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 SGMA regulations 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 Section 354.22 *et seq.* of the regulations, and as further clarified in the SMC BMP (DWR, 2017; CCR, 2016).

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 Section 10721(x).

  The six 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 interconnected surface waters.

- **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.

- **Measurable objectives** refer to 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.

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

  Minimum thresholds are indicators of an unreasonable condition.

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

  Interim milestones are targets such as groundwater elevations that will be achieved every five 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 Eastside Aquifer Subbasin is to manage groundwater resources for long-term community, financial, and environmental benefits to the Subbasin's residents and businesses. This GSP will 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.

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 and project types include:

Management Actions:

- [LIST TO BE ADDED AFTER CHAPTER 9 IS DEVELOPED]

Projects:

- [LIST TO BE ADDED AFTER CHAPTER 9 IS DEVELOPED]

8.3 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 Advisory Committee members. The general process included:

- Presenting to Subbasin Committees on the general SMC requirements and implications. These presentations outlined the approach to developing SMC and discussed initial SMC ideas.
- Providing supplemental data to the Subbasin Committees to guide the approach to setting SMC
- Polling and receiving feedback from the Subbasin Committees to establish preferences for establishing SMC
- Obtaining additional input on SMC from with GSA staff and GSA Board Members
- Modifying minimum thresholds and measurable objectives based on input from the public, GSA staff, and GSA Board Members

The SMC for groundwater elevations and depletion of groundwater storage in this GSP are established to assure long-term groundwater sustainability under average hydrogeologic conditions. Average hydrogeologic conditions are the anticipated future groundwater conditions in the Subbasin, averaged over the planning horizon and accounting for anticipated climate change. As described in Chapter 6, future groundwater conditions are based on historical precipitation, evapotranspiration, and streamflow, as well as reasonably anticipated climate change and sea level rise. The average hydrogeologic conditions include reasonably anticipated wet and dry periods.

Most of the SMCs, such as chronic lowering of groundwater levels, are developed to be met every year. However, because this GSP addresses long-term groundwater sustainability, some of the metrics for sustainability indicators may not be applicable in each individual future year. 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. In particular, groundwater extractions, the metric for depletion of groundwater storage, will likely experience variations caused by reasonably anticipated hydrologic fluctuations. However, under average hydrogeologic conditions, there will be no chronic depletion of groundwater storage. Sustainable management criteria that will be met under average hydrogeologic conditions are identified in the text describing the SMC.

The GSP's undesirable results reflect groundwater conditions under the reasonably anticipated climatic fluctuations that underpin the future water budget. Groundwater conditions due to extreme, unanticipated climatic conditions do not constitute an undesirable result. As stated in the SMC BMP (DWR, 2017), "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."

8.4 Sustainable Management Criteria Summary

Table 8-1 provides a summary of the SMC for each of the six sustainability indicators. The rationale and background for developing these criteria are described in detail in the following sections. 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 two 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. Sustainable Management Criteria Summary

Sustainability Indicator	Minimum Threshold	Measurement	Measurable Objective	Undesirable Result	Interim Milestones
Chronic lowering of groundwater levels	Water level minimum thresholds set to 2015 groundwater elevations. See Table 8-2.	Measured through groundwater elevation representative monitoring well network.	Water level measurable objectives set to 1999 groundwater elevations with some changes to ensure adequate water supply at shallow domestic wells. See Table 8-2	Over the course of any one year, no more than 15% of groundwater elevation minimum thresholds shall be exceeded. Allows for four exceedances per year in the Eastside Aquifer Subbasin.	See Table 8-3.
Reduction in groundwater storage	Extraction minimum threshold is set at the long-term sustainable yield. The current estimate of the long-term sustainable yield is between 50,800 and 67,800 AF/yr. for the entire Eastside Aquifer Subbasin.[1] This number is preliminary and will be revised as additional data and additional projects are implemented.	Measured through total groundwater extractions. Municipal users report groundwater extractions to MCWRA. Agricultural pumping will either be collected by MCWRA or estimated based on crop data.	Measurable objective is Identical to the minimum threshold. Pumping is set to the estimated long-term sustainable yield is between 50,800 and 67,800 AF/yr. for the entire Eastside Aquifer Subbasin.[1]	During average hydrogeologic conditions, and as a long-term average over all hydrogeologic conditions, the total groundwater pumping shall not exceed the minimum threshold.	Set to between 50,800 and 67,800 AF/yr. for the entire Eastside Aquifer Subbasin
Seawater intrusion	Minimum threshold is set using the 500 mg/L chloride isocontour at the Subbasin boundary.	Seawater intrusion maps developed by MCWRA.	Measurable objective is identical to the minimum threshold, resulting in no seawater intrusion in the Eastside Aquifer Subbasin.	On average in any one year there shall be no exceedances of the minimum threshold, resulting in no mapped seawater intrusion beyond the subbasin boundary.	No seawater intrusion above 500 mg/L chloride in the Subbasin.

[1] The long-term sustainable yield number is in the process of being refined within this range.

Sustainability Indicator	Minimum Threshold	Measurement	Measurable Objective	Undesirable Result	Interim Milestones
Degraded groundwater quality	Minimum threshold is zero additional exceedances of either the regulatory drinking water standards (potable supply wells) or the basin objectives (agricultural supply wells) for groundwater quality constituents of concern. Exceedances are only measured in public water system supply wells and on-farm domestic and agricultural (ILRP) wells. See Table 8-4.	Groundwater quality data downloaded annually from state sources.	Measurable objective is identical to the minimum threshold.	There shall be no additional minimum threshold exceedances beyond existing groundwater quality conditions during any one year as a direct result of projects or management actions taken as part of GSP implementation.	Identical to current conditions.
Subsidence	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.	Measured using DWR provided InSAR data.	Measurable objective is identical to the minimum threshold, resulting in zero net long-term subsidence.	In any one year, there will be zero exceedances of minimum thresholds for subsidence.	Zero long-term subsidence resulting from lowered groundwater levels, averaged over every five-year period.
Depletion of interconnected surface water (ISW)	Minimum threshold is set to the depletion rates observed in 2015, estimated by proxy using shallow groundwater elevations near streams. The locations of interconnected surface water should remain the same as 2015 conditions.	Groundwater elevations in shallow wells adjacent to locations of ISW identified using the SVIHM.	Measurable objective is identical to the minimum threshold.	During average hydrogeologic conditions, and as a long-term average over all hydrogeologic conditions, the depletion of interconnected surface waters shall not exceed the minimum threshold in more than 15% of wells used to monitor shallow groundwater. This percentage will be reevaluated when the monitoring network if fully established.	Set to 2015 shallow groundwater elevations.

