# Salinas Valley: 180/400-Foot Aquifer Subbasin Groundwater Sustainability Plan Update

## VOLUME 2

### Chapter 8. Sustainable Management Criteria

*Prepared for:*

*Salinas Valley Basin Groundwater Sustainability Agency*

# 8 SUSTAINABLE MANAGEMENT CRITERIA

This chapter defines the conditions that constitute sustainable groundwater management; and establishes minimum thresholds, measurable objectives, and undesirable results for each sustainability indicator. The minimum thresholds, measurable objectives, and undesirable results detailed in this chapter define the Subbasin's future conditions and commit the GSA to actions that will meet these criteria. This chapter includes adequate data to explain how SMC were developed and how they influence all beneficial uses and users.

The chapter is structured to address all the GSP Regulations § 354.22 *et. seq* regarding SMC. To retain an organized approach, the SMC are grouped by sustainability indicator. The discussion of each sustainability indicator follows a consistent format that contains all the information required by the GSP Regulations, and as further clarified in the SMC BMP (23 California Code of Regulations § 352.22 *et seq.*; DWR, 2017).

## 8.1 Definitions

The SGMA legislation and GSP Regulations contain terms relevant to the SMC. The definitions included in the GSP Regulations are repeated below. Where appropriate, additional explanatory text is added in italics. This explanatory text is not part of the official definitions of these terms.

- **Sustainability indicator** refers to any of the effects caused by groundwater conditions occurring throughout the basin that, when significant and unreasonable, cause undesirable results, as described in Water Code § 10721(x).

  The 6 sustainability indicators relevant to this subbasin include chronic lowering of groundwater levels; reduction of groundwater storage; degraded water quality; land subsidence; seawater intrusion; and depletion of ISW.

- Significant and unreasonable

  *Significant and unreasonable is not defined in the Regulations. However, the definition of undesirable results states, "Undesirable results occur when significant and unreasonable effects … are caused by groundwater conditions…." This GSP adopts the phrase significant and unreasonable to be the qualitative description of undesirable conditions due to inadequate groundwater management. Minimum thresholds are the quantitative measurement of the significant and unreasonable conditions.*

- **Minimum threshold** refers to a numeric value for each sustainability indicator used to define undesirable results.

  *Minimum thresholds are indicators of an unreasonable condition.*

- **Measurable objective** refers to a specific, quantifiable goals for the maintenance or improvement of specified groundwater conditions that have been included in an adopted Plan to achieve the sustainability goal for the basin.

  Measurable objectives are goals that the GSP is designed to achieve.

- **Interim milestone** refers to a target value representing measurable groundwater conditions, in increments of 5 years, set by an Agency as part of a Plan.

  Interim milestones are targets such as groundwater elevations that will be achieved every 5 years to demonstrate progress towards sustainability.

- Undesirable result

  *Undesirable result is not defined in the Regulations. However, the description of undesirable result states that it should be a quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the subbasin. An example undesirable result is more than 10% of the measured groundwater elevations being lower than the minimum thresholds. Undesirable results should not be confused with significant and unreasonable conditions. Significant and unreasonable conditions are qualitative descriptions of conditions to be avoided; an undesirable result is a quantitative assessment based on minimum thresholds.*

## 8.2 Sustainability Goal

The sustainability goal of the 180/400-Foot Aquifer Subbasin is to manage groundwater resources for long-term community, financial, and environmental benefits to the Subbasin's residents and businesses. The goal of this GSP is to ensure long-term viable water supplies while maintaining the unique cultural, community, and business aspects of the Subbasin. It is the express goal of this GSP to balance the needs of all water users in the Subbasin.

**Commented [AO1]:** Same GSP goal

Several projects and management actions are included in this GSP and detailed in Chapter 9. It is not necessary to implement all projects and actions listed in this GSP to achieve sustainability. However, some combination of these will be implemented to ensure the Subbasin is operated within its sustainable yield and achieves sustainability. These management actions include demand management, promoting conservation and agricultural BMPs, land retirement, reservoir reoperation, and operationalization of management guidance from Deep Aquifers Study. Chapter 9 also includes direct and indirect recharge projects, water supply projects to replace groundwater use, and a seawater extraction barrier. Finally, Chapter 9 includes implementation actions that do not directly help meet the SMC, but contribute to GSP implementation through data collection, assistance to groundwater users, and collaboration with partner agencies. This

suite of projects and management actions provide sufficient options to achieve sustainability in the 180/400-Foot Aquifer Subbasin throughout GSP implementation.

The management actions and projects are designed to achieve sustainability within 20 years by one or more of the following means:

- Educating stakeholders and prompting changes in behavior to improve chances of achieving sustainability.
- Increasing awareness of groundwater pumping impacts to promote voluntary reductions in groundwater use through improved water use practices or fallowing crop land.
- Increasing basin recharge.
- Developing new alternative water supplies for use in the Subbasin to offset groundwater pumping.

## 8.3 Achieving Long-Term Sustainability

The GSP addresses long-term groundwater sustainability. Correspondingly, the SVBGSA intends to develop SMC to avoid undesirable results under future hydrologic conditions. The understanding of future conditions is based on historical precipitation, evapotranspiration, streamflow, and reasonable anticipated climate change, which have been estimated on the basis of the best available climate science (DWR, 2018). These parameters underpin the estimated future water budget over the planning horizon (see Section ~~Error! Reference source not found.~~6.4). The average hydrologic conditions include reasonably anticipated wet and dry periods. Groundwater conditions that are the result of extreme climatic conditions and are worse than those anticipated do not constitute an undesirable result. However, SMC may be modified in the future to reflect observed future climate conditions.

The GSA will track hydrologic conditions during GSP implementation. These observed hydrologic conditions will be used to develop a value for average hydrologic conditions, which will be compared to predicted future hydrologic conditions. This information will be used to interpret the Subbasin's performance against SMC. Year-by-year micro-management is not the intent of this GSP; this GSP is developed to avoid undesirable results with long-term, deliberate groundwater management. For example, groundwater extractions may experience variations caused by reasonably anticipated hydrologic fluctuations. However, under average hydrologic conditions, there will be no chronic depletion of groundwater storage.

Further, since the GSP addresses long-term groundwater sustainability, exceedance of some SMC during an individual year does not constitute an undesirable result. Pursuant to SGMA regulations (California Water Code § 10721(w)(1)), "Overdraft during a period of drought is not

**Commented [AO2]:** Project list condensed to a higher level summary. This will be updated after working with the Subbasin Committee on Chapter 9 (Projects & Management Actions), but the intent here is the same as in the original GSP – to show DWR that we have sufficient options to meet sustainability, as defined by these sustainability criteria.

**Commented [A3]:** New section developed during the 2022 GSPs to address confusion around 'average hydrogeological year'. This explains that SGMA's intent is for long term groundwater management.

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sufficient to establish a chronic lowering of groundwater levels if extractions and groundwater recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods." Therefore, groundwater levels may temporarily exceed minimum thresholds during prolonged droughts, which could be more extreme than those that have been anticipated based on historical data and anticipated climate change conditions. Such temporary exceedances do not constitute an undesirable result.

The SMC presented in this chapter are developed on the basis of historically observed hydrologic conditions and, in most cases, reasonably anticipated climate change. These SMC may be updated in future drafts to reflect changes in anticipated climate conditions and climate change based upon groundwater modeling results.

## ~~8.3~~8.4 General Process for Establishing Sustainable Management Criteria

The SMC presented in this chapter were developed using publicly available information, feedback gathered during public meetings including subbasin committee meetings, hydrogeologic analysis, and meetings with SVBGSA staff and 180/400-Foot Aquifer Subbasin Committee members. The general process to develop the initial SMC included:

- Presentations to the Board of Directors on the SMC requirements and implications.
- Presentations to the Advisory Committee and Subbasin Specific working groups outlining the approach to developing SMC and discussing initial SMC ideas. The Advisory Committee and working groups provided feedback and suggestions for the development of initial SMC.
- Discussions with GSA staff and various Board Members.
- Modifying minimum thresholds and measurable objectives based on input from GSA staff and Board Members.

For the GSP Update, the process included:

- Presenting to the Subbasin Committee on the general SMC requirements and implications. These presentations outlined the original approach to developing SMC.
- Presenting to the Subbasin Committee on lessons learned on SMC since the original GSP, including DWR's review and assessment of the 180/400-Foot Aquifer Subbasin GSP, DWR's reviews of other GSPs, and legal consultation and Board direction during the

development of 2022 Salinas Valley GSPs. This updated GSP incorporates DWR's suggested corrective actions into the SMC where appropriate.

- Presenting recommendations on whether to update the approach to SMC in the GSP Update, and receiving feedback from the Subbasin Committees and public.
- Modifying SMC approach for the storage and ISW SMC based on direction from the Subbasin Committee.
- Receiving public comment on the GSP Update SMC Chapter, and discussing public comment with the Subbasin Committee.

## ~~8.4~~8.5 Sustainable Management Criteria Summary

Table 8-1 provides a summary of the SMC for each of the 6 sustainability indicators. Measurable objectives are the goals that reflect the Subbasin's desired groundwater conditions for each sustainability indicator. These provide operational flexibility above the minimum thresholds. The minimum thresholds are quantitative indicators of the Subbasin's locally defined significant and unreasonable conditions. The undesirable result is a combination of minimum threshold exceedances that show a significant and unreasonable condition across the Subbasin as a whole. This GSP is designed to not only avoid undesirable results, but to achieve the sustainability goals within 20 years, along with interim milestones every 5 years that show progress. The management actions and projects provide sufficient options for reaching the measurable objectives within 20 years and maintaining those conditions for 30 years for all 6 sustainability indicators. The rationale and background for developing these criteria are described in detail in the following sections.

**Commented [AO4]:** Additional explanation added for clarity.

The SMC are individual criteria that will each be met simultaneously, rather than in an integrated manner. For example, the groundwater elevation and seawater intrusion SMC are 2 independent SMC that will be achieved simultaneously. The groundwater elevation SMC do not hinder the seawater intrusion SMC, but also, they do not ensure the halting of seawater intrusion by themselves. The SMC presented in Table 8-1 are part of the GSA's 50-year management plan: SGMA allows for 20 years to reach sustainability, and requires the Subbasin have no undesirable results for the subsequent 30 years.

Table 8-~~1~~8-~~1~~1. Sustainable Management Criteria Summary

| Sustainability Indicator | Measurement | Minimum Threshold | Measurable Objective | Undesirable Result |
|---|---|---|---|---|
| **Chronic lowering of groundwater levels** | Measured through groundwater level representative monitoring well network. | Minimum thresholds are set to 1 foot above 2015 groundwater elevations. See Table 8-2~~Table 8-2~~. | Measurable objectives are set to 2003 groundwater elevations. See Table 8-2~~Table 8-2~~ | More than 15% of groundwater elevation minimum thresholds are exceeded. Allows for 5 exceedances per year in the 180-Foot Aquifer; 7 in the 400-Foot Aquifer; and 2 in the Deep Aquifers. |
| **Reduction in groundwater storage** | Measured by proxy through groundwater level representative monitoring well network. | Minimum threshold is set to 626,000 AF below the measurable objective. This reduction is based on the groundwater level minimum thresholds. This number does not include the Deep Aquifers and will be refined as additional data are collected and other projects are implemented. | Measurable objective is set to zero when the groundwater elevations are held at the groundwater level measurable objectives. Since the goal is to manage to the measurable objective, additional water in storage is needed until groundwater elevations are at their measurable objectives. | There is an exceedance of the minimum threshold. |
| **Seawater intrusion** | Seawater intrusion maps developed by MCWRA. | Minimum threshold is the 2017 extent of the 500 mg/L chloride isocontour as developed by MCWRA for the 180-Foot and 400-Foot Aquifers. The minimum threshold is the line defined by Highway 1 for the Deep Aquifers. | Measurable objective is the line defined by Highway 1 for the 180-Foot, 400-Foot, and Deep Aquifers. | Any exceedance of the minimum threshold, resulting in mapped seawater intrusion beyond the 2017 extent of the 500 mg/L chloride isocontour. |
| **Degraded groundwater quality** | Groundwater quality data downloaded annually from GAMA groundwater information system. | Minimum threshold is zero additional exceedances of either the regulatory drinking water standards (potable supply wells) or the Basin Plan objectives (irrigation supply wells) for groundwater quality COC. Exceedances are only measured in public water system supply wells and ILRP on-farm domestic and | Measurable objective is identical to the minimum threshold. | Future or new minimum thresholds exceedances are caused by a direct result of GSA groundwater management action(s), including projects or management actions and regulation of groundwater extraction. |

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| Sustainability Indicator | Measurement | Minimum Threshold | Measurable Objective | Undesirable Result |
|---|---|---|---|---|
| | | irrigation supply wells. See Table 8-5~~Table 8-5~~. See Table 8-5~~Table 8-5~~ | | |
| **Land subsidence** | Measured using DWR provided InSAR data. | Minimum threshold is zero net long-term subsidence, with no more than 0.1 foot per year of estimated land movement to account for InSAR errors. | Measurable objective is identical to the minimum threshold, resulting in zero net long-term subsidence. | There is an exceedance of the minimum threshold for subsidence due to lowered groundwater elevations. |
| **Depletion of interconnected surface water** | Groundwater elevations in shallow wells adjacent to locations of ISW identified using the SVIHM. | Minimum thresholds are established by proxy using shallow groundwater elevations observed in 2015 near locations of ISW. | Measurable objectives are established by proxy using shallow groundwater elevations observed in 2003 near locations of ISW. | There is an exceedance of the minimum threshold in a shallow groundwater monitoring well used to monitor ISW. |

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## ~~8.5~~8.6 Chronic Lowering of Groundwater Elevations SMC

### ~~8.5.1~~8.6.1 Locally Defined Significant and Unreasonable Conditions

Locally defined significant and unreasonable groundwater elevations in the Subbasin are those that:

- Are at or below the observed groundwater elevations in 2015. Public and stakeholder input identified these historical groundwater elevations as significant and unreasonable.
- Cause significant financial burden to local agricultural interests.
- Interfere with other sustainability indicators

These significant and unreasonable conditions were determined based on input collected during Subbasin Committee meetings and discussions with GSA staff.

### ~~8.5.2~~8.6.2 Minimum Thresholds

*The minimum thresholds for chronic lowering groundwater levels are set to 1 foot above 2015 groundwater elevations in this Subbasin.*

The minimum threshold values for each well within the groundwater elevation representative monitoring network are provided in Table 8-2~~Table 8-2~~. The minimum threshold contour maps, along with the RMS well locations for the 180/400-Foot Aquifer Subbasin are shown on Figure 8-1 and Figure 8-2 for the 180-Foot and 400-Foot Aquifers, respectively. There were not enough 2015 groundwater elevation measurements of the Deep Aquifers to produce contours.

**Commented [AO6]:** For all SMC, reiteration of the GSP Regulations removed unless necessary to understand the section because it was repetitive.

MT/MO/Undesirable Results statements put at the top of each respective section in italics to be clear.

Table 8-~~28~~ 2. Chronic Lowering of Groundwater Levels Minimum Thresholds and Measurable Objectives

Commented [AO7]: Updated to include expanded monitoring network

| Monitoring Site | Minimum Threshold (ft) | Measurable Objective (ft) |
|---|---|---|
| **180-Foot Aquifer** | | |
| **13S/02E-13N01** | 6.2 | 11.2* |
| **13S/02E-21Q01** | 6.4* | 8.5* |
| **13S/02E-26L01** | -6.2* | -3.0* |
| **13S/02E-29D04** | -4.5* | -2.5* |
| **14S/02E-03F04** | -7.9 | -4.5 |
| **14S/02E-10P01** | -17.8 | -6.4 |
| **14S/02E-11A02** | -10.6 | -6.0* |
| **14S/02E-12B02** | -10.8 | -2.0* |
| **14S/02E-13F03** | -11.2 | -5.7 |
| **14S/02E-17C02** | 5.5 | 11.5* |
| **14S/02E-21L01** | -6.0 | -1.8 |
| **14S/02E-26H01** | -12.3 | -6.2 |
| **14S/02E-27A01** | -9.9 | -3.1* |
| **14S/02E-34B03** | -21.8 | -4.8 |
| **14S/02E-36E01** | -15.7 | -3.3 |
| **14S/03E-18C01** | 7.6 | 12.4* |
| **14S/03E-30G08** | -17.4 | -8.5 |
| **14S/03E-31F01** | -11.4 | -2.2 |
| **15S/02E-12C01** | -13.0* | -3.0* |
| **15S/03E-09E03** | -15.1 | 2.9 |
| **15S/03E-13N01** | -10.0 | 12.8 |
| **15S/03E-16M01** | -6.0 | 11.5 |
| **15S/03E-17M01** | -4.6 | 11.9 |
| **15S/03E-25L01** | -2.7 | 24.6 |
| **15S/03E-26F01** | -8.1 | 12.5 |
| **15S/04E-31A02** | 16.6 | 41.5 |
| **16S/04E-05M02** | 18.7 | 47.9 |
| **16S/04E-13R02** | 63.9 | 85.3 |
| **16S/04E-15D01** | 30.6 | 58.6 |
| **16S/04E-15R02** | 35.0 | 64.3 |
| **16S/04E-27B02** | 69.5* | 84.5* |
| **16S/05E-30E01** | 60.7 | 85.0 |
| **16S/05E-31M01** | 70.0 | 94.8 |
| **17S/04E-01D01** | 75.9 | 100.9 |
| **17S/05E-06C02** | 65.1 | 91.5 |
| **400-Foot Aquifer** | | |
| **12S/02E-33H02** | -3.0* | 3.0* |
| **13S/02E-10K01** | -19.3 | -16.0* |
| **13S/02E-21N01** | -6.3 | -3.0* |
| **13S/02E-24N01** | -7.0 | 0.0* |

| Monitoring Site | Minimum Threshold (ft) | Measurable Objective (ft) |
|---|---|---|
| **13S/02E-27P01** | -44.5 | -20.8 |
| **13S/02E-29D03** | -6.4 | -2.4 |
| **13S/02E-31N02** | -5.0* | -0.4 |
| **13S/02E-32A02** | -4.6* | -1.0* |
| **14S/02E-02C03** | -29.9 | -20.0* |
| **14S/02E-03F03** | -13.5 | -5.2 |
| **14S/02E-05F04** | -15.2 | -6.9 |
| **14S/02E-08M02** | -5.0* | -1.0* |
| **14S/02E-11A04** | -25.1 | -17.5 |
| **14S/02E-11M03** | -30.0* | -20.0* |
| **14S/02E-12B03** | -27.8 | -18.5 |
| **14S/02E-12Q01** | -13.6 | -9.3 |
| **14S/02E-16A02** | -19.6 | -7.9 |
| **14S/02E-22L01** | -22.9 | -3.1 |
| **14S/02E-26J03** | -20.6* | -5.0 |
| **14S/02E-27G03** | -17.1 | -8.3 |
| **14S/02E-34A03** | -12.4 | -7.5 |
| **14S/02E-36G01** | -13.7 | -0.1 |
| **14S/03E-18C02** | -19.7 | -12.5 |
| **14S/03E-20C01** | -41.0 | -35.0* |
| **14S/03E-29F03** | -26.0 | -15.0* |
| **14S/03E-31L01** | -9.0 | -3.0* |
| **15S/02E-01A03** | -15.3 | -0.7 |
| **15S/02E-02G01** | -28.0 | -11.2 |
| **15S/02E-12A01** | -17.1 | -4.7 |
| **15S/03E-03R02** | -17.0 | -1.0* |
| **15S/03E-04Q01** | -11.0 | 0.0* |
| **15S/03E-05C02** | -16.0 | -5.0* |
| **15S/03E-08F01** | -17.8 | -5.2 |
| **15S/03E-14P02** | -11.7 | 8.4 |
| **15S/03E-15B01** | -14.1 | 5.8 |
| **15S/03E-16F02** | -6.5 | 5.0* |
| **15S/03E-17P02** | -17.0 | -2.0* |
| **15S/03E-26A01** | -4.5 | 15.0 |
| **15S/03E-28B02** | -0.5 | 15.0* |
| **15S/04E-29Q02** | 5.8 | 33.9 |
| **16S/04E-04C01** | 11.7 | 47.2 |
| **16S/04E-08H03** | 24.6 | 54.7 |
| **16S/04E-10R02** | 40.7 | 67.2 |
| **16S/04E-25G01** | 51.3 | 76.4 |
| **16S/05E-30J02** | 67.2 | 90.7 |
| **Deep Aquifers** | | |

| Monitoring Site | Minimum Threshold (ft) | Measurable Objective (ft) |
|---|---|---|
| **13S/01E-36J02** | -4.2 | 2.0* |
| **13S/02E-19Q03** | -2.4 | 6.3 |
| **13S/02E-28L03** | -40.0* | -29.0* |
| **13S/02E-32E05** | -9.2 | 1.6 |
| **14S/02E-06L01** | -7.2 | 3.0 |
| **14S/02E-18B01** | -35.0* | -25.0* |
| **14S/02E-22A03** | -80.0* | -60.0* |
| **14S/02E-28C02** | -41.2 | -15.0* |
| **15S/03E-10D04** | -20.0* | -10.0* |
| **15S/03E-17E02** | -15.0* | -10.0* |
| **16S/04E-11D51** | 43.0* | 50.0* |

*Groundwater elevation was estimated.

