sup>291</sup> 23 CCR § 355.4(b)(5).

including the lateral extent, total depth, and interactions between geologic formations.

b) Identify the steps that will be taken to fill data gaps prior to the next periodic evaluation and fill those data gaps.<sup>292</sup> Department staff recommend the GSA propose a project or management action and a schedule to address the hydrogeologic conceptual model's data gaps, especially to better define the principal aquifers and understand the potential interconnectivity between them.

# **RECOMMENDED CORRECTIVE ACTION 3**

The GSA should provide groundwater maps and contour maps that cover the entire Basin and are shown in units of feet of elevation above mean sea level in the Basin Setting and in the Appendix 2-B: Expanded Basin Setting. The GSA should also indicate the month or months associated with the Basin's seasonal high and low measurements and provide contour maps that display the groundwater elevation contour in groundwater elevation above mean sea level<sup>293</sup> in addition to depth below ground surface.

### **RECOMMENDED CORRECTIVE ACTION 4**

The GSA should continue efforts on identifying groundwater dependent ecosystems within the Basin and refine their discussion of the impacts to groundwater dependent ecosystems based on improvements in the groundwater levels monitoring network, and further biological studies the GSA has committed to in the 2024 Plan. The GSA should provide maps, descriptions, and clarification on how the level of impacts to potential groundwater dependent ecosystems relates to declining groundwater levels and minimum thresholds.

## **RECOMMENDED CORRECTIVE ACTION 5**

The GSA should revise the sustainable management criteria for degraded water quality as follows:

- a) The GSA should redefine the undesirable results for degraded water quality, to be consistent with the GSP Regulations, and should be based on criteria used to define when and where the effects of the groundwater conditions cause undesirable results, based on a quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the Basin.<sup>294</sup>
- b) The GSA should refine its minimum thresholds for degraded water quality to be based on the number of supply wells, a volume of water, or a location of an

<sup>&</sup>lt;sup>292</sup> 23 CCR § 354.38(d).

<sup>&</sup>lt;sup>293</sup> 23 CCR § 354.16(a)(1).

<sup>&</sup>lt;sup>294</sup> 23 CCR § 354.26(b)(2).

isocontour that exceeds concentrations of constituents determined by the Agency to be of concern for the Basin.<sup>295</sup>

c) The GSA should coordinate with the appropriate groundwater users, including drinking water, environmental, and irrigation users as identified in the Plan, and water quality regulatory agencies and programs in the Basin to understand and develop a process for monitoring and determining if groundwater management and extraction is resulting in migration of constituents of concern or degraded water quality in the Basin.<sup>296</sup>

# **RECOMMENDED CORRECTIVE ACTION 6**

The GSA should revise sustainable management criteria for subsidence to comply with GSP Regulations, specifically, the GSA should provide the criteria used to define when and where the effects of the groundwater conditions cause undesirable results for each applicable sustainability indicator. The criteria shall be based on a quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the Basin.<sup>297</sup>

# **RECOMMENDED CORRECTIVE ACTION 7**

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

- a) Quantify the volume, location, and timing of depletions of interconnected surface water.<sup>298</sup>
- b) Define what constitutes undesirable results for the depletion of interconnected surface water in the Basin. Describe the potential effects on the beneficial uses and users of groundwater, or other potential effects that may occur or are occurring from undesirable results.<sup>299</sup>

<sup>&</sup>lt;sup>295</sup> 23 CCR § 354.28(c)(4).

<sup>&</sup>lt;sup>296</sup> 23 CCR § 354.28(c)(4).

<sup>&</sup>lt;sup>297</sup> 23 CCR § 354.26(b)(2).

<sup>&</sup>lt;sup>298</sup> 23 CCR § 354.16(f).

<sup>&</sup>lt;sup>299</sup> 23 CCR § 354.26(a).

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

# **RECOMMENDED CORRECTIVE ACTION 8**

The GSA should revise the monitoring frequency for the degraded water quality monitoring network so that it better monitors impacts to beneficial uses and users of groundwater.<sup>300</sup>

<sup>&</sup>lt;sup>300</sup> 23 CCR § 354.34(b)(2).