8.5 Chronic Lowering of Groundwater Elevations SMC

8.5.1 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 low groundwater elevations in a significant number of domestic and small water system wells that lead to inadequate water production
- 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 Minimum Thresholds

The minimum threshold for chronic lowering groundwater levels are set at 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. The minimum threshold contour maps, along with the representative monitoring network well locations for the Eastside Aquifer Subbasin are shown on Figure 8-1 and Figure 8-2 for the Shallow and Deep Zones, respectively.

Thirteen RMS are screened in both the Shallow and Deep Zones of the Eastside Aquifer, as indicated in Table 8-2. Depending on the year, these wells could be more representative of either the Shallow or Deep Zone. Thus, these wells are shown on the minimum threshold and measurable objective maps for both the Shallow and Deep Zones.

Table 8-2. Chronic Lowering of Groundwater Elevations Minimum Thresholds and Measurable Objectives

Monitoring Site	Aquifer Zone	Minimum Threshold (ft)	Measurable Objective (ft)
14S/03E-06R01	Shallow	-29.7	-24.9*
14S/03E-11H01	Shallow	25.2	88.3
14S/03E-24H01	Shallow	-84.1	-54.5
14S/03E-25C02	Shallow	-65.4	-42.2*
14S/03E-27B01	Shallow	-27.4*	-22.7*
14S/03E-33G01	Shallow	-18.0	-6.9*
14S/03E-36A01	Shallow	-55.2	-29.7
15S/04E-07R02	Shallow	-4.6	17.8
15S/04E-14N01	Shallow	-34.6	14.0*
15S/04E-24N03	Shallow	-15.8	26.0
16S/05E-17R01	Shallow	61.9	77.1
14S/03E-17F01	Deep	-44.0	-27.5*
14S/03E-21L01	Deep	-36.0	-22.6*
14S/03E-25C01	Deep	-64.9	-41.7*
14S/03E-34C01	Deep	-31.0	-13.3*
15S/03E-02G01	Deep	-36.0	-8.8*
16S/04E-02Q03	Deep	32.5	57.8
14S/03E-03K01	Both	-63.1	-40.7
14S/03E-09E02	Both	-54.0	-38.2*
14S/03E-15H03	Both	-55.3	-36.7
14S/04E-31Q02	Both	-61.0	-25.6*
15S/04E-06R01	Both	-30.5	-4.1
15S/04E-09D01	Both	-52.0	-29.2
15S/04E-15D02	Both	-26.5	-0.2
15S/04E-21F04	Both	-12.2	16.5*
15S/04E-27G01	Both	3.8	33.5
15S/04E-36H01	Both	12.9	56.2
16S/05E-05N01	Both	29.1	62.5
16S/05E-07G01	Both	38.7	69.3
16S/05E-27G01	Both	77.7	88.4*

*Groundwater elevation was estimated.