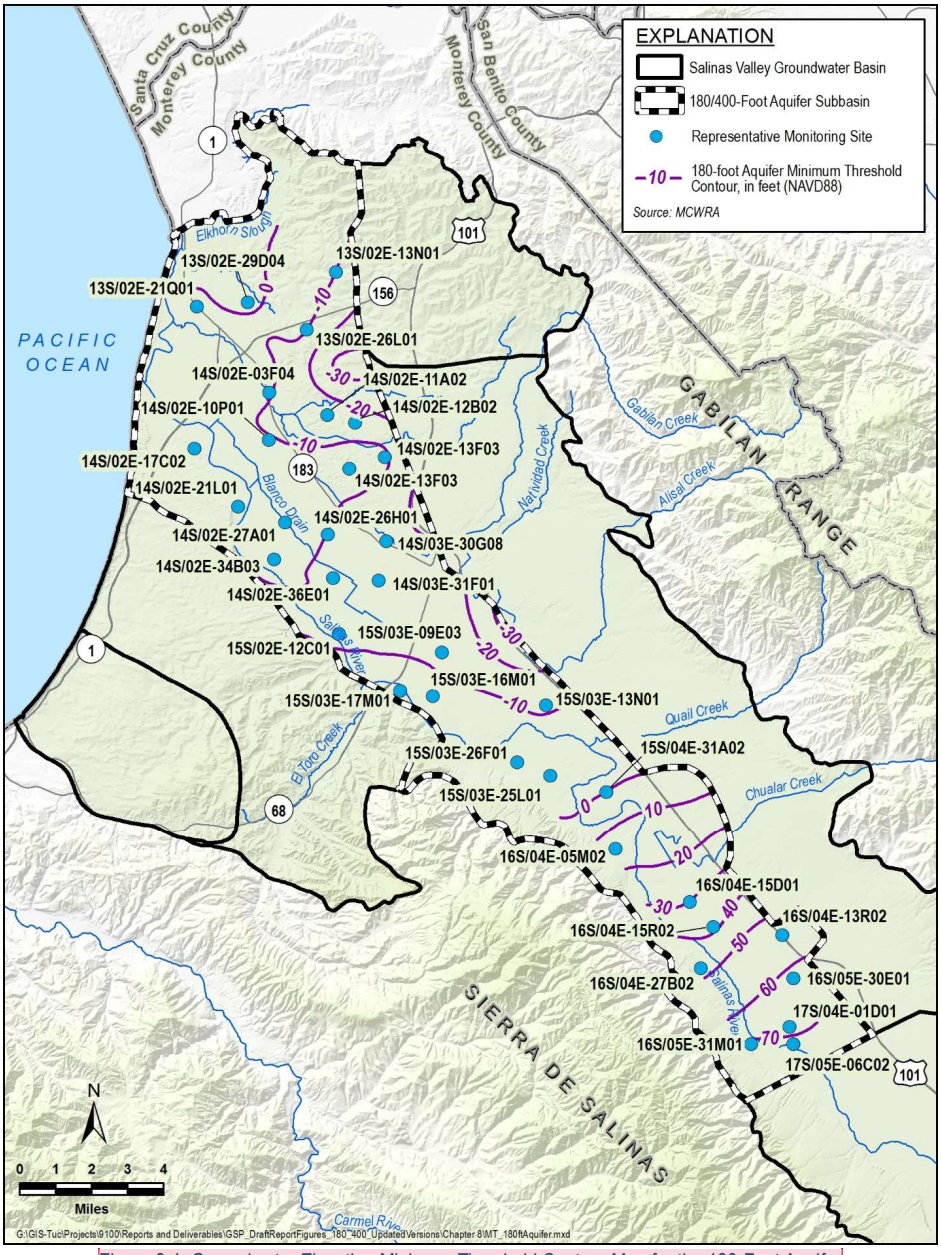


Figure 8-1. Groundwater Elevation Minimum Threshold Contour Map for the 180-Foot Aquifer

**Commented [AO8]:** Same contours, but with additional wells in the expanded monitoring network

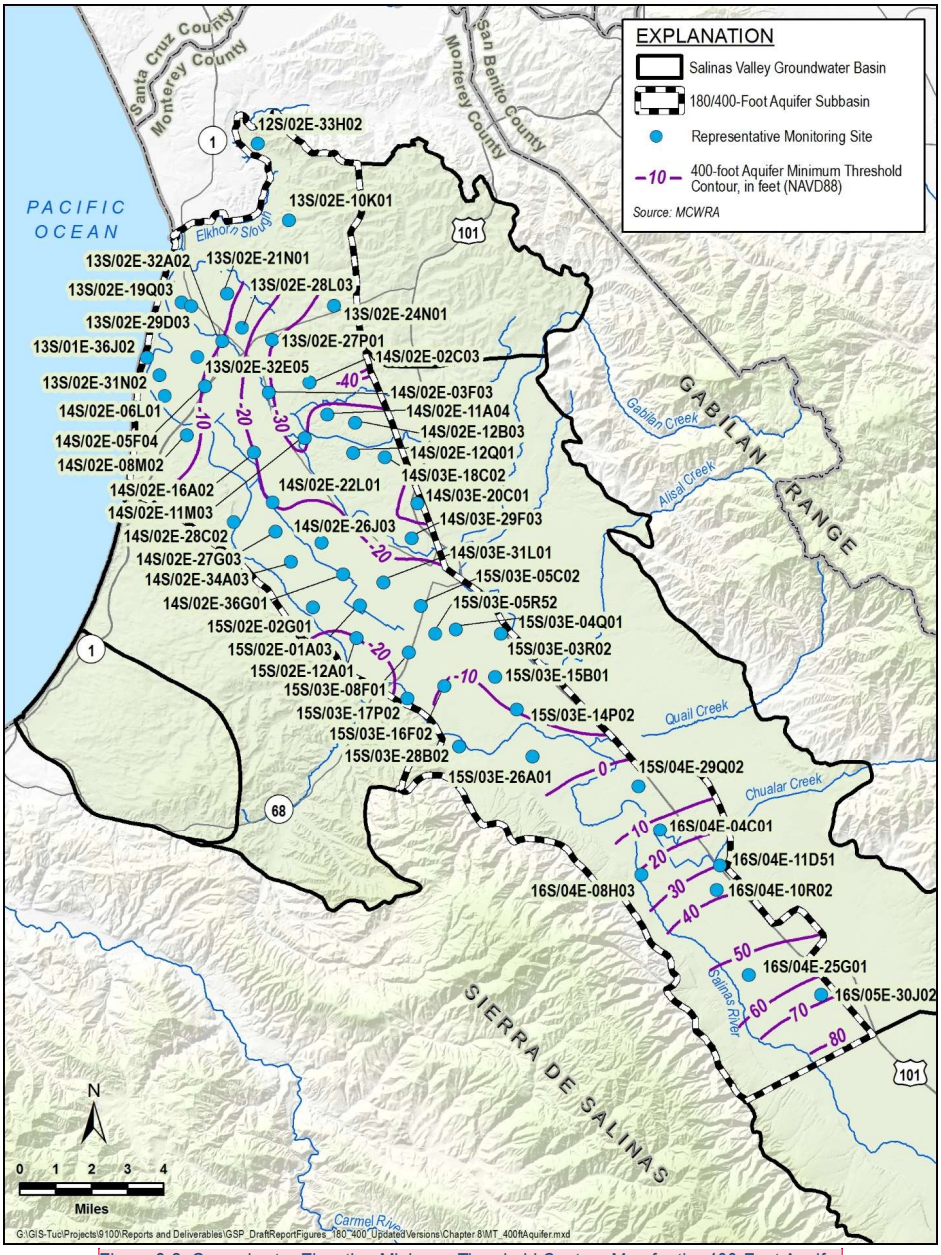


Figure 8-2. Groundwater Elevation Minimum Threshold Contour Map for the 400-Foot Aquifer

**Commented [AO9]:** Same contours, but with additional wells in the expanded monitoring network

### ~~8.5.2.1~~8.6.2.1 Information and Methodology Used to Establish Minimum Thresholds and Measurable Objectives

The development of both minimum thresholds and measurable objectives followed similar processes and are described in this section. The information used includes:

- Feedback from discussions with the Subbasin Committee on challenges and goals
- Historical groundwater elevation data and hydrographs from wells monitored by the MCWRA
- Maps of current and historical groundwater elevation data
- Analysis of the impact of groundwater elevations on domestic wells

The general steps for developing minimum thresholds and measurable objectives were:

**Commented [AO10]:** Clarified wording, but steps didn't change. Original MTs and MOs did not change, and same process was followed to add expanded monitoring network wells.

1. The Subbasin Committee selected an approach and criteria for to setting the groundwater level minimum thresholds and measurable objectives.
2. SVBGSA used MCWRA's average groundwater elevation change hydrographs to select representative years that could define minimum thresholds and measurable objectives for the Subbasin. Groundwater elevations like those experienced during the representative climatic cycle between 1967 and 1998 were used to identify minimum thresholds and measurable objectives to ensure that they were achievable under reasonably expected climatic conditions. This representative period corresponds to important water management milestones for the Salinas Valley Groundwater Basin; water year 1967 marks the beginning of operations at San Antonio Reservoir, with first water releases in November 1966. The Castroville Seawater Intrusion Project (CSIP) began operating in 1998.

   The average groundwater elevation change hydrograph with preliminary minimum threshold and measurable objectives lines for the 180/400-Foot Aquifer Subbasin are shown on Figure 8-3. The average 2015 groundwater elevations in the 180/400-Foot Aquifer Subbasin are considered significant and unreasonable. When looking at the groundwater elevation changes within the representative climatic cycle, the historical lowest elevations occurred in 1991, at approximately 1 foot higher than 2015 elevations. The minimum thresholds were therefore set one foot above the 2015 groundwater elevations. The measurable objective is set to 2003 groundwater elevations, which is an achievable goal for the Subbasin under reasonably expected climatic conditions.

3. SVBGSA identified the appropriate minimum thresholds and measurable objectives on the respective monitoring well hydrographs. Each hydrograph was visually inspected to

check if the minimum threshold and measurable objective was reasonable. If an RMS did not have measurements from the minimum threshold or measurable objective years, the SMC were estimated using the hydrographs. Moreover, if the SMC seemed unreasonable for an RMS, they were adjusted based on historic water levels. The interpolated or adjusted minimum thresholds and measurable objectives are indicated by an asterisk in Table 8-2~~Table 8-2~~.

Hydrographs with well completion information showing minimum thresholds for each RMS are included in Appendix 8A.

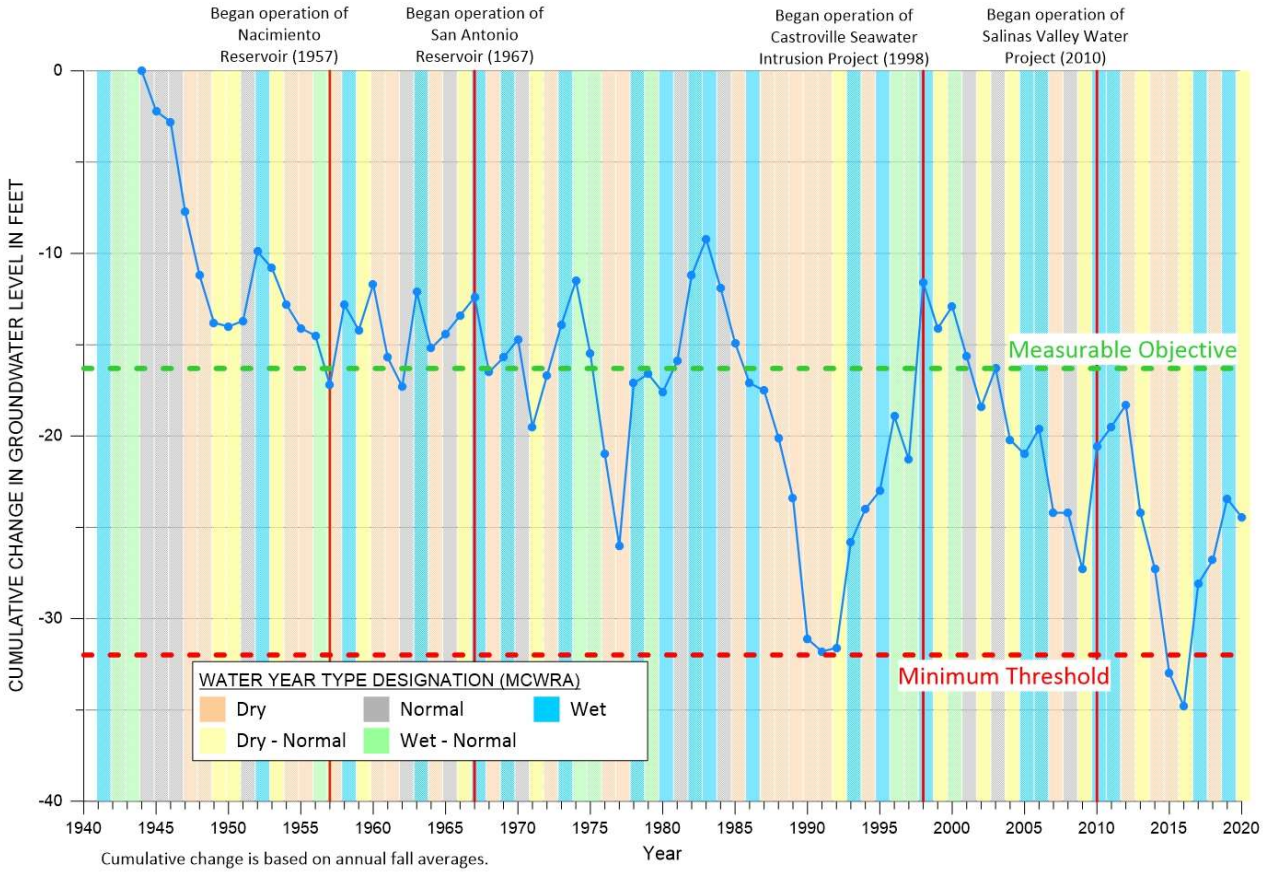


Figure 8-3. Cumulative Groundwater Elevation Change Hydrograph with Selected Measurable Objective and Minimum Threshold for the 180/400-Foot Aquifer Subbasin

**Commented [AO11]:** Adjusted to be for the 180/400 Subbasin, not MCWRA Pressure Area, which includes the Monterey Subbasin too

### ~~8.5.2.2~~8.6.2.2 Minimum Thresholds Impact on Domestic Wells

To address the human right to water, minimum thresholds for groundwater elevations are compared to the range of domestic well depths in the Subbasin using DWR's Online System for Well Completion Reports (OSWCR) database. This check was done to assure that the minimum thresholds maintain operability in a reasonable percentage of domestic wells. The proposed minimum thresholds for groundwater elevation do not necessarily protect all domestic wells because it is impractical to manage a groundwater basin in a manner that fully protects the shallowest wells. The average computed depth of domestic wells in the Subbasin is 362 feet using the Public Land Survey System sections data in the OSWCR database.

While this approach is reasonable, there are some adjustments that had to be made to improve the accuracy of the analysis. These include:

- The OSWCR database may include wells that have been abandoned, destroyed, or replaced, such as if the user switched to a water system, and abandoned or destroyed wells would have no detrimental impacts from lowered groundwater levels.
- Only wells likely to be in the principal aquifers were considered, since some domestic wells may draw water from shallow, perched groundwater that is not managed under this GSP.
- Wells in the Deep Aquifers were not included because there was not enough 2015 or 2003 groundwater elevation data to contour the minimum thresholds or measurable objectives.
- Only wells that had accurate locations were included, since some wells in the OSWCR database are not accurately located, it could lead to inaccurate estimations of depth to water in the wells.
- The depth to water is derived from a smoothly interpolated groundwater elevation contour map. Errors in the map may result in errors in groundwater elevation at the selected domestic wells.

Given the limitations listed above, the analysis only included 14 wells with accurate locations out of the total 294 OSWCR domestic wells in the 180-Foot and 400-Foot Aquifers. The analysis showed that 83% of domestic wells in the 180-Foot Aquifer will have at least 25 feet of water in them as long as groundwater elevations remain above minimum thresholds; and all domestic wells in the 180-Foot Aquifer will have at least 25 feet of water in them when measurable objectives are achieved. In the 400-Foot Aquifer, 88% of domestic wells will have at least 25 feet of water in them if groundwater elevations remain above minimum thresholds and when

**Commented [AO12]:** Same basic analysis but some refinements added to increase certainty based on feedback during the 2022 GSP development process. Results added to this section.

**Commented [TC13R12]:** **Original GSP:** Minimum thresholds for groundwater elevations are compared to the range of domestic well depths in the Subbasin using DWR's Online System for Well Completion Reports (OSWCR) database. This check was done to assure that the minimum thresholds maintain operability in a reasonable percentage of domestic wells. The proposed minimum thresholds for groundwater elevation do not necessarily protect all domestic wells because it is impractical to manage a groundwater basin in a manner that fully protects the shallowest wells. The average computed depth of domestic wells in the Subbasin is 316.6 feet for the domestic wells in the OSWCR database.

-In the 180-Foot Aquifer, 89% of all domestic wells will have at least 25 feet of water in them as long as groundwater elevations remain above minimum thresholds; and 91% of all domestic wells will have at least 25 feet of water in them when measurable objectives are achieved.

-In the 400-Foot Aquifer, 79% of all domestic wells will have at least 25 feet of water in them provided groundwater elevations remain above minimum thresholds; and 82% of all domestic wells will have at least 25 feet of water in them when measurable objectives are achieved.

measurable objectives are achieved. These percentages were considered reasonable given the limitations listed above.

#### ~~8.5.2.3~~8.6.2.3 Relationship between Individual Minimum Thresholds and Relationship to Other Sustainability Indicators

The SVBGSA compared minimum thresholds between RMSs to understand the relationship between RMSs (i.e., describe why or how a water level minimum threshold set at a particular RMS is similar to or different from water level thresholds in nearby RMS). The groundwater elevation minimum thresholds are derived from historical and/or smoothly interpolated groundwater elevations in the Subbasin. Therefore, the minimum thresholds are unique at every well, but when combined represent a reasonable and potentially realistic groundwater elevation map. Because the underlying groundwater elevation map is a reasonably achievable condition, the individual minimum thresholds at RMSs do not conflict with each other.

Groundwater elevation minimum thresholds can influence other sustainability indicators. SVBGSA reviewed the groundwater level minimum thresholds' relationship with each of the other sustainability indicators' minimum thresholds to ensure a groundwater level minimum threshold would not trigger an undesirable result for any of the other sustainability indicators. The groundwater elevation minimum thresholds are selected to avoid undesirable results for other sustainability indicators.

- **Reduction in groundwater storage.** The chronic lowering of groundwater levels minimum thresholds are identical to the groundwater storage minimum thresholds. Thus, the groundwater level minimum thresholds will not result in an undesirable loss of groundwater storage.

- **Seawater intrusion.** The chronic lowering of groundwater level minimum thresholds are set above historical lows. Therefore, the groundwater elevation minimum thresholds are intended to not exacerbate, and may help control, the rate of seawater intrusion. Seawater intrusion may be managed by either lowering groundwater elevations to capture seawater intrusion or raising groundwater elevations to drive seawater intrusion towards the coast. Because it has not been determined if lower or higher groundwater elevations will be used to manage seawater intrusion; the groundwater elevation minimum threshold was not set solve seawater intrusion, but rather to not exacerbate seawater intrusion.

- **Degraded water quality.** The chronic lowering of groundwater levels minimum could affect groundwater quality through 2 processes:

    1. Changes in groundwater elevation could change groundwater gradients, which could cause poor quality groundwater to flow toward production and domestic wells that would not have otherwise been impacted. These groundwater gradients, however, are

only dependent on differences between groundwater elevations, not on the groundwater elevations themselves. Therefore, the minimum threshold groundwater elevations do not directly lead to a significant and unreasonable degradation of groundwater quality in production and domestic wells.

2. Decreasing groundwater elevations can mobilize COC that are concentrated at depth, such as arsenic. The groundwater level minimum thresholds are near or above historical lows. Therefore, any depth dependent constituents have previously been mobilized by historical groundwater levels. Maintaining groundwater elevations above the minimum thresholds assures that no new depth dependent COC are mobilized, and are therefore protective of beneficial uses and users.

Commented [AO14]: Revision in wording, thanks to feedback, but same two main potential relationships.

- **Land subsidence.** The chronic lowering of groundwater levels minimum thresholds are set at or above recent low groundwater elevations. Thus, they are set at levels that will not induce the dewatering and compaction of clay-rich sediments that causes subsidence in response to lowering groundwater elevations.

- **Depletion of ISW.** The chronic lowering of groundwater levels minimum thresholds are identical to the ISW minimum thresholds. Therefore, the groundwater level minimum thresholds will not result in a significant or unreasonable depletion of ISW, including groundwater-dependent ecosystems.

### ~~8.5.2.4~~8.6.2.4 Effect of Minimum Thresholds on Neighboring Basins and Subbasins

The 180/400-Foot Aquifer Subbasin has 4 neighboring subbasins within the Salinas Valley Groundwater Basin:

- The Langley Subbasin to the north
- The Eastside Subbasin to the east
- The Forebay Subbasin to the south
- The Monterey Subbasin to the southwest

The SVBGSA is either the exclusive GSA or is one of the coordinating GSAs for the adjacent Subbasins. Because the SVBGSA covers all these subbasins, the SVBGSA is coordinating the development of the minimum thresholds and measurable objectives for all these subbasins. The Langley, Eastside, Forebay, and Monterey Subbasins have submitted GSPs in January 2022. Minimum thresholds for the 180/400-Foot Aquifer Subbasin have been reviewed relative to information developed for the neighboring subbasins' GSPs to ensure that these minimum thresholds will not prevent the neighboring subbasins from achieving sustainability. SVBGSA and MCWDGSA are close collaborators in developing and implementing their GSPs for the 180/400 and Monterey Subbasins. While SVBGSA and MCWDGSA have chosen slightly different groundwater level minimum thresholds for the same aquifers, the groundwater levels

across the Subbasin boundary will continue to be closely monitored to ensure both subbasin minimum thresholds are met. Data development and management will be a part of a collaborative relationship during implementation to ensure both subbasins reach sustainability.

The Pajaro Valley Basin lies directly to the north of the Subbasin. Because the minimum thresholds in the 180/400-Foot Aquifer Subbasin are above historical low groundwater elevations, it is likely that the minimum thresholds will not prevent the Pajaro Basin from achieving and maintaining sustainability. The SVBGSA will coordinate closely with the Pajaro Valley Water Agency to ensure that the basins do not prevent each other from achieving sustainability.

#### ~~8.5.2.5~~8.6.2.5 Effects on Beneficial Users and Land Uses

The groundwater level minimum thresholds may have several effects on beneficial users and land uses in the Subbasin.

**Agricultural land uses and users.** The groundwater elevation minimum thresholds prevent continued lowering of groundwater elevations in the Subbasin. Unless sufficient projects and management actions are undertaken, this may have the effect of limiting the amount of groundwater pumping in the Subbasin. Limiting the amount of groundwater pumping may limit the amount and type of crops that can be grown in the Subbasin. The groundwater elevation minimum thresholds could therefore limit expansion of the Subbasin's agricultural economy. This could have various effects on beneficial users and land uses:

- Agricultural land currently under irrigation may become more valuable as bringing new lands into irrigation becomes more difficult and expensive.
- Agricultural land not currently under irrigation may become less valuable because it may be too difficult and expensive to irrigate.

**Urban land uses and users.** The groundwater level minimum thresholds may reduce the amount of groundwater pumping in the Subbasin. This may limit urban growth, or result in urban areas obtaining alternative sources of water. This may result in higher water costs for public drinking water systems.

**Domestic land uses and users.** The groundwater level minimum thresholds are intended to protect most domestic wells, including small state and small local system wells. Therefore, the minimum thresholds will likely have an overall beneficial effect on existing domestic land uses by protecting the ability to pump from domestic wells. However, extremely shallow domestic wells may become dry, requiring owners to drill deeper wells. Additionally, the groundwater elevation minimum thresholds may limit the number of new domestic wells or small state and small local system wells that can be drilled to limit future declines in groundwater elevations.

**Ecological land uses and users.** The groundwater level minimum thresholds may limit the amount of groundwater pumping in the Subbasin and may limit both urban and agricultural growth. This outcome may benefit ecological land uses and users by curtailing the conversion of native vegetation to agricultural or domestic uses, and by reducing pressure on existing ecological land caused by declining groundwater elevations.

#### ~~8.5.2.6~~8.6.2.6 Relevant Federal, State, or Local Standards

No federal, state, or local standards exist for chronic lowering of groundwater levels.

#### ~~8.5.2.7~~8.6.2.7 Method for Quantitative Measurement of Minimum Thresholds

Groundwater level minimum thresholds will be directly measured from the representative monitoring well network. The groundwater elevation monitoring will be conducted in accordance with the monitoring plan outlined in Chapter 7. Furthermore, the groundwater elevation monitoring will meet the requirements of the technical and reporting standards included in the GSP Regulations.

As noted in Chapter 7, the current groundwater elevation representative monitoring network in the Subbasin includes 91 wells. Data gaps were identified in Chapter 7 and will be resolved during implementation of this GSP.

**Commented [AO15]:** Updated

### ~~8.5.3~~8.6.3 Measurable Objectives

The measurable objectives for chronic lowering of groundwater levels represent target groundwater elevations that are higher than the minimum thresholds. These measurable objectives provide operational flexibility to ensure that the Subbasin can be managed sustainably over a reasonable range of hydrologic variability.

> *The measurable objectives for the chronic lowering of groundwater levels are set to 2003 groundwater elevations.*

The measurable objectives are summarized in Table 8-2~~Table 8-2~~ and are also shown on the hydrographs for each RMS in Appendix 8A.

#### ~~8.5.3.1~~8.6.3.1 Methodology for Setting Measurable Objectives

The methodology for establishing measurable objectives is described in detail in Section 8.6.2.1~~8.5.2.1~~. A year from the relatively recent past was selected for setting measurable objectives to ensure that objectives are achievable. Figure 8-3 shows that there was a slow downward trend in average groundwater elevations through 2003. Since 2003, water elevations have consistently decreased at a more rapid rate. Groundwater elevations from 2003 were selected as representative of the measurable objectives for the 180/400-Foot Aquifer Subbasin.

The measurable objective contour maps for the 180/400-Foot Aquifer Subbasin along with the representative monitoring network wells are shown on Figure 8-4 and Figure 8-5 for the 180-Foot and 400-Foot Aquifers, respectively.

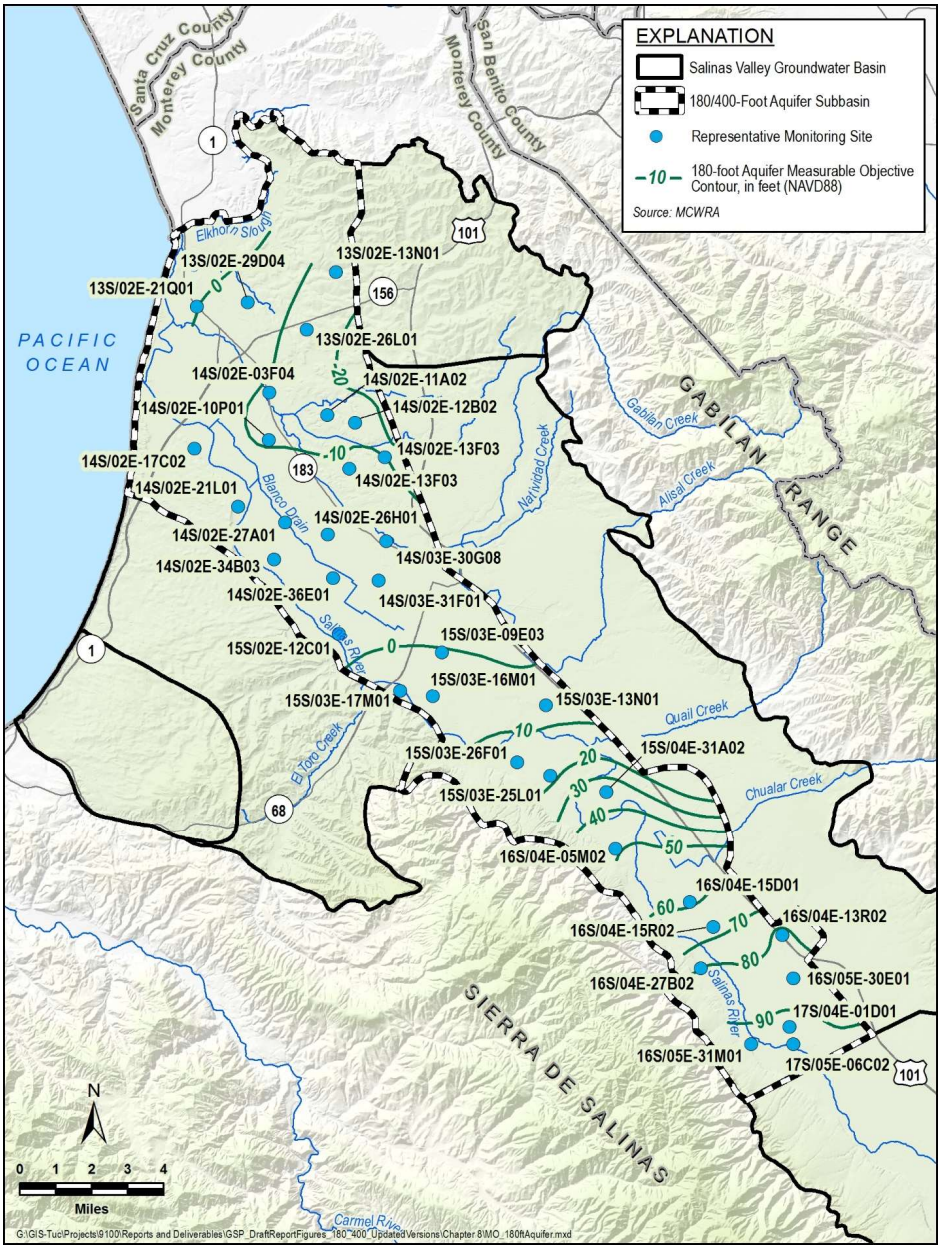


Figure 8-4. Groundwater Elevation Measurable Objective Contour Map for the 180-Foot Aquifer

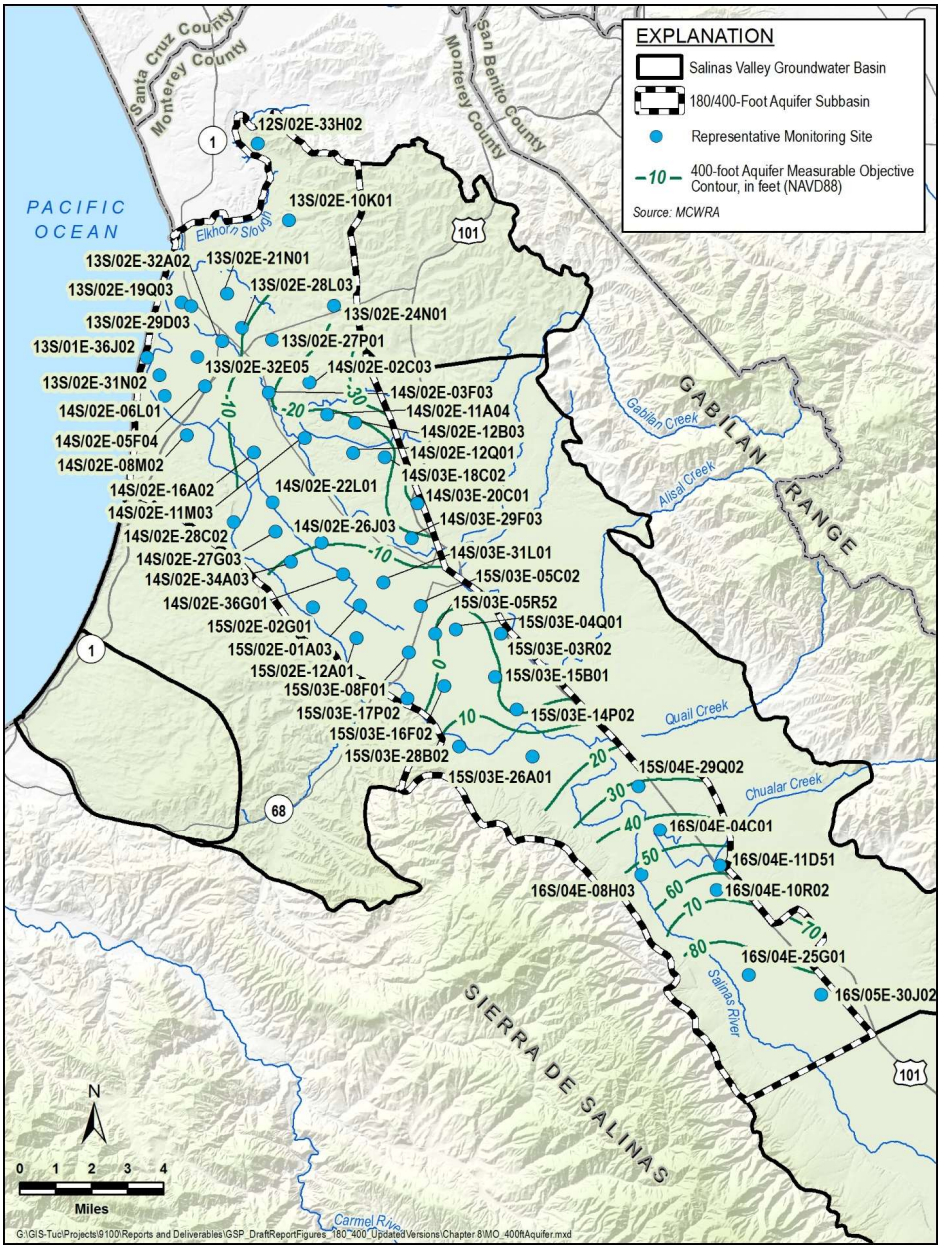


Figure 8-5. Groundwater Elevation Measurable Objective Contour Map for the 400-Foot Aquifer

### ~~8.5.3.2~~8.6.3.2 Interim Milestones

Interim milestones for groundwater elevations are shown in Table 8-3. These are only initial estimates of interim milestones. Interim milestones for groundwater levels will be modified as better data, analyses, and project designs become available.

Table 8-~~3~~8 ~~3~~. Chronic Lowering of Groundwater Levels Interim Milestones

| Monitoring Site | Current Groundwater Elevation (ft) | Interim Milestone at Year 2025 (ft) | Interim Milestone at Year 2030 (ft) | Interim Milestone at Year 2035 (ft) | Measurable Objective (ft) (goal to reach at 2040) |
|---|---|---|---|---|---|
| **180-Foot Aquifer** | | | | | |
| **13S/02E-13N01** | 6.6* | 7.8 | 8.9 | 10.1 | 11.2* |
| **13S/02E-21Q01** | 8.6 | 8.6 | 8.6 | 8.5 | 8.5* |
| **13S/02E-26L01** | -4.2* | -3.9 | -3.6 | -3.3 | -3.0* |
| **13S/02E-29D04** | -3.3 | -3.1 | -2.9 | -2.7 | -2.5* |
| **14S/02E-03F04** | -5.2 | -5.0 | -4.9 | -4.7 | -4.5 |
| **14S/02E-10P01** | -19.4 | -16.2 | -12.9 | -9.7 | -6.4 |
| **14S/02E-11A02** | -8.2 | -7.7 | -7.1 | -6.6 | -6.0* |
| **14S/02E-12B02** | -7.6 | -6.2 | -4.8 | -3.4 | -2.0* |
| **14S/02E-13F03** | -8.0 | -7.4 | -6.9 | -6.3 | -5.7 |
| **14S/02E-17C02** | 9.3 | 9.9 | 10.4 | 11.0 | 11.5* |
| **14S/02E-21L01** | -5.0 | -4.2 | -3.4 | -2.6 | -1.8 |
| **14S/02E-26H01** | -9.5 | -8.7 | -7.9 | -7.0 | -6.2 |
| **14S/02E-27A01** | -7.3 | -6.3 | -5.2 | -4.2 | -3.1* |
| **14S/02E-34B03** | -12.8 | -10.8 | -8.8 | -6.8 | -4.8 |
| **14S/02E-36E01** | -12.5 | -10.2 | -7.9 | -5.6 | -3.3 |
| **14S/03E-18C01** | 11.8 | 12.0 | 12.1 | 12.3 | 12.4* |
| **14S/03E-30G08** | -13.1 | -12.0 | -10.8 | -9.7 | -8.5 |
| **14S/03E-31F01** | -7.2 | -6.0 | -4.7 | -3.5 | -2.2 |
| **15S/02E-12C01** | -13.7 | -11.0 | -8.4 | -5.7 | -3.0* |
| **15S/03E-09E03** | -4.4 | -2.6 | -0.8 | 1.1 | 2.9 |
| **15S/03E-13N01** | -11.4 | -5.4 | 0.7 | 6.8 | 12.8 |
| **15S/03E-16M01** | 3.6* | 5.6 | 7.6 | 9.5 | 11.5 |
| **15S/03E-17M01** | 4.7* | 6.5 | 8.3 | 10.1 | 11.9 |
| **15S/03E-25L01** | 13.6* | 16.4 | 19.1 | 21.9 | 24.6 |
| **15S/03E-26F01** | 0.3 | 3.4 | 6.4 | 9.5 | 12.5 |
| **15S/04E-31A02** | 30.7 | 33.4 | 36.1 | 38.8 | 41.5 |
| **16S/04E-05M02** | 35.8 | 38.8 | 41.9 | 44.9 | 47.9 |
| **16S/04E-13R02** | 74.2 | 77.0 | 79.8 | 82.5 | 85.3 |
| **16S/04E-15D01** | 48.3 | 50.9 | 53.4 | 56.0 | 58.6 |
| **16S/04E-15R02** | 55.1 | 57.4 | 59.7 | 62.0 | 64.3 |
| **16S/04E-27B02** | 69.5* | 73.3 | 77.0 | 80.8 | 84.5* |
| **16S/05E-30E01** | 77.1* | 79.1 | 81.1 | 83.0 | 85.0 |