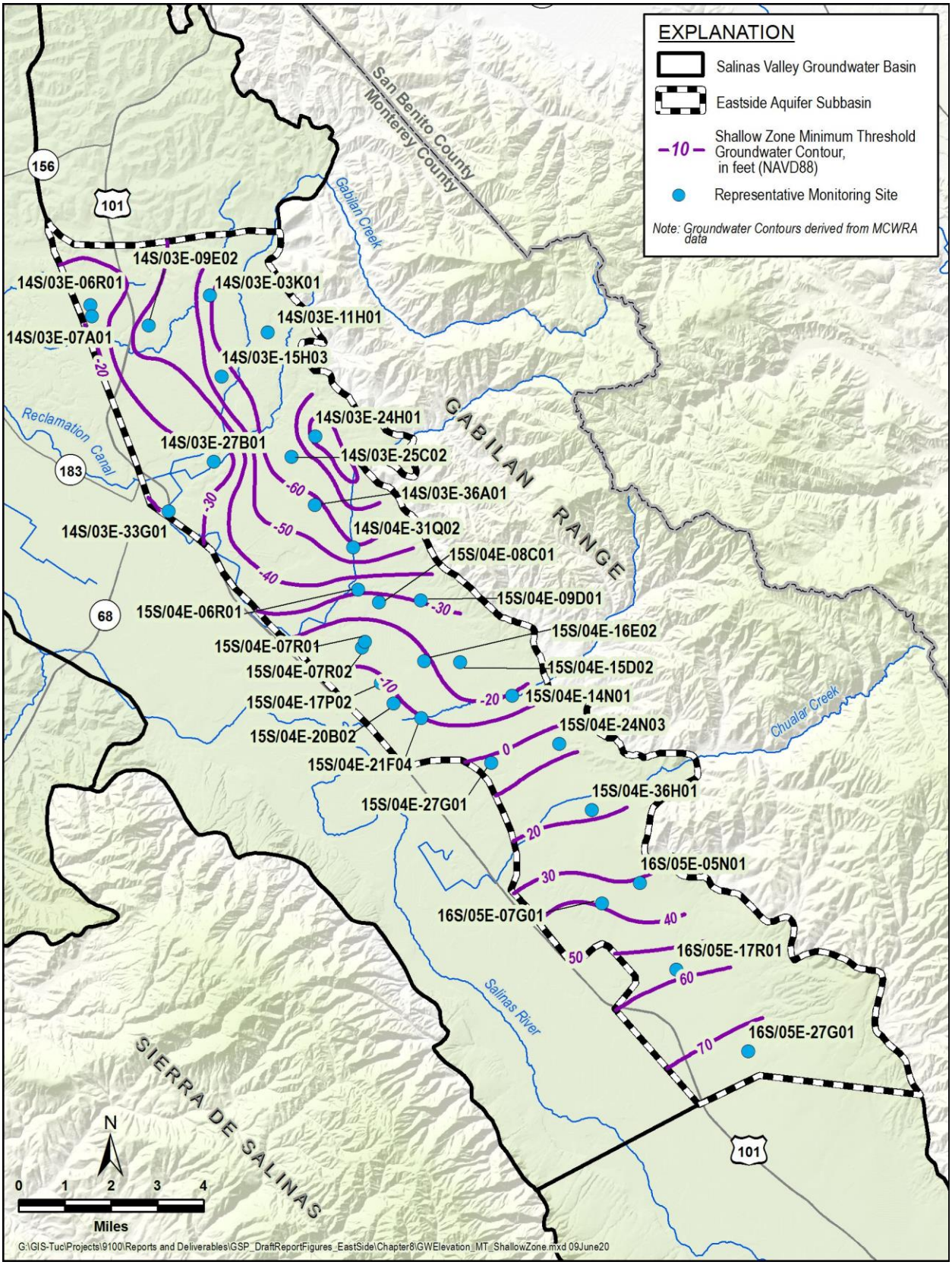

Figure 8-1. Groundwater Elevation Minimum Threshold Contour Map for the Shallow Zone of the Eastside Aquifer

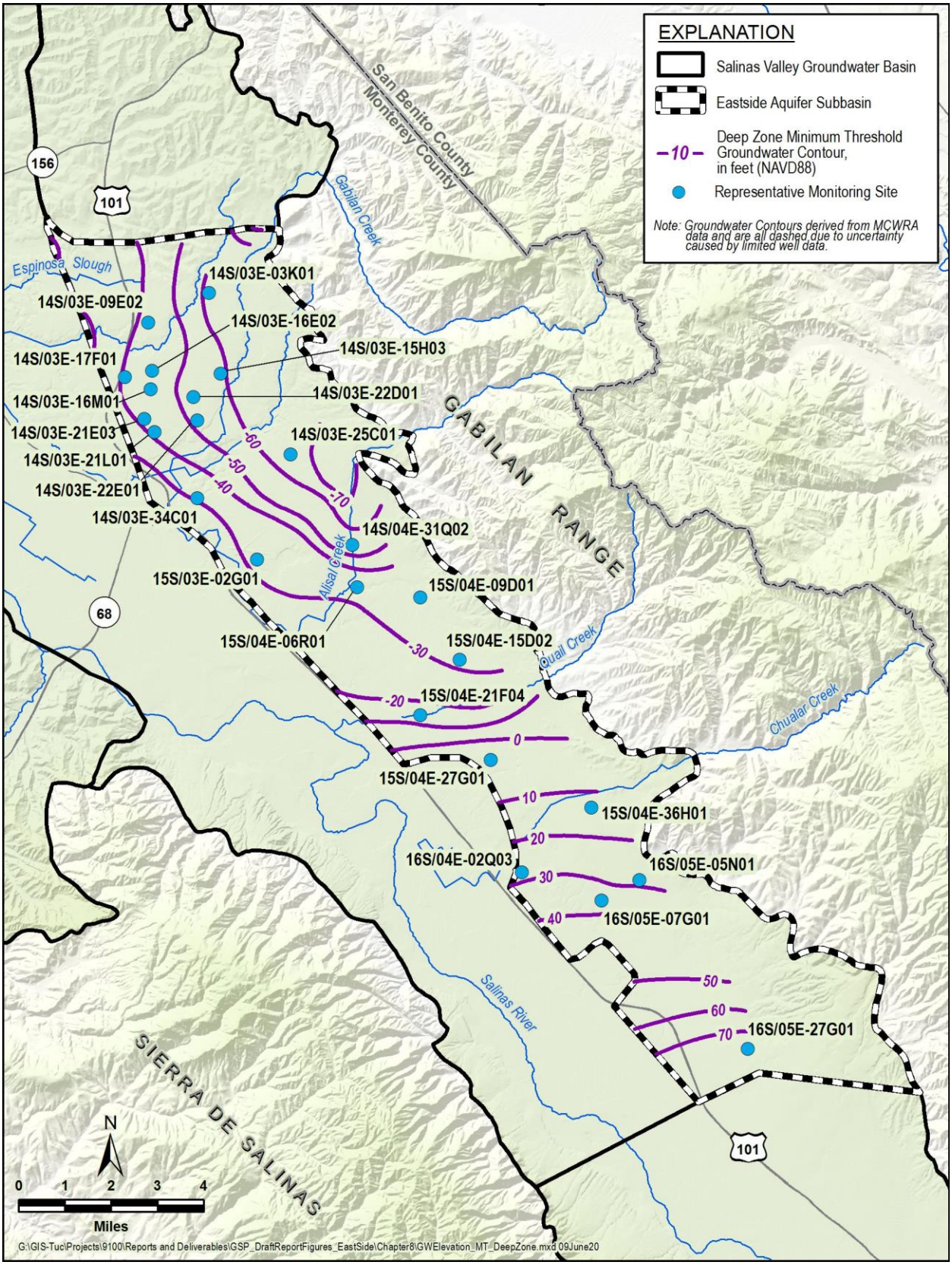

Figure 8-2. Groundwater Elevation Minimum Threshold Contour Map for the Shallow Zone of the Eastside Aquifer

8.5.2.1 Information and Methodology Used to Establish Minimum Thresholds and Measurable Objectives

The development of both minimum thresholds and measurable objectives follow a similar process, which is described in this section. The information used for establishing the chronic lowering of groundwater elevations measurable objectives and minimum thresholds includes:

- Feedback from discussions with the Subbasin Committee on challenges and goals
- Historical groundwater elevation data and hydrographs from wells monitored by the Monterey County Water Resources Agency (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:

1. The Subbasin Planning 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 minimum threshold and measurable objectives lines for the Eastside Aquifer Subbasin are shown on Figure 8-3. The average 2015 groundwater elevations in the Eastside 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 6 feet lower than 2015 elevations. The minimum thresholds were therefore set to the 2015 groundwater elevations. The measurable objective is set to 1999 groundwater elevations, which is an achievable goal for the Subbasin under reasonably expected climatic conditions.