| Monitoring Site | Current Groundwater Elevation (ft) | Interim Milestone at Year 2025 (ft) | Interim Milestone at Year 2030 (ft) | Interim Milestone at Year 2035 (ft) | Measurable Objective (ft) (goal to reach at 2040) |
|---|---|---|---|---|---|
| **16S/05E-31M01** | 87.6 | 89.4 | 91.2 | 93.0 | 94.8 |
| **17S/04E-01D01** | 74.5 | 81.1 | 87.7 | 94.3 | 100.9 |
| **17S/05E-06C02** | 71.9 | 76.8 | 81.7 | 86.6 | 91.5 |
| **400-Foot Aquifer** | | | | | |
| **12S/02E-33H02** | 2.3 | 2.5 | 2.7 | 2.8 | 3.0* |
| **13S/02E-10K01** | -20.4 | -19.3 | -18.2 | -17.1 | -16.0* |
| **13S/02E-21N01** | -6.1 | -5.3 | -4.6 | -3.8 | -3.0* |
| **13S/02E-24N01** | -2.0 | -1.5 | -1.0 | -0.5 | 0.0* |
| **13S/02E-27P01** | -28.5 | -26.6 | -24.7 | -22.7 | -20.8 |
| **13S/02E-29D03** | -4.3 | -3.8 | -3.4 | -2.9 | -2.4 |
| **13S/02E-31N02** | -1.8 | -1.5 | -1.1 | -0.8 | -0.4 |
| **13S/02E-32A02** | -2.5 | -2.1 | -1.8 | -1.4 | -1.0* |
| **14S/02E-02C03** | -29.0 | -26.8 | -24.5 | -22.3 | -20.0* |
| **14S/02E-03F03** | -11.8 | -10.2 | -8.5 | -6.9 | -5.2 |
| **14S/02E-05F04** | -8.5 | -8.1 | -7.7 | -7.3 | -6.9 |
| **14S/02E-08M02** | -3.2 | -2.7 | -2.1 | -1.6 | -1.0* |
| **14S/02E-11A04** | -26.7 | -24.4 | -22.1 | -19.8 | -17.5 |
| **14S/02E-11M03** | -24.0 | -23.0 | -22.0 | -21.0 | -20.0* |
| **14S/02E-12B03** | -28.2 | -25.8 | -23.4 | -20.9 | -18.5 |
| **14S/02E-12Q01** | -10.9 | -10.5 | -10.1 | -9.7 | -9.3 |
| **14S/02E-16A02** | -14.5 | -12.9 | -11.2 | -9.6 | -7.9 |
| **14S/02E-22L01** | -12.7 | -10.3 | -7.9 | -5.5 | -3.1 |
| **14S/02E-26J03** | -18.7 | -15.3 | -11.9 | -8.4 | -5.0 |
| **14S/02E-27G03** | -13.9 | -12.5 | -11.1 | -9.7 | -8.3 |
| **14S/02E-34A03** | -13.4 | -11.9 | -10.5 | -9.0 | -7.5 |
| **14S/02E-36G01** | -9.8 | -7.4 | -5.0 | -2.5 | -0.1 |
| **14S/03E-18C02** | -18.3 | -16.9 | -15.4 | -14.0 | -12.5 |
| **14S/03E-20C01** | -41.0 | -39.5 | -38.0 | -36.5 | -35.0* |
| **14S/03E-29F03** | -23.0 | -21.0 | -19.0 | -17.0 | -15.0* |
| **14S/03E-31L01** | -9.0 | -7.5 | -6.0 | -4.5 | -3.0* |
| **15S/02E-01A03** | -12.7 | -9.7 | -6.7 | -3.7 | -0.7 |
| **15S/02E-02G01** | -23.0 | -20.1 | -17.1 | -14.2 | -11.2 |
| **15S/02E-12A01** | -13.8 | -11.5 | -9.3 | -7.0 | -4.7 |
| **15S/03E-03R02** | -8.0 | -6.3 | -4.5 | -2.8 | -1.0* |
| **15S/03E-04Q01** | -6.0 | -4.5 | -3.0 | -1.5 | 0.0* |
| **15S/03E-05C02** | -16.0 | -13.3 | -10.5 | -7.8 | -5.0* |
| **15S/03E-08F01** | -15.4 | -12.9 | -10.3 | -7.8 | -5.2 |
| **15S/03E-14P02** | -7.6 | -3.6 | 0.4 | 4.4 | 8.4 |
| **15S/03E-15B01** | -5.5 | -2.7 | 0.2 | 3.0 | 5.8 |
| **15S/03E-16F02** | 0.4 | 1.6 | 2.7 | 3.9 | 5.0* |

| Monitoring Site | Current Groundwater Elevation (ft) | Interim Milestone at Year 2025 (ft) | Interim Milestone at Year 2030 (ft) | Interim Milestone at Year 2035 (ft) | Measurable Objective (ft) (goal to reach at 2040) |
|---|---|---|---|---|---|
| **15S/03E-17P02** | -8.0 | -6.5 | -5.0 | -3.5 | -2.0* |
| **15S/03E-26A01** | 5.1 | 7.6 | 10.1 | 12.5 | 15.0 |
| **15S/03E-28B02** | 4.0 | 6.8 | 9.5 | 12.3 | 15.0* |
| **15S/04E-29Q02** | 17.4 | 21.5 | 25.7 | 29.8 | 33.9 |
| **16S/04E-04C01** | 34.4 | 37.6 | 40.8 | 44.0 | 47.2 |
| **16S/04E-08H03** | 42.8 | 45.8 | 48.7 | 51.7 | 54.7 |
| **16S/04E-10R02** | 55.0 | 58.1 | 61.1 | 64.2 | 67.2 |
| **16S/04E-25G01** | 70.3 | 71.8 | 73.4 | 74.9 | 76.4 |
| **16S/05E-30J02** | 83.0 | 84.9 | 86.9 | 88.8 | 90.7 |
| **Deep Aquifers** | | | | | |
| **13S/01E-36J02** | -9.6 | -6.7 | -3.8 | -0.9 | 2.0* |
| **13S/02E-19Q03** | -8.9 | -5.1 | -1.3 | 2.5 | 6.3 |
| **13S/02E-28L03** | -27.4 | -27.8 | -28.2 | -28.6 | -29.0* |
| **13S/02E-32E05** | -14.7 | -10.6 | -6.6 | -2.5 | 1.6 |
| **14S/02E-06L01** | -14.7 | -10.3 | -5.9 | -1.4 | 3.0 |
| **14S/02E-18B01** | -27.6* | -27.0 | -26.3 | -25.7 | -25.0* |
| **14S/02E-22A03** | -103.2 | -92.4 | -81.6 | -70.8 | -60.0* |
| **14S/02E-28C02** | -40.0 | -33.8 | -27.5 | -21.3 | -15.0* |
| **15S/03E-10D04** | -21.7 | -18.8 | -15.9 | -12.9 | -10.0* |
| **15S/03E-17E02** | -14.0 | -13.0 | -12.0 | -11.0 | -10.0* |
| **16S/04E-11D51** | | | | | |

*Groundwater elevation estimated.

## ~~8.5.4~~8.6.4 Undesirable Results

### ~~8.5.4.1~~8.6.4.1 Criteria for Defining Chronic Lowering of Groundwater Levels Undesirable Results

The chronic lowering of groundwater levels undesirable result is a quantitative combination of groundwater level minimum threshold exceedances. The undesirable result is:

> *More than 15% of the groundwater elevation minimum thresholds are exceeded in any single aquifer.*

Since the GSP addresses long-term groundwater sustainability, exceedances of groundwater levels minimum thresholds during a drought do not constitute an undesirable result. Pursuant to SGMA Regulations (California Water Code § 10721(w)(1)), "Overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and groundwater recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods." Therefore, groundwater levels may temporarily exceed minimum

thresholds during droughts, and do not constitute an undesirable result, as long as groundwater levels rebound.

Commented [AO16]: Added for clarification

Undesirable results provide flexibility in defining sustainability. Increasing the percentage of allowed minimum threshold exceedances provides more flexibility but may lead to significant and unreasonable conditions for some beneficial users. Reducing the percentage of allowed minimum threshold exceedances ensures strict adherence to minimum thresholds but reduces flexibility due to unanticipated hydrogeologic conditions. The undesirable result was set at 15% to balance the interests of beneficial users with the practical aspects of groundwater management under uncertainty.

The 15% limit on minimum threshold exceedances in the undesirable result allows for 5 exceedances in the 180-Foot Aquifer, 7 exceedances in the 400-Foot Aquifer, and 2 in the Deep Aquifers. This was considered a reasonable number of exceedances given the hydrogeologic uncertainty of the Subbasin. As the monitoring system grows, additional exceedances will be allowed. One additional exceedance will be allowed for approximately every 7 new monitoring wells.

Commented [AO17]: Updated based on expanded monitoring network, but with the same percentages

### ~~8.5.4.2~~8.6.4.2 Potential Causes of Undesirable Results

As of 2020, an undesirable result for chronic lowering of groundwater levels does currently exist in all principal aquifers in the 180/400-Foot Aquifer Subbasin. In the 180-Foot Aquifer, groundwater elevations in 5 of the 35 RMS wells (14%) were at or below the minimum threshold in the most recent Fall 2020 groundwater elevation measurements. In the 400-Foot Aquifer, groundwater elevations for 7 out of 45 RMS wells (16%) were at or below the minimum threshold, and in the Deep Aquifers 6 out of 11 RMS (55%) wells were below the minimum threshold in fall 2020. Conditions that may lead to an undesirable result include the following:

Commented [AO18]: Added current status, per GSP regulations for Assessment

- **Localized pumping clusters.** Even if regional pumping is maintained within the sustainable yield, clusters of high-capacity wells may cause excessive localized drawdowns that lead to undesirable results.

- **Expansion of *de minimis* pumping.** Individual *de minimis* pumpers do not have a significant impact on groundwater elevations. However, many *de minimis* pumpers are often clustered in specific residential areas. Pumping by these *de minimis* users is not regulated under this GSP. Adding additional domestic *de minimis* pumpers in these areas may result in excessive localized drawdowns and undesirable results.

- **Departure from the GSP's climatic assumptions, including extensive, unanticipated drought.** Minimum thresholds were established based on historical groundwater elevations and reasonable estimates of future climatic conditions and groundwater

elevations. Departure from the GSP's climatic assumptions or extensive, unanticipated droughts may lead to excessively low groundwater elevations and undesirable results.

#### ~~8.5.4.3~~8.6.4.3 Effects on Beneficial Users and Land Uses

The primary detrimental effect on beneficial users from allowing multiple exceedances occurs if more than 1 exceedance take place in a small geographic area. Allowing 15% exceedances is reasonable if the exceedances are spread out across the Subbasin, and as long as any 1 well does not regularly exceed its minimum threshold. If the exceedances are clustered in a small area, it will indicate that significant and unreasonable effects are being born by a localized group of landowners.

## ~~8.6~~8.7 Reduction in Groundwater Storage SMC

Commented [AO19]: Revised per stakeholder input, and correspondingly the relationships between other SMC and this indicator were also revised to reflect that this is benchmarked to the groundwater level and seawater intrusion minimum thresholds and measurable objectives.

### ~~8.6.1~~8.7.1 Locally Defined Significant and Unreasonable Conditions

Locally defined significant and unreasonable conditions in groundwater storage in the Subbasin are those that:

- Lead to chronic, long-term reduction in groundwater storage, or
- Interfere with other sustainability indicators

These significant and unreasonable conditions were determined based on input collected during Subbasin Committee meetings and discussions with GSA staff.

### ~~8.6.2~~8.7.2 Minimum Thresholds

*The minimum threshold for reduction in groundwater storage is 626,000 acre-feet below the measurable objective in the 180/400-Foot Aquifer Subbasin. This reduction is based on the groundwater level and seawater intrusion minimum thresholds. This number does not include any storage changes in the Deep Aquifers and will be refined as additional data are collected and other projects are implemented.*

Although not the metric for establishing change in groundwater storage, the GSAs are committed to pumping at or less than the Subbasin's long-term sustainable yield. SGMA allows 20 years to reach sustainability.

#### ~~8.6.2.1~~8.7.2.1 Information and Methodology Used to Establish Minimum Thresholds and Measurable Objectives

The groundwater storage minimum threshold and measurable objective rely on the groundwater elevation and seawater intrusion minimum thresholds. The methodologies used to the establish

those two minimum thresholds are detailed in Section 8.6.2.1~~8.5.2.1~~ and Section 8.8.2.1~~8.7.2.1~~. The GSP Regulations § 354.36 (b) states that: "Groundwater elevations may be used as a proxy for monitoring other sustainability indicators if the Agency demonstrates the following: (1) Significant correlation exists between groundwater elevations and the sustainability indicators for which groundwater elevation measurements serve as a proxy." The general relationship between groundwater storage and groundwater elevations is discussed in greater detail in Chapter 4, Section 4.4.2.

Figure 8-6 compares the Subbasin's cumulative change in storage, plotted on the black line, with the average annual change in groundwater elevation, plotted on the blue line. The groundwater elevation change data are derived from the groundwater level monitoring network; the cumulative change in groundwater storage is derived from the SVIHM. Although the data come from 2 sources, the data generally show similar patterns between 1980 and 2016. The decrease in storage modeled by the SVIHM from 1983 to 1998 is not exactly reflected in the change in groundwater elevations, because the modeled storage is dependent on the simulated groundwater elevations in the SVIHM. However, from 1998 to 2016, the cumulative change in storage and annual change in groundwater elevations seem to be more closely related as verified on Figure 8-7.

Figure 8-7 shows a scatter plot of cumulative change in storage and annual average change in groundwater elevation. The blue data points show data for the entire model period from 1980 to 2016 and the orange data points show data from 1998 to 2016. Although, the data for the entire model period demonstrate a weak correlation ($R^2$=0.3748), a more significant positive correlation exists between groundwater elevations and the amount of groundwater in storage between 1998 and 2016 ($R^2$=0.8334). The correlation for the 1998 to 2016 period is sufficient to show that groundwater elevations are an adequate proxy for groundwater storage. The data presented on Figure 8-6 and Figure 8-7 are used to establish groundwater elevation as proxies for groundwater in storage for the portion of the Subbasin that is not seawater intruded.

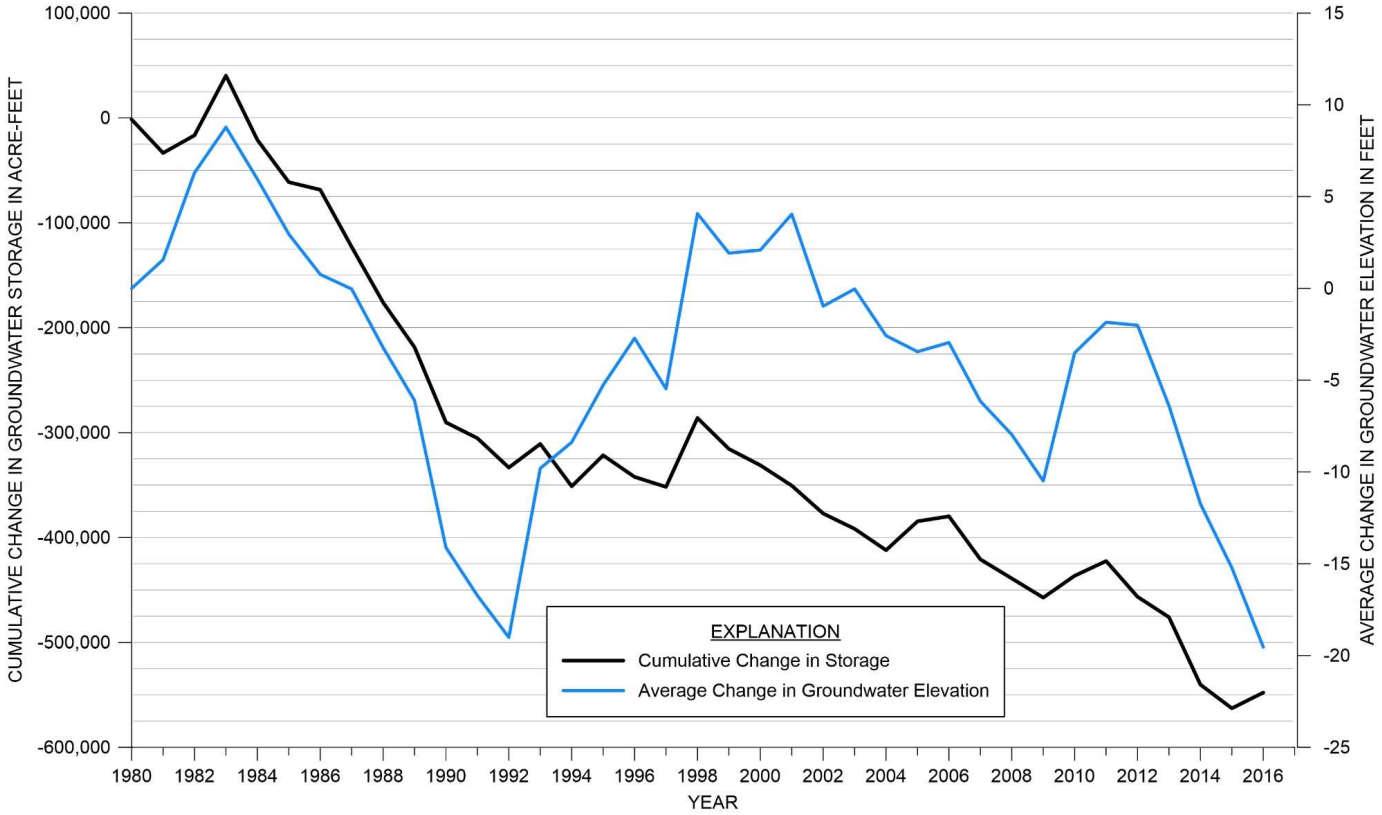


Figure 8-6. Cumulative Change in Storage and Average Change in Groundwater Elevation in the 180/400-Foot Aquifer Subbasin

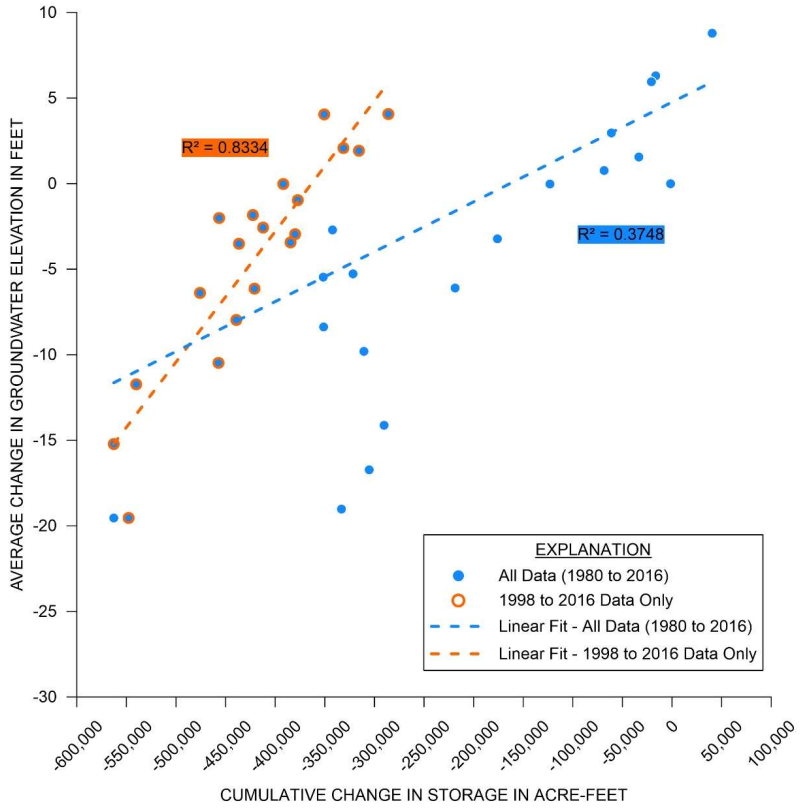


Figure 8-7. Correlation Between Cumulative Change in Storage and Average Change in Groundwater Elevation

objectives multiplied by the area of the Subbasin that is not~~equivalent to the~~ seawater intruded ~~area~~ and a storage coefficient. The non-seawater intruded area in the Subbasin at the measurable objective is 84,200 acres. As described in Appendix 5B, the storage coefficient of 0.078 is used, based on an average of previous estimates of ~~specific~~ storage coefficients. ~~Two storage coefficients were investigated. A storage coefficient of 0.036 was used in the *State of the Basin* report, which is an average of historical estimates (DWR, 2004a). A storage coefficient of 0.12 is the initial estimate of specific yield in the SVIHM and the ongoing seawater intrusion modeling of the Subbasin, which is the most current estimate. The storage coefficient of 0.036 yields a groundwater level-based change in groundwater storage of 41,000 acre-feet reported. The storage coefficient of 0.12 yields a groundwater level-based change in groundwater storage of~~

~~Appendix 5B.~~Calculations based on the previous storage coefficient estimates result in a range from 41,000 AF to 138,000 AF. An average of the estimates is used here, resulting in a difference between the storage minimum threshold and measurable objective of 90,000 AF for the non-seawater intruded area.

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The storage change due to seawater intrusion was estimated by calculating the volume of water in the 180-Foot and 400-Foot Aquifers that would transition from saline to fresh based on the location of the minimum threshold and measurable objective 500-mg/L chloride isocontour locations. Approximately 334,000 acre-feet of usable water would be added to storage in the 180-Foot Aquifer if the 500-mg/L isocontour is moved to the measurable objective location. Approximately 202,000 acre-feet of usable water would be added to storage in the 400-Foot Aquifer if the 500-mg/L isocontour is moved to the measurable objective location. The total increase in usable stored water due to reduced seawater intrusion is therefore 536,000 ~~acre-feet~~AF.

Total change in groundwater storage between minimum threshold conditions and measurable objective conditions is the sum of the storage change due to groundwater elevations and the storage change due to seawater intrusion. ~~Using the two~~The previous ~~specific~~ storage coefficient estimates result in a range from 577,000 to 674,000 AF~~,~~ for the amount of water in storage between minimum threshold and measurable objective groundwater conditions ~~ranges from 577,000 to 674,000 AF~~. The average of this range, 626,000 AF, is used to set the minimum threshold for reduction of groundwater storage. A storage coefficient of 0.078 will be used to adequately compare current conditions to the minimum threshold. The groundwater storage change due to a reduction in seawater intrusion accounts for about 86% of the total average storage change between minimum thresholds and measurable objective conditions; change in water levels account for only 14% of the change in storage. Therefore, the choice of storage coefficient only has a small influence on the SMC.

The Deep Aquifers were not included in this calculation, which is a data gap that will continued to be addressed during GSP implementation. This estimate will be refined as more data are gathered and other projects are implemented.

#### ~~8.6.2.2~~8.7.2.2 Relationship between Individual Minimum Thresholds and Relationship to Other Sustainability Indicators

The minimum threshold for reduction in groundwater storage is a single value for the entire Subbasin. Therefore, the concept of potential conflict between minimum thresholds at different locations is not applicable.

The reduction in groundwater storage minimum threshold could influence other sustainability indicators. The reduction in groundwater storage minimum threshold is selected to avoid undesirable results for other sustainability indicators, as outlined below.

- **Chronic lowering of groundwater levels.** The reduction in storage minimum threshold is calculated from the groundwater level minimum thresholds. Therefore, the minimum threshold for reduction in groundwater storage is consistent with, and will not result in, a significant or unreasonable impact on groundwater elevations.
- **Seawater intrusion.** The reduction in storage minimum threshold is based on the groundwater level minimum thresholds, which is meant to keep groundwater elevation above historical lows and does not promote additional pumping. Therefore, the minimum threshold for reduction in groundwater storage will not result in a significant increase in seawater intrusion. However, keeping reduction of groundwater storage at the minimum threshold may not, by itself, stop all seawater intrusion.
- **Degraded water quality.** The reduction in storage minimum threshold is established to maintain groundwater elevations above historical lows. The change in storage minimum threshold will not directly lead to any additional degradation of groundwater quality.
- **Land subsidence.** The reduction in storage minimum threshold is established to maintain groundwater elevations above historical lows. Therefore, the change in storage minimum threshold will not induce any additional dewatering of clay-rich sediments; and will not induce additional subsidence.
- **Depletion of ISW.** The reduction in storage minimum threshold is established to maintain groundwater elevations above historical lows. Therefore, the change in storage minimum threshold will not induce additional depletion of ISW.

#### ~~8.6.2.3~~8.7.2.3 Effect of Minimum Thresholds on Neighboring Basins and Subbasins

The 180/400-Foot Aquifer Subbasin has 4 neighboring subbasins within the Salinas Valley Groundwater Basin:

- The Langley Subbasin to the north
- The Eastside Subbasin to the east
- The Forebay Subbasin to the south
- The Monterey Subbasin to the southwest

The SVBGSA is either the exclusive GSA or is one of the coordinating GSAs for the adjacent Subbasins. Because the SVBGSA covers all these subbasins, the SVBGSA is coordinating the development of the minimum thresholds and measurable objectives for all these subbasins. The Langley, Eastside, Forebay, and Monterey Subbasins have submitted GSPs in January 2022. Minimum thresholds for the 180/400-Foot Aquifer Subbasin have been reviewed relative to

information developed for the neighboring subbasins' GSPs to ensure that these minimum thresholds will not prevent the neighboring subbasins from achieving sustainability.

The Pajaro Valley Basin occurs directly to the north. Because the minimum thresholds in the 180/400-Foot Aquifer Subbasin are set at the long-term future sustainable yield, it is likely that the minimum thresholds will not prevent the Pajaro Basin from achieving and maintaining sustainability. The SVBGSA will coordinate closely with the Pajaro Valley Water Agency as it sets minimum thresholds to ensure that the basins do not prevent each other from achieving sustainability.

#### ~~8.6.2.4~~8.7.2.4 Effect on Beneficial Uses and Users

The reduction in groundwater storage minimum threshold might limit the amount of groundwater pumping in the Subbasin. Limiting pumping may impact the beneficial uses and users of the Subbasin.

**Agricultural land uses and users.** Limiting the amount of groundwater pumping may limit agricultural production or restrict options for crops that can be grown in the Subbasin by reducing the amount of available water. Agricultural lands that are currently not irrigated may be particularly impacted because the additional groundwater pumping needed to irrigate these lands could remove groundwater from storage until it is below the minimum threshold.

**Urban land uses and users.** Limiting the amount of groundwater pumping may increase the cost of water for municipal users in the Subbasin because municipalities may need to find other, more expensive water sources.

**Domestic land uses and users.** The change in storage minimum threshold is based on groundwater level minimum thresholds that protect most domestic wells. Therefore, the minimum threshold will likely have an overall beneficial effect on existing domestic land uses by protecting the ability to pump from domestic wells.

**Ecological land uses and users.** Limiting the amount of pumping may generally benefit the environmental groundwater uses. Maintaining historical amounts of groundwater in the Subbasin maintains groundwater supplies for environmental purposes at levels similar to historical levels.

#### ~~8.6.2.5~~8.7.2.5 Relation to State, Federal, or Local Standards

No federal, state, or local standards exist for reductions in groundwater storage.

### ~~8.6.2.6~~8.7.2.6 Method for Quantitative Measurement of Minimum Threshold

The amount of groundwater in storage will be calculated by calculating the change between groundwater elevation contour maps. The change in storage estimates will also be checked every 5 years when the SVIHM model is updated.

## ~~8.6.3~~8.7.3 Measurable Objectives

> *The measurable objective for reduction in groundwater storage measurable objective is 0 when groundwater levels and seawater intrusion are at their measurable objectives.*

Since the goal is to manage to the measurable objective, additional water in storage is needed until groundwater elevations are at their measurable objectives.

### ~~8.6.3.1~~8.7.3.1 Methodology for Setting Measurable Objectives

The measurable objective for reduction in groundwater storage was calculated as described in Section 8.6.2.1~~8.5.2.1~~.

### ~~8.6.3.2~~8.7.3.2 Interim Milestones

The reduction in storage interim milestones are shown in Table 8-4~~Table 8-4~~ for each of the 5-year intervals, consistent with the minimum thresholds and the measurable objectives. At 2017 groundwater elevations, the groundwater in storage is about ~~157,800~~-20,000 AF below the ~~measurable objective~~minimum threshold, to reach the measurable objective a gain of ~~39~~161,400 AF in groundwater storage needs to occur every 5 years until 2040. At current, 2020, groundwater elevations the groundwater in storage is approximately 43,500 AF below the minimum threshold.

Table 8-~~4~~8-4. Reduction in Groundwater Storage Interim Milestones

| Gain in Storage needed to Reach Measurable Objective (AF) | At Current Conditions (2020) | At Interim Milestone Year 2025 | At Interim Milestone Year 2030 | At Interim Milestone Year 2035 | At Measurable Objective Year 2040 |
|---|---|---|---|---|---|
| 5-year incremental change | -669,100 | ~~39~~161,400 | ~~39~~161,400 | ~~39~~161,400 | 0 |
| Cumulative change | -669,100 | -484,200~~-118,700~~ | -322,800~~-78,900~~ | -161,400~~-39,400~~ | 0 |

## ~~8.6.4~~8.7.4 Undesirable Results

### ~~8.6.4.1~~8.7.4.1 Criteria for Defining Reduction in Groundwater Storage Undesirable Results

The reduction in groundwater storage undesirable result is:

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*There is an exceedance of the minimum threshold.*

Since the GSP addresses long-term groundwater sustainability, exceedances of groundwater storage minimum thresholds during a drought do not constitute an undesirable result. Pursuant to SGMA Regulations (California Water Code § 10721(w)(1)), "Overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and groundwater recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods." Therefore, groundwater storage may temporarily exceed minimum thresholds during droughts, and do not constitute an undesirable result, as long as groundwater levels rebound.

Under current conditions, there is an undesirable result for reduction in groundwater storage because the minimum threshold is exceeded by 8,500 AF.

#### ~~8.6.4.2~~8.7.4.2 Potential Causes of Undesirable Results

Conditions that may lead to an undesirable result for the reduction in groundwater storage sustainability indicator include the following:

- **Expansion of agricultural or municipal pumping.** Additional agricultural or municipal pumping may result in lowered groundwater elevations that reduce groundwater storage to an undesirable result.
- **Expansion of *de minimis* pumping.** Pumping by *de minimis* users is not regulated under this GSP. Adding domestic *de minimis* pumpers in the Subbasin may result in low groundwater levels that reduce the groundwater storage below to an undesirable result.
- **Departure from the GSP's climatic assumptions, including extensive, unanticipated drought.** The undesirable result is established based on reasonable anticipated future climatic conditions and groundwater elevations. Departure from the GSP's climatic assumptions or extensive, unanticipated droughts may lead to excessively low groundwater recharge and unanticipated high pumping rates that could reduce groundwater in storage to an undesirable result.

#### ~~8.6.4.3~~8.7.4.3 Effects on Beneficial Users and Land Use

The practical effect of the reduction in groundwater storage undesirable result is no chronic, long-term net change in groundwater storage. Therefore, beneficial uses and users will have access to a similar amount of water in storage that currently exists, and the undesirable result will not have an additional negative effect on the beneficial users and uses of groundwater.

## ~~8.7~~8.8 Seawater Intrusion SMC

### ~~8.7.1~~8.8.1 Locally Defined Significant and Unreasonable Conditions

Locally defined significant and unreasonable seawater intrusion in the Subbasin is defined as follows:

- Any seawater intrusion in the Subbasin is significant and unreasonable.

This significant and unreasonable condition was determined based on input collected during Subbasin Committee meetings and discussions with GSA staff.

### ~~8.7.2~~8.8.2 Minimum Thresholds

> *The minimum threshold for seawater intrusion is defined as the 2017 extent of the 500 mg/L chloride concentration isocontour for the 180-Foot and 400-Foot Aquifers, and as the line defined by Highway 1 for the Deep Aquifers.*

Figure 8-8 and Figure 8-9 present the minimum threshold, shown in red, for seawater intrusion in the 180-Foot and 400-Foot Aquifers, respectively, as represented by the 2017 extent of the 500 mg/L chloride concentration isocontour. The purple lines on the two figures show the current 2020 extent of seawater intrusion in the 180-Foot and 400-Foot Aquifers.

Figure 8-10 shows the minimum threshold for the Deep Aquifers in red that is defined by Highway 1. There is no reported seawater intrusion in the Deep Aquifers.

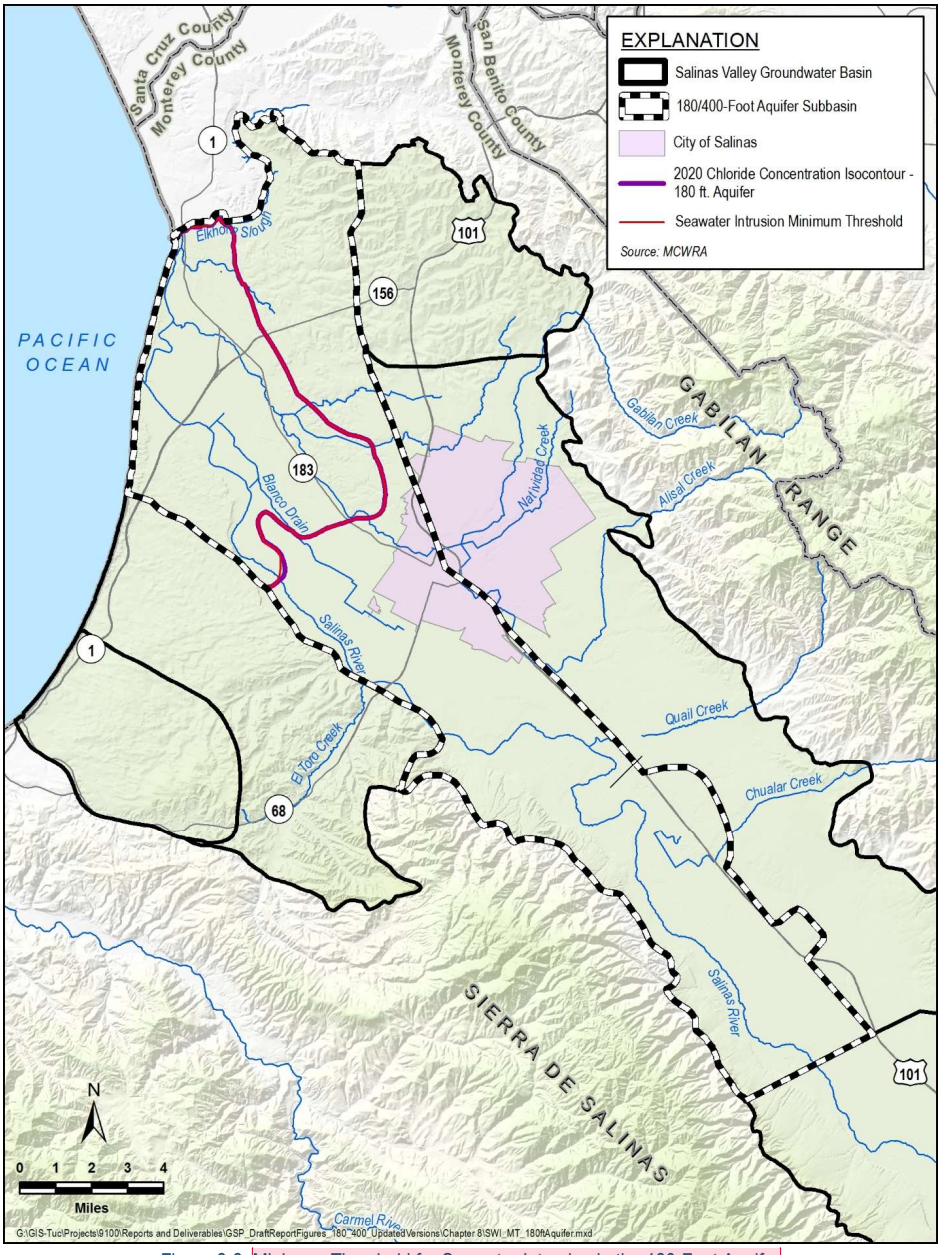


Figure 8-8. Minimum Threshold for Seawater Intrusion in the 180-Foot Aquifer

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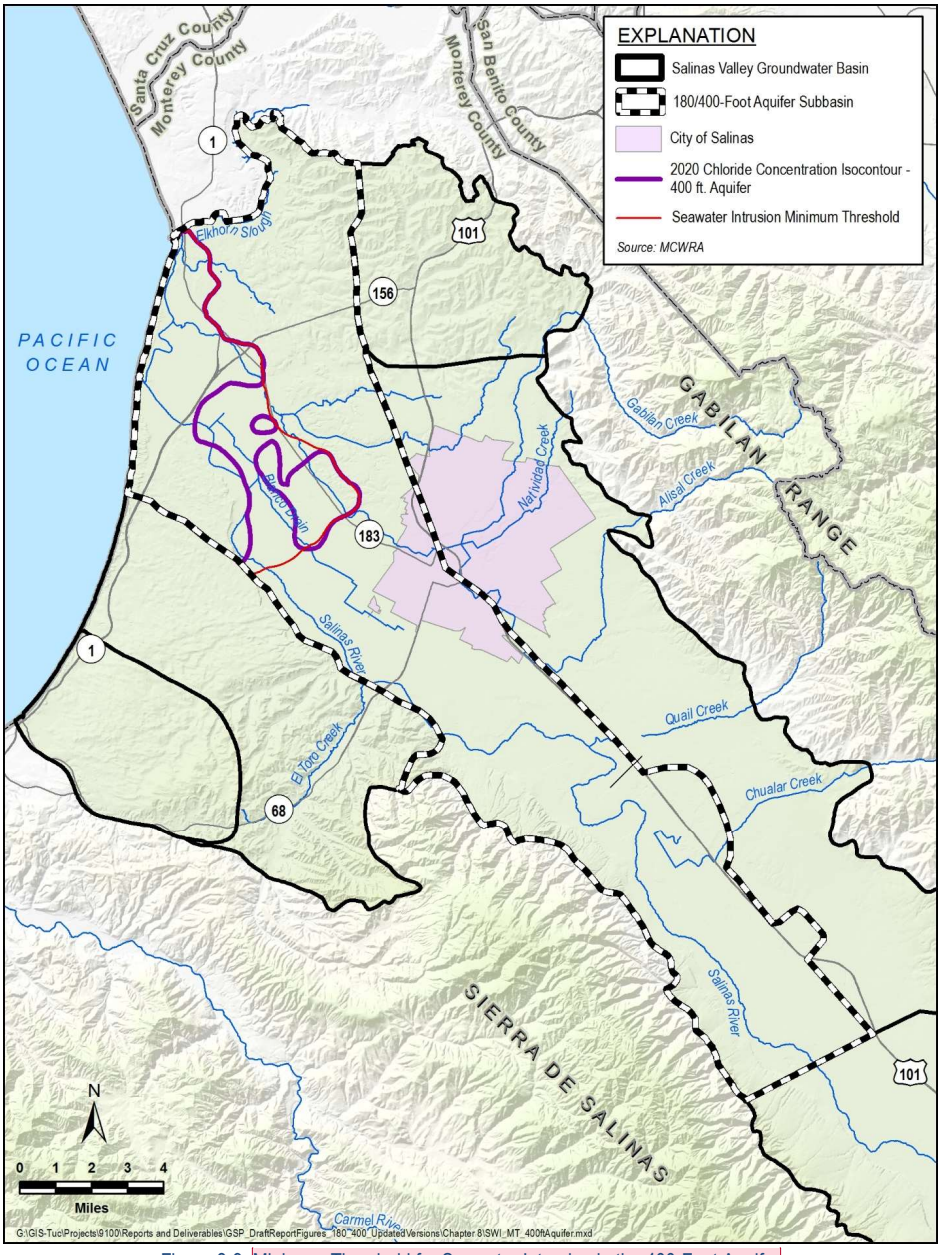