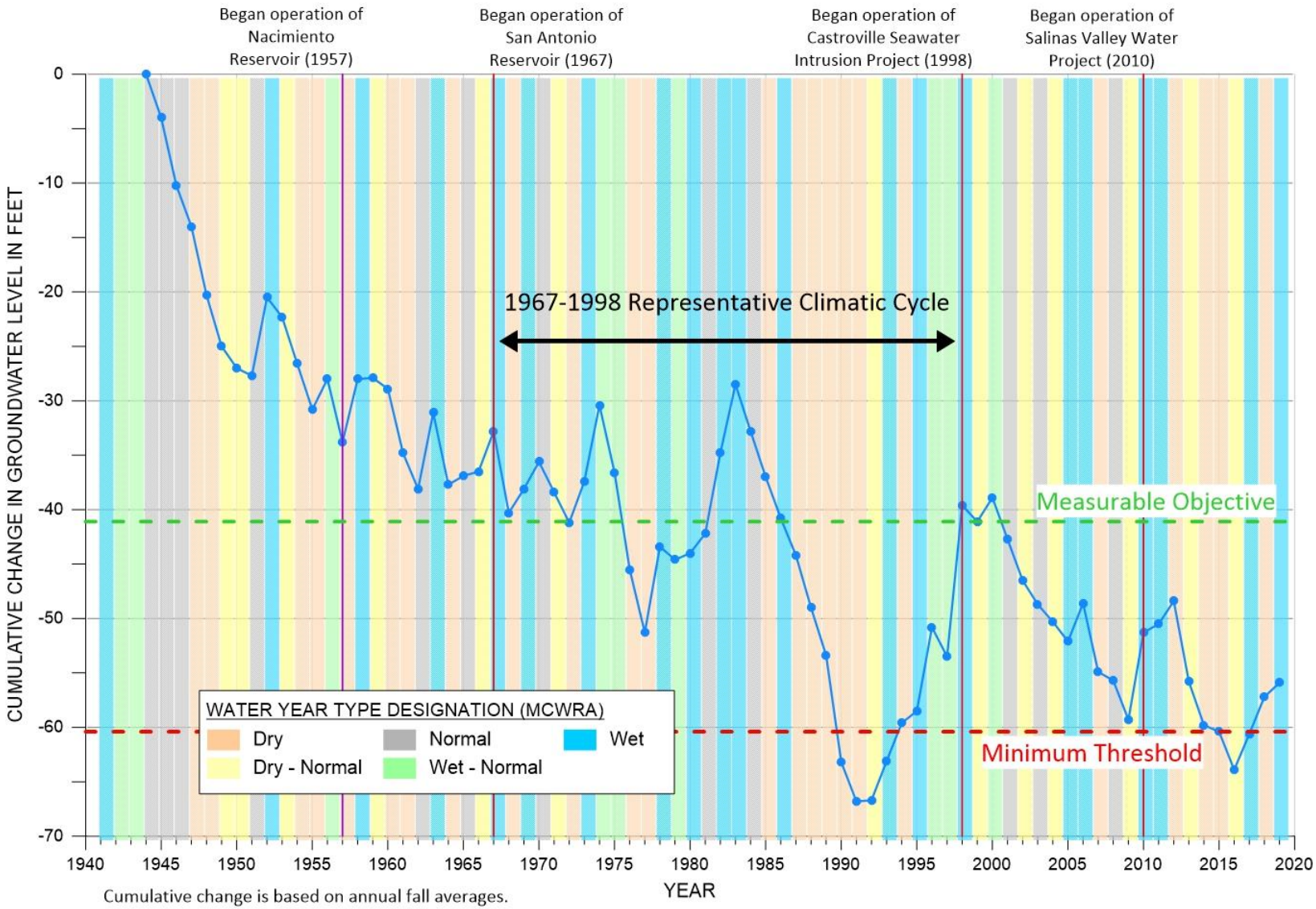

Figure 8-3. Cumulative Groundwater Elevation Change Hydrograph with Selected Measurable Objective and Minimum Threshold for the Eastside Aquifer Subbasin

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 interpolated from the groundwater elevation contours. The RMS location was intersected with groundwater elevation contour maps to estimate the minimum thresholds and measurable objectives. Moreover, if the SMC seemed unreasonable for an RMS, they were adjusted based on historical water levels and on groundwater elevation trends seen in surrounding wells. The interpolated or adjusted minimum thresholds and measurable objectives are indicated by an asterisk in Table 8-2.

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

8.5.2.2 Minimum Thresholds Impact on Domestic Wells

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 365.5 feet using data from the OSWCR database.

While this approach is reasonable, there are some errors that add inaccuracy to the analysis. These include:

- The OSWCR database may include wells that have been abandoned, destroyed, or replaced, and therefore will have no detrimental impacts from lowered groundwater levels.
- The Subbasin experienced a prolonged drought from 1986 to 1992, causing many new wells to be drilled. Thus, wells drilled prior to 1991 are likely abandoned if they were not modified.
- Some domestic wells may draw water from shallow, perched groundwater that is not managed in this GSP.
- Some wells in the OSWCR database are not accurately located, and therefore the estimated depth to water may not be accurate.

- 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 included 20 wells that had accurate locations and were drilled post 1990 out of the total 206 domestic wells in the OSWCR database. The analysis of domestic wells showed that in the Eastside Aquifer all domestic wells will have at least 25 feet of water in them as long as groundwater elevations remain above minimum thresholds; therefore, all domestic wells will have at least 25 feet of water in them when measurable objectives are achieved.

8.5.2.3 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 representative monitoring site is similar to or different from water level thresholds in nearby representative monitoring sites). 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.