Figure 8-9. Minimum Threshold for Seawater Intrusion in the 400-Foot Aquifer

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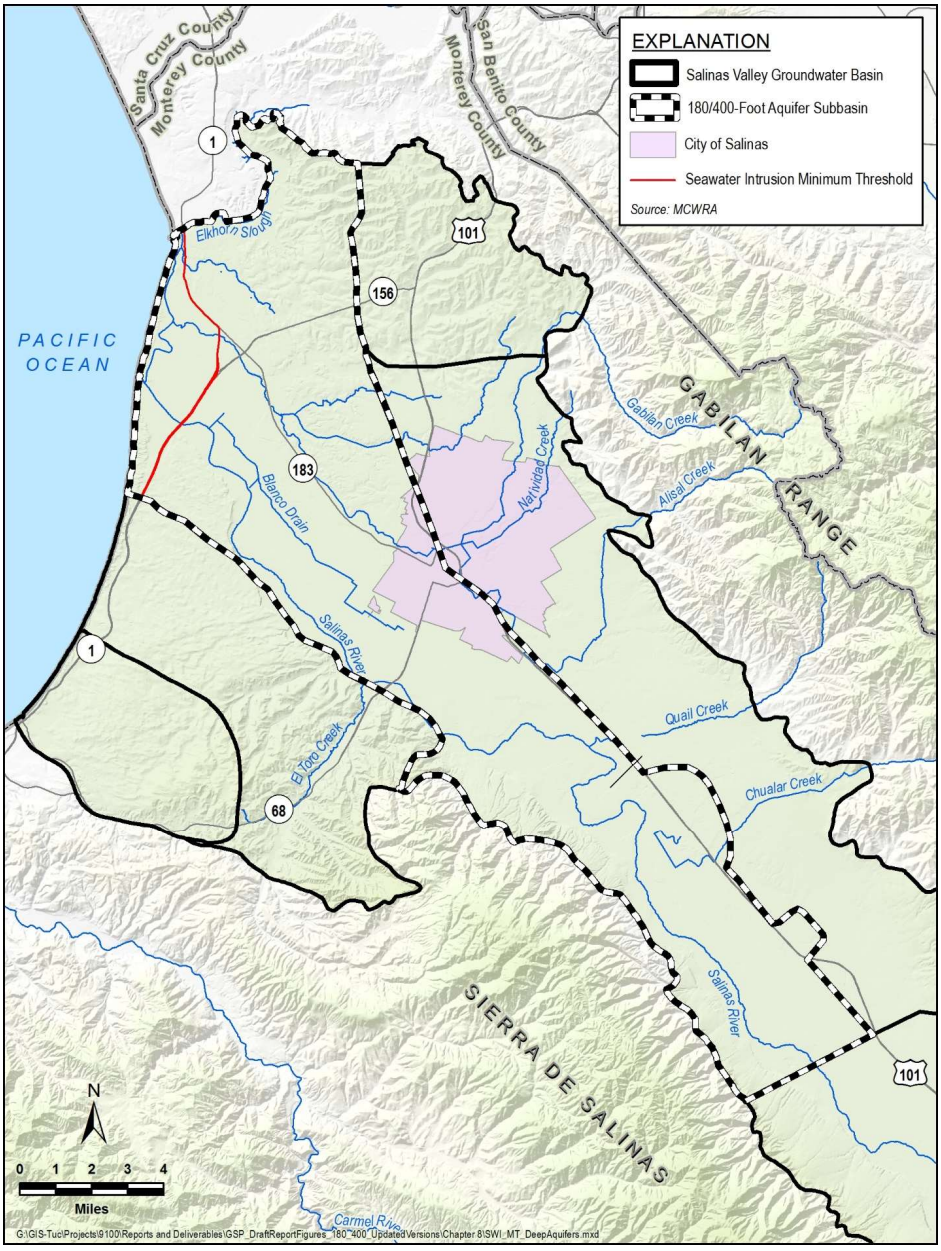


Figure 8-10. Minimum Threshold for Seawater Intrusion in the Deep Aquifers

### ~~8.7.2.1~~8.8.2.1 Information and Methodology Used to Establish Minimum Thresholds and Measurable Objectives

The seawater intrusion minimum threshold is based on seawater intrusion maps developed by MCWRA. MCWRA publishes estimates of the extent of seawater intrusion every year. The MCWRA maps define the extent of seawater intrusion as the inferred location of the 500 mg/L chloride isocontour. These maps are developed through analysis and contouring of groundwater quality measured at privately-owned wells and dedicated monitoring wells near the coast. The maps of current and historical seawater intrusion is included in Chapter 5.

The groundwater model that will be used to assess the effectiveness of projects and management actions on seawater intrusion specifically incorporates assumptions for future sea level rise. Therefore, the actions to avoid undesirable results will address sea level rise.

### ~~8.7.2.2~~8.8.2.2 Relationship between Individual Minimum Thresholds and Relationship to Other Sustainability Indicators

The relationship between the seawater intrusion minimum threshold and other sustainability indicators are as follows:

- **Chronic lowering of groundwater levels.** The seawater intrusion minimum threshold does not promote additional pumping that could cause groundwater elevations to decrease in the Subbasin. Therefore, the seawater intrusion minimum threshold will not result in significant or undesirable groundwater elevations.

- **Reduction in groundwater storage.** The seawater intrusion minimum threshold does not promote additional pumping or lowering of groundwater elevations that will lead to a reduction in storage. Therefore, the seawater intrusion minimum threshold will not result in an exceedance of the groundwater storage minimum threshold.

- **Degraded water quality.** The seawater intrusion minimum threshold does not promote decreasing groundwater elevations that could lead to exceedances of groundwater quality minimum thresholds. In fact, the seawater intrusion minimum threshold may have a beneficial impact on groundwater quality by preventing increases in chloride concentrations in supply wells.

- **Land subsidence.** The seawater intrusion minimum threshold does not promote additional pumping that could cause subsidence. Therefore, the seawater intrusion minimum threshold will not result in an exceedance of the subsidence minimum threshold.

- **Depletion of ISW.** The seawater intrusion minimum threshold does not promote additional pumping or lower groundwater elevations adjacent to ISW. Therefore, the seawater intrusion minimum threshold will not result in a significant or unreasonable depletion of ISW.

### ~~8.7.2.3~~8.8.2.3 Effect of Minimum Threshold on Neighboring Basins and Subbasin

The 180/400-Foot Aquifer Subbasin has 4 neighboring subbasins within the Salinas Valley Groundwater Basin:

- The Langley Subbasin to the north
- The Eastside Subbasin to the east
- The Forebay Subbasin to the south
- The Monterey Subbasin to the southwest

The SVBGSA is either the exclusive GSA or is one of the coordinating GSAs for the adjacent Subbasins. Because the SVBGSA covers all these subbasins, the SVBGSA is coordinating the development of the minimum thresholds and measurable objectives for all these subbasins. The Langley, Eastside, Forebay, and Monterey Subbasins have submitted GSPs in January 2022. Minimum thresholds for the 180/400-Foot Aquifer Subbasin have been reviewed relative to information developed for the neighboring subbasins' GSPs to ensure that these minimum thresholds will not prevent the neighboring subbasins from achieving sustainability. SVBGSA and MCWDGSA are close collaborators in developing and implementing their GSPs for the 180/400 and Monterey Subbasins. Although SVBGSA uses the seawater intrusion isocontour developed by MCWRA, and MCWDGSA uses an isocontour derived based on a combination of TDS and chloride measurements and geophysical data, the seawater across the Subbasin boundary will continue to be closely monitored to ensure both subbasin minimum thresholds are met. The MCWRA seawater intrusion isocontour for the Monterey Subbasin has notable data gaps, which is why MCWDGSA chose other data for more accuracy in the Monterey Subbasin. These data will be aligned during implementation with enhanced data-sharing and collaboration per conversations among SVBGSA, MCWDGSA, and MCWRA staff.

The Pajaro Valley Basin has submitted an alternative submittal. Because the minimum thresholds in the 180/400-Foot Aquifer Subbasin is no further intrusion, it is likely that the minimum threshold will not prevent the Pajaro Basin from achieving and maintaining sustainability. The SVBGSA will coordinate closely with the Pajaro Valley Water Agency as it sets minimum thresholds to ensure that the basins do not prevent each other from achieving sustainability.

#### ~~8.7.2.4~~8.8.2.4 Effects on Beneficial Users and Land Uses

**Agricultural land uses and users.** The seawater intrusion minimum threshold generally provides positive benefits to the Subbasin's agricultural water users. Preventing seawater intrusion into the Subbasin ensures that a supply of usable groundwater will exist for agricultural use.

**Urban land uses and users**. The seawater intrusion minimum threshold generally provides positive benefits to the Subbasin's urban water users. Preventing seawater intrusion into the Subbasin will help ensure an adequate supply of groundwater for municipal supplies.

**Domestic land uses and users**. The seawater intrusion minimum threshold generally provides positive benefits to the Subbasin's domestic water users. Preventing seawater intrusion into the Subbasin will help ensure an adequate supply of groundwater for domestic supplies.

**Ecological land uses and users**. Although the seawater intrusion minimum threshold does not directly benefit ecological uses, it can be inferred that the seawater intrusion minimum thresholds provide generally positive benefits to the Subbasin's ecological water uses. Preventing seawater intrusion into the Subbasin will help prevent unwanted high salinity levels from impacting ecological groundwater uses.

#### ~~8.7.2.5~~8.8.2.5 Relevant Federal, State, or Local Standards

No federal, state, or local standards exist for seawater intrusion.

#### ~~8.7.2.6~~8.8.2.6 Method for Quantitative Measurement of Minimum Threshold

Chloride concentrations are measured in groundwater samples collected from the MCWRA's seawater intrusion monitoring network. These samples are used to develop the inferred location of the 500 mg/L chloride isocontour. The methodology and protocols for collecting samples and developing the 500 mg/L chloride isocontour are detailed in Appendix 7B and Appendix 7C.

### ~~8.7.3~~8.8.3 Measurable Objectives

> *The measurable objective for seawater intrusion is defined as the 500 mg/L chloride concentration isocontour as the line defined by Highway 1.*

#### ~~8.7.3.1~~8.8.3.1 Methodology for Setting Measurable Objectives

In the 180/400-Foot Subbasin, the measurable objective for the seawater intrusion SMC is the same as the line that defines Highway 1. This will improve the Subbasin's groundwater quality and provide access to usable groundwater to additional beneficial users. This measurable objective may be modified as the projects and actions to address seawater intrusion are refined.

The methodology used to set measurable objectives is discussed in Section 8.8.2.1 ~~Error! Reference source not found.~~.

#### ~~8.7.3.2~~8.8.3.2 Interim Milestones

The interim milestones for seawater intrusion are:

1. 2025: identical to current conditions
2. 2030: one-third of the way to the measurable objective
3. 2035: two-thirds of the way to the measurable objective

These are only our initial estimates of interim milestones for seawater intrusion. The interim milestones will be refined using the Seawater Intrusion Model, in conjunction with the SVOM based on specific projects and management actions as project scoping progresses.

### ~~8.7.4~~8.8.4 Undesirable Results

#### ~~8.7.4.1~~8.8.4.1 Criteria for Defining Seawater Intrusion Undesirable Results

The seawater intrusion undesirable result is a quantitative combination of chloride concentrations minimum threshold exceedances. There is only one minimum threshold for each of the three aquifers. Because even localized seawater intrusion is not acceptable, the basin-wide undesirable result is zero exceedances of minimum thresholds. For the Subbasin, the seawater intrusion undesirable result is:

> *Any exceedance of the minimum threshold, resulting in mapped seawater intrusion beyond the 2017 extent of the 500 mg/L chloride.*

#### ~~8.7.4.2~~8.8.4.2 Potential Causes of Undesirable Results

Conditions that may lead to an undesirable result include the following:

- Increased coastal pumping that could draw seawater more inland
- Unanticipated high sea level rise

#### ~~8.7.4.3~~8.8.4.3 Effects on Beneficial Users and Land Use

The primary detrimental effect on beneficial users and land uses from allowing seawater intrusion to increase in the Subbasin is that the pumped groundwater may become saltier. Thus, preventing further seawater intrusion into the Subbasin prevents greater impacts to domestic, municipal, and agricultural wells and associated land uses.

## ~~8.8~~8.9 Degraded Water Quality SMC

### ~~8.8.1~~8.9.1 Locally Defined Significant and Unreasonable Conditions

Locally defined significant and unreasonable changes in groundwater quality in the Subbasin are increases in a COC caused by a direct result of a GSA groundwater management action that either:

- Results in groundwater concentrations in a potable water supply well above an established MCL or SMCL, or
- Lead to significantly reduced crop production.

These significant and unreasonable conditions were determined based on input from the Subbasin Committee and discussions with GSA staff. These conditions were determined to be significant and unreasonable because groundwater quality in exceedance of these will cause a financial burden on groundwater users. Public water systems with COC concentrations above the MCL or SMCL are required to add treatment to the drinking water supplies or drill new wells. Agricultural wells with COCs that significantly reduce crop production will reduce grower's yields and profits.

### ~~8.8.2~~8.9.2 Minimum Thresholds

> *The minimum thresholds for degraded water quality are zero additional exceedances of the regulatory drinking water standards (potable supply wells) or Basin Plan objectives (irrigation supply wells) beyond those observed in 2017 for groundwater quality constituents of concern.*

The minimum thresholds for DDW public water system supply wells and ILRP on-farm domestic wells reflect California's Title 22 drinking water standards. The minimum thresholds for irrigation supply wells are based on the water quality objectives listed in the Basin Plan (CCRWQCB, 2019). The minimum threshold values for the COC for all 3 sets of wells are provided in Table 8-5~~Error! Reference source not found.~~ and are based on data up to 2017. Full discussion of these current conditions is included in Chapter 5. Because the minimum thresholds reflect no additional exceedances, the minimum thresholds are set to the number of existing exceedances. Surpassing the number of existing exceedances for any of the listed constituents will lead to an undesirable result. Not all wells in the monitoring network are sampled for every COC.

Field Code Changed

Field Code Changed

Minimum thresholds are established based on existing groundwater quality in 2017. Since 2017, ~~GSP implementation,~~ there has only been one new additional COC in the Subbasin. Manganese has been added to the list of COC for ILRP irrigation supply wells, because there was no

exceedance of manganese in 2017 the minimum threshold for this new COC is set to 0. DDW wells and ILRP on-farm domestic wells do not have any new COC.

Table 8-~~58-5~~. Degradation of Groundwater Quality Minimum Thresholds

| Constituent of Concern (COC) | Minimum Threshold/Measurable Objective Number of Wells Exceeding Regulatory Standard from latest sample (April 1974 to December 2017) |
|---|---|
| **DDW Wells** | |
| 1,2 Dibromo-3-chloropropane | 9 |
| 1,2,3-Trichloropropane | 11 |
| 1,2,4-Trichlorobenzene | 1 |
| Aluminum | 1 |
| Arsenic | 1 |
| Benzo(a)Pyrene | 2 |
| Chloride | 2 |
| Di(2-ethylhexyl)phthalate | 2 |
| Dinoseb | 2 |
| Fluoride | 1 |
| Heptachlor | 2 |
| Hexachlorobenzene | 2 |
| Iron | 2 |
| Manganese | 1 |
| Methyl-tert-butyl ether (MTBE) | 3 |
| Nitrate (as nitrogen) | 4 |
| Selenium | 2 |
| Specific Conductance | 2 |
| Tetrachloroethene | 1 |
| Total Dissolved Solids | 4 |
| Vinyl Chloride | 34 |
| **ILRP On-Farm Domestic Wells** | |
| Chloride | 9 |
| Iron | 7 |
| Manganese | 1 |
| Nitrite | 1 |
| Nitrate (as nitrogen) | 36 |
| Nitrate + Nitrite (sum as nitrogen) | 4 |
| Specific Conductance | 35 |
| Sulfate | 2 |
| Total Dissolved Solids | 33 |
| **ILRP Irrigation Supply Wells** | |
| Chloride | 19 |
| Iron | 2 |
| Manganese | 0 |

### ~~8.8.2.1~~8.9.2.1 Information and Methodology Used to Establish Water Quality Minimum Thresholds and Measurable Objectives

As noted in the GSP Regulations, minimum thresholds are based on a degradation of groundwater quality, not an improvement of groundwater quality (23 California Code of Regulations § 354.28 (c)(4)). Therefore, this GSP is designed to avoid taking any action that may inadvertently move groundwater constituents already in the Subbasin in such a way that the constituents have a significant and unreasonable impact that would not otherwise occur. COC must meet 2 criteria:

1. They must have an established level of concern such as an MCL or SMCL for drinking water, or a level known to affect crop production.
2. They must have been found in the Subbasin at levels above the level of concern.

Based on the review of groundwater quality in Chapter 5, the COC that may affect drinking water supply wells include those for DDW and ILRP on-farm domestic wells listed in

Table 8-5

~~Table 8-5~~. The COC that are known to cause reductions in crop production are those for ILRP irrigation supply wells listed in

Table 8-5

~~Table 8-5~~.

As discussed in Chapter 7, wells for 3 separate water quality monitoring networks were reviewed and used for developing SMC:

- Public water system supply wells regulated by the SWRCB DDW.
- On-farm domestic wells monitored as part of CCRWQCB ILRP. This dataset was obtained from the SWRCB through the GAMA groundwater information system. The ILRP data were separated into 2 data sets, 1 for on-farm domestic wells and the other for irrigation supply wells (discussed below) for purposes of developing initial draft minimum thresholds and measurable objectives for each type of well. The monitoring well network for the ILRP will change when the monitoring network for Ag Order 4.0 is finalized. At that time, the new ILRP domestic monitoring network will be incorporated into this GSP, replacing the current network, for water quality monitoring.
- Irrigation supply wells monitored as part of ILRP. As mentioned above, this dataset was obtained from the SWRCB through the GAMA groundwater information system. Like the on-farm domestic well dataset, the IRLP irrigation supply monitoring network will change when Ag Order 4.0 is finalized.

Each of these well networks are monitored for a different set of water quality parameters. Furthermore, some groundwater quality impacts are detrimental to only certain networks. For example, high nitrates are detrimental to public water system supply wells and on-farm domestic wells but are not detrimental to irrigation supply wells. The constituents monitored in each well network are indicated by an X in Table 8-6. An X does not necessarily indicate that the constituents have been found above the regulatory standard in that monitoring network.

Table 8-68-6. Summary of Constituents Monitored in Each Well Network

| Constituent | Public Water System Supply | On Farm Domestic[1] | Irrigation Supply |
|---|---|---|---|
| Silver | X | | |
| Aluminum | X | | |
| Alachlor | X | | |
| Arsenic | X | | |
| Atrazine | X | | |
| Boron | X | X | X |
| Barium | X | | |
| Beryllium | X | | |
| Lindane | X | | |
| Di(2-ethylhexyl) phthalate | X | | |
| Bentazon | X | | |
| Benzene | X | | |
| Benzo(a)Pyrene | X | | |
| Toluene | X | | |
| Cadmium | X | | |
| Chlordane | X | | |
| Chloride | X | X | X |
| Chlorobenzene | X | | |
| Cyanide | X | | |
| Chromium | X | | |
| Carbofuran | X | | |
| Carbon Tetrachloride | X | | |
| Copper | X | | |
| Dalapon | X | | |
| 1,2 Dibromo-3-chloropropane | X | | |
| 1,1-Dichloroethane | X | | |
| 1,2-Dichloroethane | X | | |
| 1,2-Dichlorobenzene | X | | |
| 1,4-Dichlorobenzene | X | | |
| 1,1-Dichloroethylene | X | | |
| cis-1,2-Dichloroethylene | X | | |
| trans-1,2-Dichloroethylene | X | | |
| Dichloromethane (a.k.a. methylene chloride) | X | | |
| 1,2-Dichloropropane | X | | |
| Dinoseb | X | | |
| Diquat | X | | |
| Di(2-ethylhexyl)adipate | X | | |
| Ethylbenzene | X | | |
| Endrin | X | | |
| Fluoride | X | | |
| Trichlorofluoromethane | X | | |

| Constituent | Public Water System Supply | On Farm Domestic[1] | Irrigation Supply |
|---|---|---|---|
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | X | | |
| Iron | X | X | X |
| Foaming Agents (MBAS) | X | | |
| Glyphosate | X | | |
| Hexachlorocyclopentadiene | X | | |
| Hexachlorobenzene | X | | |
| Heptachlor | X | | |
| Mercury | X | | |
| Manganese | X | X | X |
| Molinate | X | | |
| Methyl-tert-butyl ether (MTBE) | X | | |
| Methoxychlor | X | | |
| Nickel | X | | |
| Nitrite | X | X | |
| Nitrate (as nitrogen) | X | X | |
| Nitrate + Nitrite (sum as nitrogen) | | X | |
| Oxamyl | X | | |
| 1,1,2,2-Tetrachloroethane | X | | |
| Perchlorate | X | | |
| Polychlorinated Biphenyls | X | | |
| Tetrachloroethene | X | | |
| Pentachlorophenol | X | | |
| Picloram | X | | |
| Antimony | X | | |
| Specific Conductance | X | X | |
| Selenium | X | | |
| 2,4,5-TP (Silvex) | X | | |
| Simazine | X | | |
| Sulfate | X | X | |
| Styrene | X | | |
| 1,1,1-Trichloroethane | X | | |
| 1,1,2-Trichloroethane | X | | |
| 1,2,4-Trichlorobenzene | X | | |
| Trichloroethene | X | | |
| 1,2,3-Trichloropropane | X | | |
| Total Dissolved Solids | X | X | |
| Thiobencarb | X | | |
| Thallium | X | | |
| Toxaphene | X | | |
| Vinyl Chloride | X | | |
| Xylenes | X | | |
| Zinc | X | | |

[1]Basin plan states domestic wells are monitored for Title 22 constituents; however, GAMA groundwater information system only provides data for the constituents listed above.