- **Change in groundwater storage.** The groundwater elevation minimum thresholds are set at 2015 groundwater elevations. Groundwater elevations above 2015 elevations are consistent with the practice of pumping at or less than the sustainable yield. Therefore, the groundwater elevation minimum thresholds will not result in long term significant or unreasonable change in groundwater storage.
- **Seawater intrusion.** The groundwater elevation minimum thresholds are set at 2015 groundwater elevations, which is above historical lows. Therefore, the groundwater elevation minimum thresholds are intended to not exacerbate, and may help control, the rate of seawater intrusion.
- **Degraded water quality.** Water quality could be affected through two 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 cause wells to draw poor-quality groundwater from deeper zones. No additional poor groundwater quality issues were identified due to low groundwater elevations when groundwater elevations were previously at minimum threshold levels. Therefore, the groundwater elevation minimum thresholds are set above historical lows to avoid any additional deeper, poor-quality water from impacting shallower production and domestic wells.

- **Subsidence.** Subsidence is caused by dewatering and compaction of clay-rich sediments in response to lowering groundwater elevations. The groundwater elevation minimum thresholds are set at or above historical low groundwater elevations. Because future groundwater elevations will be higher than historical low groundwater elevations, they will not induce additional dewatering of clay-rich sediments, and thus will not induce additional subsidence.
- **Depletion of interconnected surface waters.** Lowering average groundwater elevations in areas adjacent to interconnected surface water bodies will increase depletion rates. Because the groundwater elevation minimum thresholds are set at 2015 elevations, future groundwater elevations will not induce additional depletion of interconnected surface waters over historical rates. Therefore, the groundwater elevation minimum thresholds will not result in a significant or unreasonable depletion of interconnected surface waters, including groundwater-dependent ecosystems.

8.5.2.4 Effect of Minimum Thresholds on Neighboring Basins and Subbasins

The Eastside Aquifer Subbasin has three neighboring subbasins within the Salinas Valley Groundwater Basin:

- The Langley Area Subbasin to the north
- The Forebay Aquifer Subbasin to the south
- The 180/400-Foot Aquifer Subbasin to the west

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 180/400-Foot Aquifer Subbasin submitted a GSP in 2020 and the Langley Area and Forebay

Aquifer Subbasins are in the process of GSP development for submittal in January 2022. Minimum thresholds for the Eastside Aquifer Subbasin will be 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.

8.5.2.5 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. 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 municipal water users.

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. 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 Relevant Federal, State, or Local Standards

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

8.5.2.7 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 30 wells. Data gaps were identified in Chapter 7 and will be resolved during implementation of this GSP.

8.5.3 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. Measurable objectives for the chronic lowering of groundwater levels are set to 1999 groundwater elevations and are summarized in Table 8-2. The measurable objectives are also shown on the hydrographs for each RMS in Appendix 8A.

8.5.3.1 Methodology for Setting Measurable Objectives

The methodology for establishing measurable objectives is described in detail in Section 8.5.2.1.

A year from the relatively recent past was selected for setting measurable objectives to ensure that objectives are achievable. Groundwater elevations from 1999 were selected as representative of the measurable objectives for the Eastside Aquifer Subbasin.

The measurable objective contour maps for the Eastside Aquifer Subbasin along with the representative monitoring network wells are shown on Figure 8-4 and Figure 8-5 for the Shallow and Deep Zones, respectively.

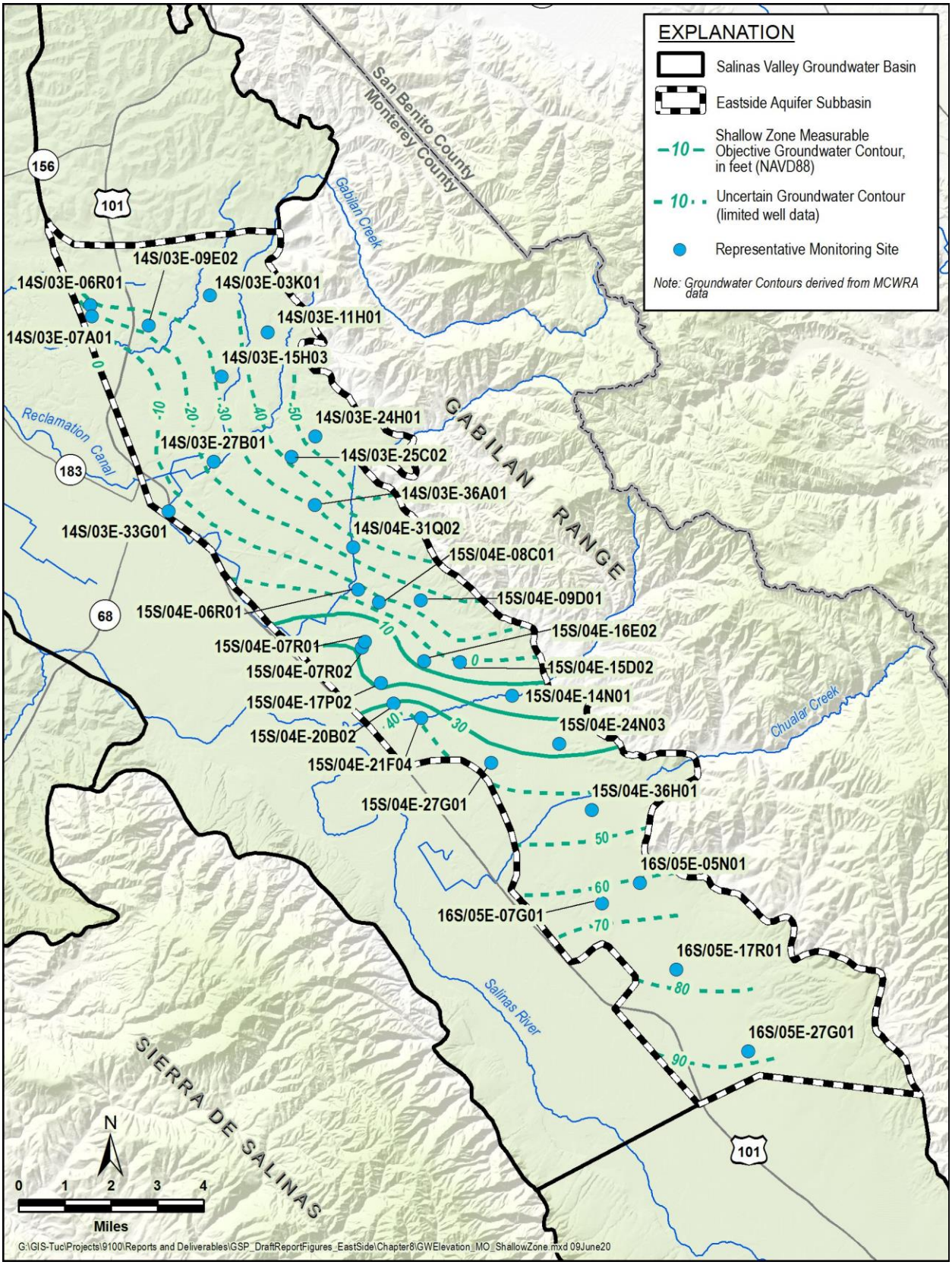

Figure 8-4. Groundwater Elevation Measurable Objective Contour Map for the Shallow Zone of the Eastside Aquifer

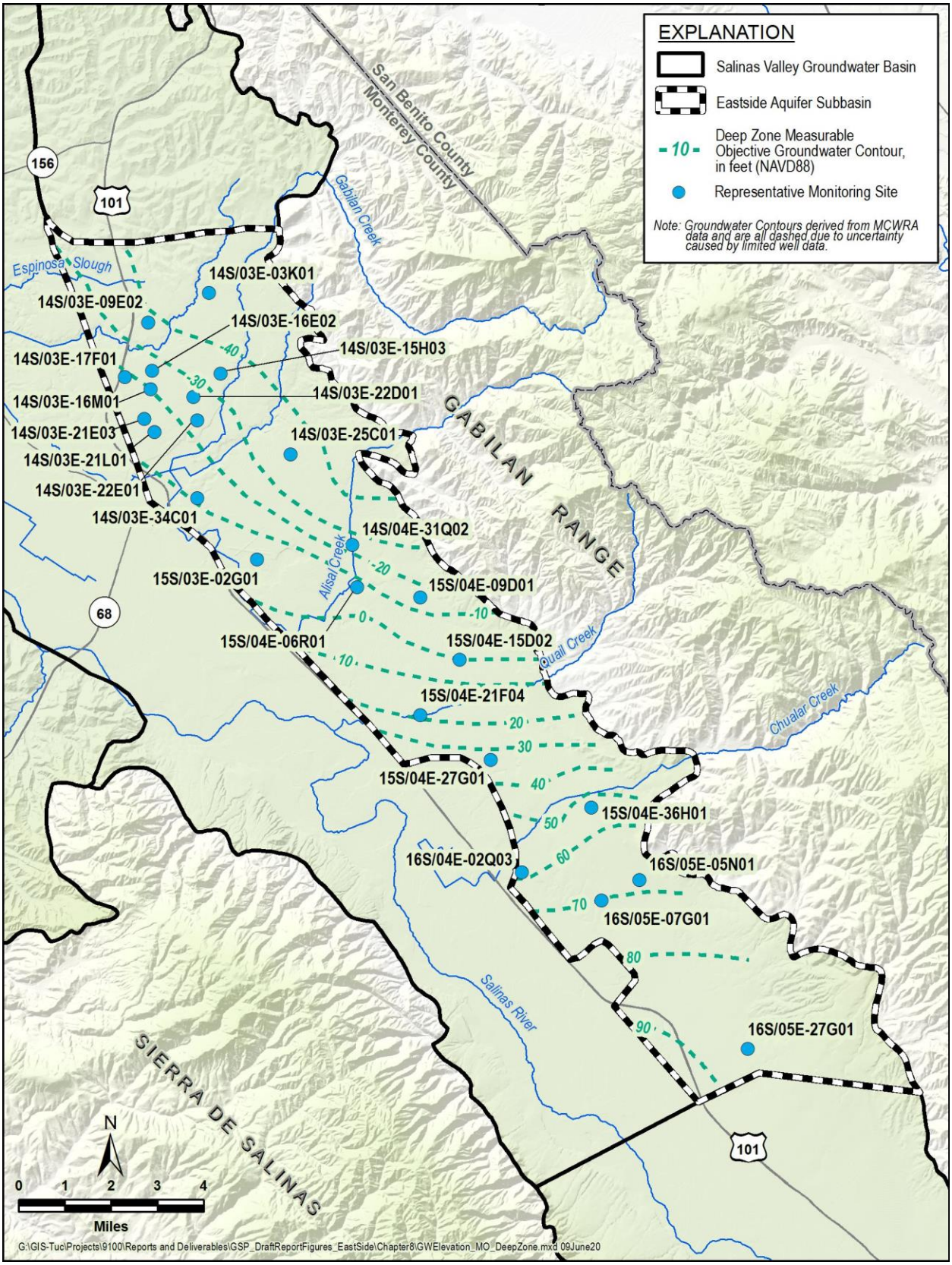

Figure 8-5. Groundwater Elevation Measurable Objective Contour Map for the Deep Zone of the Eastside Aquifer

8.5.3.2 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 elevations will be modified once the SVIHM is available for use.