### ~~8.8.2.2~~8.9.2.2 Relationship between Individual Minimum Thresholds and Relationship to Other

#### Sustainability Indicators

Preventing degradation of groundwater quality may affect other sustainability indicators or may limit activities needed to achieve minimum thresholds for other sustainability indicators as described below:

- **Chronic lowering of groundwater levels.** The degradation of groundwater quality minimum thresholds could influence groundwater level minimum thresholds by limiting the types of water that can be used for recharge to maintain or raise groundwater elevations. Water used for recharge cannot exceed any groundwater quality standards. In addition, a change in groundwater elevations may cause a change in groundwater flow direction which in turn could cause poor water quality to migrate into areas of good water quality.

- **Reduction in groundwater storage.** The degradation of groundwater quality minimum thresholds do not promote lower groundwater elevations. Therefore, the groundwater quality minimum thresholds will not result in an exceedance of the groundwater storage minimum threshold.

- **Seawater intrusion.** The degradation of groundwater quality minimum thresholds do not promote additional pumping that could exacerbate seawater intrusion. Therefore, the groundwater quality minimum thresholds will not result in an exceedance of the seawater intrusion minimum threshold.

- **Land subsidence.** The degradation of groundwater quality minimum thresholds do not promote additional pumping that could cause subsidence. Therefore, the groundwater quality minimum thresholds will not result in an exceedance of the subsidence minimum threshold.

- **Depletion of ISW.** The degradation of groundwater quality minimum thresholds do not promote additional pumping or lower groundwater elevations adjacent to ISW. Therefore, the groundwater quality minimum thresholds will not result in a significant or unreasonable depletion of ISW.

### ~~8.8.2.3~~8.9.2.3 Effect of Minimum Thresholds on Neighboring Basins and Subbasins

The 180/400-Foot Aquifer Subbasin has 4 neighboring subbasins within the Salinas Valley Groundwater Basin:

- The Langley Subbasin to the north

- The Eastside Subbasin to the east

- The Forebay Subbasin to the south
- The Monterey Subbasin to the southwest

The SVBGSA is either the exclusive GSA or is one of the coordinating GSAs for the adjacent Subbasins. Because the SVBGSA covers all these subbasins, the SVBGSA is coordinating the development of the minimum thresholds and measurable objectives for all these subbasins. The Langley, Eastside, Forebay, and Monterey Subbasins have submitted GSPs in January 2022. Minimum thresholds for the 180/400-Foot Aquifer Subbasin have been reviewed relative to information developed for the neighboring subbasins' GSPs to ensure that these minimum thresholds will not prevent the neighboring subbasins from achieving sustainability.

The Pajaro Valley Basin lies directly to the north of the Subbasin. Because the minimum thresholds in the 180/400-Foot Aquifer Subbasin are to prevent degradation of water quality, it is likely that the minimum thresholds will not prevent the Pajaro Basin from achieving and maintaining sustainability. The SVBGSA will coordinate closely with the Pajaro Valley Water Agency as it sets minimum thresholds to ensure that the basins do not prevent each other from achieving sustainability.

#### ~~8.8.2.4~~8.9.2.4 Effect on Beneficial Uses and Users

**Agricultural land uses and users.** The groundwater quality minimum thresholds generally provide positive benefits to the Subbasin's agricultural water users. Preventing any GSA actions that would result in additional agricultural supply wells exceeding levels that could reduce crop production ensures that a supply of usable groundwater will exist for beneficial agricultural use.

**Urban land uses and users.** The groundwater quality minimum thresholds generally provide positive benefits to the Subbasin's urban water users. Preventing any GSA actions that would result in COC in additional drinking water supply wells exceeding MCLs or SMCLs ensures adequate groundwater quality for public water system supplies.

**Domestic land uses and users.** The groundwater quality minimum thresholds generally provide positive benefits to the Subbasin's domestic water users. Preventing any GSA actions that would result in COC in additional drinking water supply wells exceeding MCLs or SMCLs ensures adequate groundwater quality for domestic supplies.

**Ecological land uses and users.** Although the groundwater quality minimum thresholds do not directly benefit ecological uses, it can be inferred that the degradation of groundwater quality minimum thresholds provide generally positive benefits to the Subbasin's ecological water uses. Preventing any GSA actions that would result in COC migrating will prevent unwanted contaminants from impacting ecological groundwater uses.

### ~~8.8.2.5~~8.9.2.5 Relation to State, Federal, or Local Standards

The groundwater quality minimum thresholds specifically incorporate state and federal standards for drinking water and basin plan objectives.

### ~~8.8.2.6~~8.9.2.6 Method for Quantitative Measurement of Minimum Thresholds

Degradation of groundwater quality minimum thresholds will be directly measured from existing public water system supply wells, on-farm domestic wells, and irrigation supply wells. Groundwater quality will be measured with SWRCB GAMA groundwater information system data submitted through existing monitoring programs—DDW and ILRP—as discussed in Chapter 7.

- Exceedances of MCLs and SMCLs in public water system supply wells will be monitored with annual water quality data submitted to the DDW.
- Exceedances of MCLs and SMCLs in on-farm domestic wells will be monitored with ILRP data.
- Exceedances of water quality objectives for crop production will be monitored with ILRP data.

Initially, the review of drinking water MCLs, SMCLs, and water quality objectives that maintain adequate crop production will be centered around the COC identified above. If during review of the water quality data additional constituents appear to exceed any of the regulatory standards, these additional constituents will be added to the list of COC for the Subbasin.

## ~~8.8.3~~8.9.3 Measurable Objectives

The measurable objectives for degradation of groundwater quality represent target groundwater quality distributions in the Subbasin. SGMA does not mandate the improvement of groundwater quality. Therefore, the measurable objectives are based on no groundwater quality degradation and are identical to the minimum thresholds, as defined in 8.9.2.1 ~~**Error! Reference source not found.**~~.

Field Code Changed

> *The measurable objectives for degraded water quality are zero additional exceedances of the regulatory drinking water standards (potable supply wells) or Basin Plan objectives (irrigation supply wells) beyond those observed in 2017 for groundwater quality constituents of concern.*

### ~~8.8.3.1~~8.9.3.1 Methodology for Setting Measurable Objectives

As described above, measurable objectives are set to be identical to the minimum thresholds and therefore follow the same method as detailed in Section 8.9.2.1~~Error! Reference source not found.~~.

Field Code Changed

### ~~8.8.3.2~~8.9.3.2 Interim Milestones

There is no anticipated degradation of groundwater quality during GSP implementation that results from the implementation of projects and actions as described in Chapter 9. Therefore, the expected interim milestones are identical to current conditions.

## ~~8.8.4~~8.9.4 Undesirable Results

Commented [AO24]: Section updated according to Board consideration of an updated approach, based on DWR's review of the 180/400 GSP

### ~~8.8.4.1~~8.9.4.1 Criteria for Defining Undesirable Results

The degradation of groundwater quality becomes an undesirable result when a quantitative combination of groundwater quality minimum thresholds is exceeded. For the Subbasin, the exceedance of minimum thresholds is unacceptable as a direct result of GSP implementation. Some groundwater quality changes are expected to occur independent of SGMA activities; because these changes are not related to SGMA activities, nor GSA management, they do not constitute an undesirable result. Additionally, SGMA states that GSAs are not responsible for addressing water quality degradation that was present before January 1, 2015 (California Water Code § 10727.2(b)(4)). Therefore, the degradation of groundwater quality reaches an undesirable result when:

> *Future or new minimum thresholds exceedances are caused by a direct result of GSA groundwater management action(s), including projects or management actions and regulation of groundwater extraction.*

The groundwater level SMC is designed and intended to help protect groundwater quality. Setting the groundwater level minimum thresholds at or above historical lows assures that no new depth dependent constituents of water quality concern are mobilized. The GSA may pursue projects or management actions to ensure that groundwater levels do not fall below groundwater level minimum thresholds.

This undesirable result recognizes there is an existing regulatory framework in the form of the California Porter Cologne Act and the federal Clean Water Act that addresses water quality management; and considers existing federal, state, and local groundwater quality standards, which were used in the development of minimum thresholds in the GSP. SVBGSA is not responsible for enforcing drinking water requirements or for remediating violations of those requirements that were caused by others (Moran and Belin, 2019). The existing regulatory regime does not require nor obligate the SVBGSA

to take any affirmative actions to manage or control existing groundwater quality. However, SVBGSA is committed to monitoring and disclosing changes in groundwater quality and ensuring its groundwater management actions do not cause drinking water or irrigation water to be unusable.

SVBGSA will work closely with the Central Coast Regional Water Quality Control Board and other entities that have regulatory authority over water quality. SVBGSA will lead the Water Quality Coordination Group, as described in Chapter 9, which includes meeting annually with these partner agencies to review the status of water quality data and discuss any action needed to address water quality degradation.

If the GSA has not implemented any groundwater management actions in the Subbasin, including projects, management actions, or pumping management, no such management actions constitute an undesirable result. If minimum thresholds are exceeded after the GSA has implemented actions in the Subbasin, the GSA will review groundwater quality and groundwater gradients in and around the project areas to assess if the exceedance resulted from GSA actions to address sustainability indicators, or was independent of GSA activities. Both the implementation of actions and assessment of exceedances will occur throughout the GSP timeframe of 50 years as required by SGMA. The general approach to assess if a minimum threshold exceedance is due to GSA action will include:

- If no projects, management actions, or other GSP implementation actions have been initiated in a subbasin, or near the groundwater quality impact, then the impact was not caused by any GSA action.
- Many projects will likely include a new monitoring network. If data from the project-specific monitoring network do not show groundwater quality impacts, this will suggest that the impact was not caused by any GSA actions.
- If a GSA undertakes a project that changes groundwater gradients, moves existing constituents, or results in the exceedance of minimum thresholds, SVBGSA will undertake a more rigorous technical study to assess local, historical groundwater quality distributions, and the impact of the GSA activity on that distribution.
- For SGMA compliance, undesirable results for groundwater quality are not caused by (1) lack of action; (2) GSA required reductions in pumping; (3) exceedances in groundwater quality minimum thresholds that occur, if there are fewer exceedances than if there had been a lack of management; (4) exceedances in groundwater quality minimum thresholds that would have occurred independent of projects or management actions implemented by the GSA; (5) past harm.

#### ~~8.8.4.2~~8.9.4.2 Potential Causes of Undesirable Results

Conditions that may lead to an undesirable result include the following:

- **Required Changes to Subbasin Pumping**. If the location and rates of groundwater pumping change as a result of projects implemented under the GSP, these changes could alter hydraulic gradients and associated flow directions, and cause movement of one of the COC towards a supply well at concentrations that exceed relevant standards.
- **Groundwater Recharge**. Active recharge of imported water or captured runoff could modify groundwater gradients and move one of the COC towards a supply well in concentrations that exceed relevant limits.
- **Recharge of Poor-Quality Water**. Recharging the Subbasin with water that exceeds an MCL, SMCL, or level that reduces crop production could lead to an undesirable result.

#### ~~8.8.4.3~~8.9.4.3 Effects on Beneficial Users and Land Use

The undesirable result for degradation of groundwater quality is avoiding groundwater degradation caused by a direct result of a GSA groundwater management action. Therefore, the undesirable result will not impact the use of groundwater and will not have a negative effect on the beneficial users and uses of groundwater. This undesirable result does not apply to groundwater quality changes that occur due to other causes.

## ~~8.9~~8.10 Land Subsidence SMC

### ~~8.9.1~~8.10.1 Locally Defined Significant and Unreasonable Conditions

Locally defined significant and unreasonable subsidence in the Subbasin is defined as follows:

- Any inelastic land subsidence that is caused by lowering of groundwater elevations in the Subbasin or
- Any inelastic subsidence that causes an increase of flood risk.

These significant and unreasonable conditions were determined based on input collected during Subbasin Committee meetings and discussions with GSA staff.

Subsidence can be elastic or inelastic. Elastic subsidence is the small, reversible lowering and rising of the ground surface. Inelastic subsidence is generally irreversible. This SMC only concerns inelastic subsidence.

### ~~8.9.2~~8.10.2 Minimum Thresholds

*The minimum threshold for subsidence is zero net long-term subsidence, with no more than 0.1 foot per year of estimated land movement measured subsidence between June of one year and June of the subsequent year to account for InSAR measurement errors.*

The most current 2020 subsidence data, described in Chapter 5, does not exceed the subsidence minimum threshold.

#### ~~8.9.2.1~~8.10.2.1 Information Used and Methodology for Establishing Subsidence Minimum Thresholds

The minimum threshold was established using InSAR data available from DWR. The general minimum threshold is for no long-term irreversible subsidence in the Subbasin. The InSAR data provided by DWR, however, is subject to measurement error. DWR stated that, on a statewide level, for the total vertical displacement measurements between June 2015 and June 2019, the errors are as follows (DWR, 2019, personal communication):

1. The error between InSAR data and continuous GPS data is 16 mm (0.052 feet) with a 95% confidence level.
2. The measurement accuracy when converting from the raw InSAR data to the maps provided by DWR is 0.048 feet with 95% confidence level.

By adding errors 1 and 2, the combined error is 0.1 foot. While this is not a robust statistical analysis, it does provide an estimate of the potential error in the InSAR maps provided by DWR.

Additionally, the InSAR data provided by DWR reflects both elastic and inelastic subsidence. While it is difficult to compensate for elastic subsidence, visual inspection of monthly changes in ground elevations suggest that elastic subsidence is largely seasonal. To minimize the influence of elastic subsidence on the assessment of long-term, permanent subsidence, changes in ground level will only be measured annually from June of one year to June of the following year.

#### ~~8.9.2.2~~8.10.2.2 Relationship between Individual Minimum Thresholds and Relationship to Other Sustainability Indicators

The subsidence minimum threshold has little or no impact on other minimum thresholds, as described below:

- **Chronic lowering of groundwater levels.** The land subsidence minimum threshold will not decrease groundwater elevations and therefore will not result in significant or unreasonable groundwater elevations.

- **Reduction in groundwater storage.** The land subsidence minimum threshold will not change the amount of pumping and therefore will not result in a significant or unreasonable change in groundwater storage.

- **Seawater intrusion.** The land subsidence minimum threshold does not promote additional pumping that could exacerbate seawater intrusion. Therefore, the subsidence minimum threshold will not induce additional advancement of seawater intrusion along the coast.

- **Degraded water quality.** The land subsidence minimum threshold does not promote decreasing groundwater elevations that lead to exceedance of water quality minimum thresholds and therefore will not result in significant of unreasonable degradation of water quality.

- **Depletion of ISW.** The land subsidence minimum threshold does not promote additional pumping or lower groundwater elevations adjacent to ISW. Therefore, the subsidence minimum threshold will not result in a significant or unreasonable depletion of ISW.

#### ~~8.9.2.3~~8.10.2.3 Effect of Minimum Thresholds on Neighboring Basins and Subbasins

The 180/400-Foot Aquifer Subbasin has 4 neighboring subbasins within the Salinas Valley Groundwater Basin:

- The Langley Subbasin to the north
- The Eastside Subbasin to the east
- The Forebay Subbasin to the south
- The Monterey Subbasin to the southwest

The SVBGSA is either the exclusive GSA or is one of the coordinating GSAs for the adjacent Subbasins. Because the SVBGSA covers all these subbasins, the SVBGSA is coordinating the development of the minimum thresholds and measurable objectives for all these subbasins. The Langley, Eastside, Forebay, and Monterey Subbasins have submitted GSPs in January 2022. Minimum thresholds for the 180/400-Foot Aquifer Subbasin have been reviewed relative to information developed for the neighboring subbasins' GSPs to ensure that these minimum thresholds will not prevent the neighboring subbasins from achieving sustainability.

The Pajaro Valley Basin lies directly to the north of the Subbasin. Because the minimum thresholds in the 180/400-Foot Aquifer Subbasin is zero subsidence, it is likely that the minimum thresholds will not prevent the Pajaro Basin from achieving and maintaining sustainability. The

SVBGSA will coordinate closely with the Pajaro Valley Water Agency as it sets minimum thresholds to ensure that the basins do not prevent each other from achieving sustainability.

#### ~~8.9.2.4~~8.10.2.4 Effects on Beneficial Uses and Users

The subsidence minimum threshold is set to prevent any long-term inelastic subsidence. Available data indicate that there is currently no long-term subsidence occurring in the Subbasin, and pumping limits are already required by minimum thresholds for other sustainability indicators. The subsidence minimum threshold does not impact infrastructure and does not require any additional reductions in pumping, and there is no negative impact on any beneficial user.

#### ~~8.9.2.5~~8.10.2.5 Relation to State, Federal, or Local Standards

There are no federal, state, or local regulations related to subsidence.

#### ~~8.9.2.6~~8.10.2.6 Method for Quantitative Measurement of Minimum Threshold

The minimum thresholds will be assessed using DWR-supplied InSAR data.

### ~~8.9.3~~8.10.3 Measurable Objectives

The measurable objective for subsidence represents a target subsidence rates in the Subbasin. Because the minimum threshold of zero net long-term subsidence is the best achievable outcome, the measurable objective is identical to the minimum threshold.

> *The measurable objective for land subsidence is zero net long-term subsidence, with no more than 0.1 foot per year of estimated land movement measured subsidence to account for InSAR measurement errors.*

#### ~~8.9.3.1~~8.10.3.1 Methodology for Setting Measurable Objectives

The measurable objective will be assessed using DWR-supplied InSAR data.

#### ~~8.9.3.2~~8.10.3.2 Interim Milestones

The subsidence measurable objective is set at current conditions of no long-term subsidence. There is no change between current conditions and sustainable conditions. Therefore, the interim milestones are identical to current conditions of zero long-term subsidence, and annual measurements of no more than 0.1 foot of subsidence per year.

### ~~8.9.4~~8.10.4 Undesirable Results

#### ~~8.9.4.1~~8.10.4.1 Criteria for Defining Undesirable Results

By regulation, the land subsidence undesirable result is a quantitative combination of subsidence minimum threshold exceedances. For the Subbasin, no long-term subsidence is acceptable. Therefore, the land subsidence undesirable result is:

> *There is an exceedance of the minimum threshold for land subsidence due to lowered groundwater elevations.*

Should potential subsidence be observed, the SVBGSA will first assess whether the subsidence may be due to elastic subsidence. If the subsidence is not elastic, the SVBGSA will undertake a program to assess whether the subsidence is caused by lowered groundwater elevations. The first step in the assessment will be to check if groundwater elevations have dropped below historical lows. If groundwater elevations remain above historical lows, the GSA shall assume that any observed subsidence was not caused by lowered groundwater levels. If groundwater levels have dropped below historical lows, the GSA will attempt to correlate the observed subsidence with measured groundwater elevations. Additionally, if the Subbasin experiences subsidence in multiple consecutive years that are due to InSAR measurement error, the GSAs will confirm if the error is not actually net long-term subsidence.

**Commented [AO25]:** Additional description added to address concerns about not being explicit enough about how we will determine whether there is an Undesirable Result

#### ~~8.9.4.2~~8.10.4.2 Potential Causes of Undesirable Results

Conditions that may lead to an undesirable result include a shift in pumping locations. Shifting a significant amount of pumping to an area that is susceptible to subsidence could trigger subsidence that has not been observed before.

#### ~~8.9.4.3~~8.10.4.3 Effects on Beneficial Users and Land Use

The undesirable result for subsidence does not allow any subsidence to occur in the Subbasin. Therefore, there is no negative effect on any beneficial uses and users.