Table 8-3. Groundwater Elevation Interim Milestones

Monitoring Site	Current Groundwater Elevation ft	Interim Milestone at Year 2027 (ft)	Interim Milestone at Year 2032 (ft)	Interim Milestone at Year 2037 (ft)	Measurable Objective (ft) (goal to reach at 2042)
14S/03E-06R01	-26.5	-26.1	-25.7	-25.3	-24.9*
14S/03E-11H01	66.2	71.7	77.3	82.8	88.3
14S/03E-24H01	-77.6	-71.8	-66.1	-60.3	-54.5
14S/03E-25C02	-59.4	-55.1	-50.8	-46.5	-42.2*
14S/03E-27B01	-8.2	-11.8	-15.4	-19.0	-22.7*
14S/03E-33G01	-13.0	-11.5	-9.9	-8.4	-6.9*
14S/03E-36A01	-49.4	-44.5	-39.6	-34.6	-29.7
15S/04E-07R02	6.4	9.3	12.1	15.0	17.8
15S/04E-14N01	-8.9	-3.2	2.5	8.3	14.0*
15S/04E-24N03	-10.3	-1.2	7.9	16.9	26.0
16S/05E-17R01	70.4	72.1	73.8	75.4	77.1
14S/03E-17F01	-36.0	-33.9	-31.8	-29.6	-27.5*
14S/03E-21L01	-32.0	-29.6	-27.3	-24.9	-22.6*
14S/03E-25C01	-61.2	-56.3	-51.5	-46.6	-41.7*
14S/03E-34C01	-27.0	-23.6	-20.1	-16.7	-13.3*
15S/03E-02G01	-23.0	-19.4	-15.9	-12.3	-8.8*
16S/04E-02Q03	40.5	44.8	49.2	53.5	57.8
14S/03E-03K01	-58.8	-54.3	-49.8	-45.2	-40.7
14S/03E-09E02	-48.0	-45.6	-43.1	-40.7	-38.2*
14S/03E-15H03	-48.1	-45.3	-42.4	-39.6	-36.7
14S/04E-31Q02	-51.2	-44.8	-38.4	-32.0	-25.6*
15S/04E-06R01	-25.3	-20.0	-14.7	-9.4	-4.1
15S/04E-09D01	-43.2	-39.7	-36.2	-32.7	-29.2
15S/04E-15D02	-21.1	-15.9	-10.7	-5.4	-0.2
15S/04E-21F04	-0.2	4.0	8.2	12.3	16.5*
15S/04E-27G01	15.4	19.9	24.5	29.0	33.5
15S/04E-36H01	22.3	30.8	39.3	47.7	56.2
16S/05E-05N01	38.7	44.7	50.6	56.6	62.5
16S/05E-07G01	51.7	56.1	60.5	64.9	69.3
16S/05E-27G01	84.9	85.8	86.6	87.5	88.4*

*Groundwater elevation estimated.

8.5.4 Undesirable Results

8.5.4.1 Criteria for Defining Chronic Lowering of Groundwater Levels Undesirable Results

The chronic lowering of groundwater levels undesirable results is a quantitative combination of groundwater elevation minimum threshold exceedances. For the Subbasin, the groundwater elevation undesirable result is:

> *Over the course of any one year, no more than 15% of the groundwater elevation minimum thresholds shall be exceeded.*

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 four exceedances in the 30 existing representative monitoring wells. 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 seven new monitoring wells.

The groundwater elevation undesirable result reflects average year conditions, and average conditions over many years. Low groundwater elevations during unanticipated future droughts or unanticipated climatic conditions do not constitute and undesirable result. The groundwater elevation undesirable result reflects average year conditions, and average conditions over many years. Low groundwater elevations during unanticipated future droughts or unanticipated climatic conditions do not constitute and undesirable result. As stated in the SMC BMP (DWR, 2017), “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.”

8.5.4.2 Potential Causes of Undesirable Results

An undesirable result for chronic lowering of groundwater levels does not currently exist, since no groundwater elevation in any of the 30 representative monitoring wells in the Subbasin were

above the minimum threshold in the most recent Fall groundwater elevation measurements. Conditions that may lead to an undesirable result include the following:

- **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 Effects on Beneficial Users and Land Uses

The primary detrimental effect on beneficial users from allowing multiple exceedances occurs if more than one exceedance occurs in a small geographic area. Allowing 15% exceedances is reasonable if the exceedances are spread out across the Subbasin, and as long as any one 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 Reduction in Groundwater Storage SMC

8.6.1 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 Minimum Thresholds

The minimum threshold for reduction in groundwater storage is set at the long-term sustainable yield. The current estimate of the long-term sustainable yield is between 50,800 and 67,800 AF/yr. for the entire Eastside Aquifer Subbasin.[2] This number is preliminary and will be refined as additional data are collected and other projects are implemented.

The reduction in groundwater storage minimum threshold is a single extraction number for the entire Subbasin. The minimum threshold is set at the long-term sustainable yield, which is the sustainable yield once the Subbasin has reached sustainability. It does not reflect actions or extraction limitations that may be necessary to reach sustainability. SGMA allows 20 years to reach sustainability.

8.6.2.1 Information and Methodology Used to Establish Minimum Thresholds

The methodology used to estimate the sustainable yield, and the subsequent minimum threshold for reduction in groundwater storage, are detailed in Chapter 6. These calculations acknowledge and account for current land use, future urban growth, and anticipated reasonable climate change.

The minimum threshold applies to pumping of natural recharge only. Natural recharge includes items such as recharge from precipitation and percolation of excess irrigation water. Pumping of intentionally recharged water that is not part of the natural recharge is not considered when compared against the minimum threshold. Intentionally recharged water refers to water recharged through intentional reservoir releases, injection wells, or percolation ponds, with the intent of adding water to the aquifer to increase storage and raise water levels.

8.6.2.2 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.** Pumping at or below the sustainable yield will maintain or raise average groundwater elevations in the Subbasin. Therefore, the

[2] The long-term sustainable yield number is in the process of being refined within this range.

minimum threshold for reduction in groundwater storage will not result in a significant or unreasonable lowering of groundwater elevations.

- **Seawater intrusion.** Pumping at or below the sustainable yield will maintain or raise average groundwater elevations in the Subbasin. Therefore, the minimum threshold for reduction in groundwater storage will not result in a significant or unreasonable increase in seawater intrusion. However, pumping at the minimum threshold may not, by itself, stop all seawater intrusion. The seawater intrusion minimum threshold does not depend on the change in storage minimum threshold: exceedance of both the change in storage and seawater intrusion minimum thresholds will be avoided independently.
- **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.
- **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 interconnected surface waters.** 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 interconnected surface waters and will not result in a significant or unreasonable depletion of interconnected surface waters.