## ~~8.10~~8.11 Depletion of Interconnected Surface Water SMC

**Commented [AO26]:** SMC approach revised based on Jan 2022 180/400 Subbasin Committee motion, and correspondingly the relationships between other SMC and this indicator were also revised in the sections above.

Text regarding the Biological Opinion and reservoirs has also been revised based on consultation with NMFS and MCWRA since GSP submittal.

Areas with ISW occur where shallow groundwater may be connected to the surface water system. This SMC applies only to locations of ISW, as shown on Figure 4-11.

The SVIHM is used to identify the locations of ISW and to develop an estimate of the quantity and timing of stream depletions due to pumping during current and historical groundwater conditions. Shallow groundwater and surface water levels simulated by the SVIHM are used to identify the location of interconnection and evaluate the frequency with which different stream reaches are connected with groundwater in the underlying aquifer. The magnitude of stream

depletions in relation to shallow groundwater elevations in interconnected reaches are evaluated in Chapter 5.

### ~~8.10.1~~8.11.1 Locally Defined Significant and Unreasonable Conditions

Locally defined significant and unreasonable depletion of ISW in the Subbasin is defined as:

- Depletion from groundwater extraction that would result in a significant and unreasonable impact on other beneficial uses and users such as riparian water rights holders, appropriative surface water rights holders, ecological surface water users, and recreational surface water uses.

- Depletion from groundwater extraction more than observed in 2015, as measured by shallow groundwater elevations near locations of ISW. While a documented determination of whether past depletions was significant is not available, staying above 2016 depletions was determined to be a reasonable balance for all the beneficial uses and users.

These significant and unreasonable conditions were determined based on input collected during the development of 2022 GSPs, the 180/400 Subbasin Committee, and discussions with GSA staff. There is currently no data that determines what level of depletion from groundwater extraction has a significant adverse effect on steelhead trout or other beneficial use or user of. Should there be a determination regarding what level of depletion from groundwater extraction is significant, SVBGSA will take that into consideration as it reviews how it locally defines significant and unreasonable conditions for the SMC in the 5-Year Update.

### ~~8.10.2~~8.11.2 Minimum Thresholds

> *The minimum threshold for depletion of interconnected surface water are established by proxy using shallow groundwater elevations 1 foot higher than those observed in 2015 near locations of interconnected surface water.*

No minimum thresholds are established for times when flow in a river is due to conservation releases from a reservoir. One purpose for these conservation releases is to recharge the Salinas Valley Groundwater Basin. Therefore, depletion of conservation releases is a desired outcome, and the minimum thresholds and measurable objectives do not apply to these flows.

The locations of ISW identified with the SVIHM are based on best available data but contain uncertainty, which is discussed in Chapters 4, 5, and 6. Additional stream and groundwater level data are needed to reduce uncertainty, verify with observed conditions, and track changes over time. The shallow groundwater monitoring wells, USGS stream gauges, and MCWRA River Series measurement sites will be used to supplement the analysis of locations of connectivity provided by the SVIHM. These monitoring points will also become part of the ISW monitoring

network that is discussed in Chapter 7. Data from the ISW monitoring network will be used to monitor and evaluate the interconnection through time. Current conditions will be assessed according to the SMC when the ISW monitoring network is established.

As discussed in Chapter 7, a monitoring network for ISW composed of shallow groundwater monitoring wells is in the process of development. Two ~~E~~existing shallow wells ~~will be~~are ~~added~~ part of ~~to~~ the monitoring network ~~where possible~~ and they will be supplemented with 2 new shallow wells if needed. ~~-~~The monitoring network is dependent on the location and magnitude of stream reaches determined by the SVIHM. Table 8-7 includes the minimum thresholds and measurable objectives for the existing wells in the network. Neither well had an exceedance of the minimum threshold in 2020. Once the new monitoring ~~network~~ wells are drilled~~is fully established~~, SMC will be determined using the wells' groundwater elevations during the minimum threshold and measurable objective years, or interpolated values from the groundwater elevation contour maps for wells that do not have shallow groundwater elevation measurements for those years.

Table 8-7. Depletion of Interconnected Surface Water Minimum Thresholds and Measurable Objectives

| Monitoring Site | Minimum Threshold (ft) | Measurable Objective (ft) |
|---|---|---|
| 16S/04E-08H02 | 30.0* | 47.2 |
| 16S/05E-31P02 | 80.0* | 94.7 |

*Groundwater elevation estimated.

### ~~8.10.2.1~~8.11.2.1 Information Used and Methodology for Establishing Depletion of Interconnected Surface Water Minimum Thresholds

#### ~~8.10.2.1.1~~8.11.2.1.1 Establishing Groundwater Elevations as Proxies

The GSP Regulations § 354.28(d) states that: "an Agency may establish a representative minimum threshold for groundwater elevation to serve as the value for multiple sustainability indicators, where the Agency can demonstrate that the representative value is a reasonable proxy for multiple individual minimum thresholds as supported by adequate evidence."

The evaluation of ISW in the Salinas Valley Groundwater Basin is based on an approach recommended by the Environmental Defense Fund (EDF, 2018) that uses groundwater elevations as surrogates for streamflow depletion rates caused by groundwater use. Basic hydraulic principles state that groundwater flow is proportional to the difference between groundwater elevations at different locations along a flow path. Using this basic principle, groundwater flow to a stream, or conversely seepage from a stream to the underlying aquifer, is proportional to the difference between water elevation in the stream and groundwater elevations at locations away from the stream. Assuming the elevation in the stream is relatively stable, changes in interconnectivity between the stream and the underlying aquifer is determined by changes in groundwater levels in the aquifer. Thus, the change in hydraulic gradient between

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**Commented [AO27]:** New section added because it is needed with the new approach of using groundwater elevations as proxies for ISW depletion

stream elevation and surrounding groundwater elevations is representative of change in interconnection between surface water and groundwater. Monitoring the hydraulic gradient in the aquifer adjacent to the stream monitors the interconnectivity between stream and aquifer. Therefore, the gradient can be monitored by measuring and evaluating groundwater elevations at selected shallow monitoring wells near streams. No existing estimations of the quantity and timing of depletions of ISW exist, nor data available to make estimations, so the hydraulic principles provide the best available information.

#### ~~8.10.2.1.2~~8.11.2.1.2 Review of Beneficial Uses and Users of Surface Water

The various beneficial uses and users of surface waters were addressed when setting the ISW depletion minimum thresholds. The classes of beneficial uses and users that were reviewed include riparian rights holders, appropriative rights holders, ecological surface water users, and recreational surface water users. This is not a formal analysis of public trust doctrine, but it is a reasonable review all uses and users in an attempt to balance all interests. This was not an assessment about what constitutes a reasonable beneficial use under Article X, Section 2 of the California Constitution. The minimum thresholds for depletion of ISW are developed using the definition of significant and unreasonable conditions described above, public information about critical habitat, locations of ISW derived from the SVIHM, and public information about water rights described below.

**Riparian water rights holders.** ~~Table 8-7~~ Table 8-8 provides a summary of water diversions reported to the SWRCB by water rights holders on the Salinas River and its tributaries within the 180/400-Foot Aquifer Subbasin. The diversion data were obtained from queries of the SWRCB eWRIMS water rights management system. The diversion data are self-reported by water-rights holders with points of diversion located within the Subbasin. Some of the diversions shown in ~~Table 8-7~~ Table 8-8 are also reported to MCWRA as groundwater pumping.

The SVBGSA is not aware of any current water rights litigation or water rights enforcement complaints by any riparian water rights holders in the Subbasin. Therefore, SVBGSA assumes that the current level of depletion has not injured any riparian water rights holders in the Subbasin.

Table 8-~~8~~ ~~7~~. Reported Annual Surface Water Diversions in the 180/400-Foot Aquifer Subbasin

| Diversions (Acre Feet) | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Statement of Diversion and Reported Riparian Diversions** | 6,524 | 7,205 | 9,172 | 8,912 | 8,251 | 7,628 | 7,786 | 7,842 | 7,118 | 7,756 |

**Appropriative water rights holders.** There are no appropriative water right holders in the 180/400-Foot Aquifer Subbasin. The SVBGSA is not aware of any current water rights litigation or water rights enforcement complaints by any appropriative rights holders in the Subbasin. Therefore, SVBGSA assumes that the current level of depletion has not injured any appropriative water rights holders in the Subbasin.

**Ecological surface water users.** Review of MCWRA's Nacimiento Dam Operation Policy (MCWRA, 2018b) and MCWRA's water rights indicates MCWRA operates the Dam in a manner that meets downstream demands and considers ecological surface water users. Since the reservoir operations consider ecological surface water users and reflect reasonable existing surface water depletion rates, this GSP infers that stream depletion from existing groundwater pumping is not unreasonable. If further river management guidelines are developed to protect ecological surface water users, the SMC in this GSP will be revisited.

**Recreational surface water users.** No recreational activities such as boating regularly occur on surface water bodies in the Subbasin.

As shown by the analysis above, the current rate of surface water depletion is not having an unreasonable impact on the various surface water uses and users in the Subbasin. Therefore, the minimum thresholds are based on 2015 groundwater elevations, when surface water depletions were not unreasonable.

### ~~8.10.2.2~~8.11.2.2 Relationship between Individual Minimum Thresholds and Relationship to Other Sustainability Indicators

The minimum thresholds for depletion of ISW are set to 1 foot above 2015 groundwater elevations in the shallow monitoring wells within the Subbasin. The minimum thresholds all reference the same historical year and have existed simultaneously in the past. Therefore, no conflict exists between minimum thresholds measured at various locations within the Subbasin.

The depletion of ISW minimum threshold could influence other sustainability indicators as follows:

- **Chronic lowering of groundwater levels.** The depletion of ISW minimum thresholds are set at the groundwater level minimum thresholds. Therefore, the ISW minimum thresholds will not result in chronic lowering of groundwater elevations.
- **Reduction in groundwater storage.** The depletion of ISW minimum thresholds are set at the change in storage minimum thresholds, which are the same as the groundwater level minimum thresholds. Therefore, the ISW minimum thresholds will not result in an undesirable loss of groundwater storage.
- **Seawater intrusion.** The depletion of ISW minimum thresholds do not promote additional pumping that could exacerbate seawater intrusion. Therefore, seawater intrusion will not be affected by the depletion of ISW minimum thresholds.
- **Degraded water quality.** The depletion of ISW minimum thresholds do not promote decreasing groundwater elevations that lead to exceedance of groundwater quality minimum thresholds. Therefore, groundwater quality will not be affected by the ISW minimum thresholds.
- **Land subsidence**. The depletion of ISW minimum thresholds do not promote additional pumping that could cause subsidence. Therefore, subsidence will not be affected by the ISW minimum thresholds.

### ~~8.10.2.3~~8.11.2.3 Effect of Minimum Thresholds on Neighboring Basins and Subbasins

The 180/400-Foot Aquifer Subbasin has 4 neighboring subbasins within the Salinas Valley Groundwater Basin:

- The Langley Subbasin to the north
- The Eastside Subbasin to the east
- The Forebay Subbasin to the south

- The Monterey Subbasin to the southwest

The SVBGSA is either the exclusive GSA or is one of the coordinating GSAs for the adjacent Subbasins. Because the SVBGSA covers all these subbasins, the SVBGSA is coordinating the development of the minimum thresholds and measurable objectives for all these subbasins. The Langley, Eastside, Forebay, and Monterey Subbasins have submitted GSPs in January 2022. Minimum thresholds for the 180/400-Foot Aquifer Subbasin have been reviewed relative to information developed for the neighboring subbasins' GSPs to ensure that these minimum thresholds will not prevent the neighboring subbasins from achieving sustainability.

The Pajaro Valley Basin lies directly to the north of the Subbasin. Although a small portion of the 180/400-Foot Aquifer Subbasin does drain into Elkhorn Slough to the north, there is no interconnected surface water and groundwater between the Pajaro Valley and the 180/400-Foot Aquifer Subbasin due to the clay in the Elkhorn Slough. Therefore, the minimum thresholds for depletion of interconnected surface waters does not influence the ability of Pajaro Valley to achieve sustainability.

#### ~~8.10.2.4~~8.11.2.4 Effect on Beneficial Uses and Users

Table 3-9 of the *Salinas River Long-Term Management Plan* (MCWRA, 2019a) includes a list of 18 different designated beneficial uses on certain reaches of the river. In general, the major beneficial uses on the Salinas River are:

- Surface water diversions for agricultural, urban/industrial, and domestic supply
- Groundwater pumping from recharged surface water
- Freshwater habitat
- Rare, threatened, or endangered species, such as the Steelhead Trout
- CSIP diversions

The depletion of ISW minimum thresholds may have varied effects on beneficial users and land uses in the Subbasin.

**Agricultural land uses and users.** The depletion of ISW minimum thresholds prevent lowering of groundwater elevations adjacent to certain parts of streams and rivers beyond historical lows. The measurable objectives are higher than the minimum thresholds, providing flexibility for needed groundwater extraction during droughts or periods of low reservoir releases. Minimum thresholds higher than historical levels might affect the quantity and type of crops that can be grown in land adjacent to streams, and the ability of crops to withstand droughts. Therefore, these minimum thresholds are considered the least restrictive for agricultural land users.

However, because the Subbasin is in overdraft, pumping limitations may needed to reach sustainability if there are insufficient projects and management actions available.

**Urban land uses and users.** The depletion of ISW minimum thresholds prevent lowering of groundwater elevations adjacent to certain parts of streams and rivers beyond historical lows. The measurable objective is higher than the minimum thresholds, providing flexibility for needed groundwater extraction during droughts or periods of low reservoir releases. Minimum thresholds higher than historical levels may limit the amount of urban pumping near rivers and streams, which could limit urban growth. Therefore, these minimum thresholds are considered the least restrictive for urban land uses and users. However, because the Subbasin is in overdraft, pumping limitations may needed to reach sustainability if there are insufficient projects and management actions available. If pumping is limited beyond historical levels, municipalities may have to obtain alternative sources of water to achieve urban growth goals. If this occurs, this may result in higher water costs for municipal water users.

**Domestic land uses and users.** The depletion of ISW minimum thresholds protect existing domestic land users and uses near locations of ISW from groundwater elevation declines below historical lows by maintaining shallow groundwater elevations near streams and protecting the operability of relatively shallow domestic wells.

**Ecological land uses and users.** The depletion of ISW minimum thresholds address ecological uses and users by preventing depletion of ISW from groundwater pumping beyond what was historically experienced. Additionally, by setting future groundwater levels at or above recent lows, there should be less impact to ecological users than has been seen to date.

#### ~~8.10.2.5~~8.11.2.5 Relation to State, Federal, or Local Standards

There are no explicit federal, state, or local standards for depletion of ISW. However, both state and federal provisions call for the protection and restoration of conditions necessary for endangered and threatened species.

#### ~~8.10.2.6~~8.11.2.6 Method for Quantitative Measurement of Minimum Threshold

The SVIHM is used to preliminarily identify areas of ISW and will help determine when any flow in a river is primarily due to conservation releases from Nacimiento and San Antonio reservoirs. Groundwater elevations measured in shallow wells adjacent to these areas of ISW will serve as the primary approach for monitoring depletion of ISW. As discussed in Chapter 7, existing shallow wells will be added, or new shallow wells will be installed to monitor groundwater elevations adjacent to surface water bodies during GSP implementation. There may be areas in the 180/400-Foot Aquifer Subbasin that this approach may not be applicable and additional analysis may need to be conducted from these areas.

New shallow monitoring wells installed pursuant to the GSP will not have data from 2015. Minimum thresholds for those wells will be estimated by either correlation with nearby deeper wells with water-level records that include 2015, or from groundwater model results.

## ~~8.10.3~~8.11.3 Measurable Objectives

The measurable objectives for depletion of ISW target groundwater elevations that are higher than the minimum thresholds. The measurable objectives are consistent with the chronic lowering of groundwater elevation and reduction in groundwater storage measurable objectives.

> *The measurable objectives for depletion of interconnected surface water are established by proxy using shallow groundwater elevations observed in 2003 near locations of interconnected surface water.*

### ~~8.10.3.1~~8.11.3.1 Methodology for Setting Measurable Objectives

The depletion of ISW measurable objectives are set to be identical to the groundwater level measurable objectives. The methodology for establishing measurable objectives is outlined in Section 8.6.2.1~~8.5.2.1~~. Groundwater elevations from 2003 were selected as representative of the measurable objectives for the 180/400-Foot Aquifer Subbasin.

### ~~8.10.3.2~~8.11.3.2 Interim Milestones

The interim milestones leading to the depletion of ISW measurable objectives are included in Table 8-9 for the existing wells in the ISW monitoring network. ~~will be added when the monitoring network is established.~~

Table 8-9. Depletion of Interconnected Surface Water Interim Milestones

| Monitoring Site | Current Groundwater Elevation (ft) | Interim Milestone at Year 2025 (ft) | Interim Milestone at Year 2030 (ft) | Interim Milestone at Year 2035 (ft) | Measurable Objective (ft) (goal to reach at 2040) |
|---|---|---|---|---|---|
| 16S/04E-08H02 | 39.3 | 41.3 | 43.3 | 45.2 | 47.2 |
| 16S/05E-31P02 | 89.3 | 90.6 | 92.0 | 93.3 | 94.7 |

## ~~8.10.4~~8.11.4 Undesirable Results

### ~~8.10.4.1~~8.11.4.1 Criteria for Defining Undesirable Results

By regulation, the depletion of ISW undesirable result is a quantitative combination of minimum threshold exceedances. The undesirable result for depletion of ISW is:

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*There is an exceedance of the minimum threshold in a shallow groundwater monitoring well used to monitor interconnected surface water.*

Streamflow depletion in the Subbasin is complicated by many factors, such as reservoir releases, recharge of the aquifer from streamflow, losses to vegetation, and ET. The ISW SMC applies to depletion of ISW from groundwater use. For SGMA compliance purposes, the default assumption is that any depletions of surface water beyond the level of depletion that occurred prior to 2015, as evidenced by reduction in groundwater levels, represent depletions that are not significant and unreasonable. Any additional depletions of surface water flows caused by groundwater conditions in excess of conditions as they were in 2015 would likely be an undesirable result that must be addressed under SGMA. There is currently no biological opinion or habitat conservation plan that indicates additional protection is needed for species protected under the Endangered Species Act; however, if it is determined that additional protection is needed and streamflow loss is due to groundwater extraction not surface water flows, SVBGSA will adapt as necessary to adhere to environmental laws.

#### ~~8.10.4.2~~8.11.4.2 Potential Causes of Undesirable Results

Conditions that may lead to an undesirable result for the depletion of ISW include the following:

- **Localized pumping increases.** Even if the Subbasin is adequately managed at the Subbasin scale, increases in localized pumping near interconnected surface water bodies could reduce shallow groundwater elevations.

- **Expansion of riparian water rights.** Riparian water rights holders often pump from wells adjacent to streams. Pumping by these riparian water rights holder users is not regulated under this GSP. Additional riparian pumpers near interconnected reaches of rivers and streams may result in excessive localized surface water depletion.

- **Changes in Nacimiento and San Antonio Reservoir Releases.** Since the Salinas River is dependent on reservoir releases for sustained flows, releases at low levels could cause undesirable results. The ability to avoid undesirable results for ISW is partially dependent on reservoir releases.

- **Departure from the GSP's climatic assumptions, including extensive, unanticipated drought.** Minimum thresholds were established based on anticipated future climatic conditions. Departure from the GSP's climatic assumptions or extensive, unanticipated droughts may lead to excessively low groundwater elevations that increase surface water depletion rates.

### ~~8.10.4.3~~8.11.4.3 Effects on Beneficial Users and Land Use

The depletion of ISW undesirable result is to have no net increase in surface water depletion due to groundwater use beyond 2015 levels, as determined by shallow groundwater elevations. The effects of undesirable results on beneficial users and land use are the same as the effects of minimum thresholds on beneficial uses and users, as described in Section 8.11.2.4.

SVBGSA will work with National Marine Fisheries Service (NMFS) and MCWRA to further evaluate the effects of the ISW measurable objectives, minimum thresholds, and undesirable results on surface water flows and beneficial users.

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