8.6.2.3 Effect of Minimum Thresholds on Neighboring Basins and Subbasins

The Eastside Aquifer Subbasin has three neighboring subbasins within the Salinas Valley Groundwater Basin:

- The Langley Area Subbasin to the north
- The Forebay Aquifer Subbasin to the south
- The 180/400-Foot Aquifer Subbasin to the west

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 180/400-Foot Aquifer Subbasin submitted a GSP in 2020 and the Langley Area and Forebay Aquifer Subbasins are in the process of GSP development for submittal in January 2022. Minimum thresholds for the Eastside Aquifer Subbasin will be 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.

8.6.2.4 Effect on Beneficial Uses and Users

The reduction in groundwater storage minimum threshold of maintaining pumping at the Subbasin's calculated sustainable yield might require a restriction on the amount of groundwater pumping in the Subbasin. Restricting pumping may impact the beneficial uses and users of the Subbasin.

Agricultural land uses and users. Restricting the amount of groundwater pumping may limit or reduce agricultural production 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 will increase the Subbasin pumping beyond the sustainable yield, violating the minimum threshold.

Urban land uses and users. Restricting 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. Domestic groundwater users may generally benefit from this minimum threshold. Many domestic groundwater users are *de minimis* users whose pumping may not be restricted by the projects and management actions adopted in this GSP. By restricting the amount of groundwater that is pumped from the Subbasin, the *de minimis* users are protected from overdraft that could impact their ability to pump groundwater.

Ecological land uses and users. Environmental groundwater uses may generally benefit from this minimum threshold. Restricting the amount of groundwater that is pumped from the Subbasin maintains groundwater supplies for environmental purposes at levels similar to present levels.

8.6.2.5 Relation to State, Federal, or Local Standards

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

8.6.2.6 Method for Quantitative Measurement of Minimum Threshold

The total amount of groundwater withdrawn from the Subbasin will be measured in a number of ways:

- Public water systems in MCWRA zones 2, 2A, and 2B with wells that have discharge pipes greater than 3 inchses report their measured groundwater usage to MCWRA, who makes these data available to SVBGSA. These data will be used to quantify municipal pumping on an annual basis.

- Agricultural pumping will be collected in one of two ways:
    1. Agricultural pumpers in MCWRA zones 2, 2A, and 2B who comply with the existing Monterey County Water Resources Agency Ordinance 3717 report their total pumping rates annually to the MCWRA. SVBGSA will work with MCWRA to obtain the Ordinance 3717 data through a coordinated reporting program such that well owners can provide a single annual reporting to fulfill the requirements of both the GSP and the existing County Ordinance 3717.
    2. Pumping will be estimated for agricultural pumpers who do not report their pumping. The annual pumping will be estimated using Monterey County crop data and crop duty estimates, times a multiplier. The multiplier is included in these calculations to disincentivize growers from pumping more than the crop duties, yet only being assessed based on the crop duties used by Monterey County.
- Domestic pumping will be estimated by multiplying the estimated number of domestic users by a water use factor. The current water use factor is assumed to be 0.39 AF/yr. per dwelling unit.

The impact of groundwater withdrawals on the amount of groundwater in storage will be checked using the updated SVIHM model. At a minimum, the model will be updated every five years with new data and the amount of pumping that occurred in the previous five years will be checked against the simulated change in groundwater storage. These verifications will indicate whether reducing pumping to the sustainable yield will result in no net reduction in groundwater storage under average hydrologic conditions, or whether the sustainable yield should be reevaluated.

8.6.3 Measurable Objectives

The measurable objective for reduction in groundwater storage is the same as the minimum threshold.

8.6.3.1 Method for Setting Measurable Objectives

By regulation, the metric used to assess reductions in groundwater storage is an amount of pumping. Although increases in groundwater storage might be beneficial in some areas, increasing groundwater storage should be achieved through increased recharge, not through future pumping reductions. Therefore, the measurable objective is set at the same level as the minimum threshold.

8.6.3.2 Interim Milestones

The reduction in storage interim milestone is set to the estimated long-term sustainable yield for each of the five-year intervals, consistent with the minimum threshold and the measurable objective.

8.6.4 Undesirable Results

8.6.4.1 Criteria for Defining Reduction in Groundwater Storage Undesirable Results

There is only one reduction in groundwater storage minimum threshold, no minimum threshold exceedances are allowed to occur and the reduction in groundwater storage undesirable result is:

> *During average hydrogeologic conditions, and as a long-term average over all hydrogeologic conditions, the total annual groundwater pumping shall not exceed the minimum threshold, which is equivalent to the long-term sustainable yield of the Subbasin.*

The minimum threshold is set at the long-term sustainable yield, which is the sustainable yield once the Subbasin has reached sustainability. It does not reflect actions or extraction limitations that may be necessary to reach sustainability. SGMA allows 20 years to reach sustainability.

The undesirable result is established for average year conditions, and as a long-term average over all hydraulic conditions. Low quantities of groundwater in storage during unanticipated future droughts or unanticipated climatic conditions do not constitute and undesirable result. The undesirable result is established for average year conditions, and as a long-term average over all hydraulic conditions. This is in alignment with the SMC BMP (DWR, 2017) which states, "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."

8.6.4.2 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 exceedance of the long-term sustainable yield, 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 excessive pumping and exceedance of the long-term sustainable yield, an undesirable result.
- **Departure from the GSP's climatic assumptions, including extensive, unanticipated drought**. Minimum thresholds are 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 cause an exceedance of the long-term sustainable yield.

8.6.4.3 Effects on Beneficial Users and Land Use

The practical effect of the reduction in groundwater storage undesirable result is no net change in groundwater storage during average hydrologic conditions and over the long term. Therefore, beneficial uses and users will have access to the same amount of water in storage that currently exists, and the undesirable result will not have a negative effect on the beneficial users and uses of groundwater. However, pumping at the long-term sustainable yield during dry years will temporarily reduce the amount of groundwater in storage. If this occurs, there could be short-term impacts from a reduction in groundwater in storage on all beneficial users and uses of groundwater.

8.7 Seawater Intrusion SMC

8.7.1 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.

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

8.7.2 Minimum Thresholds

The minimum threshold for seawater intrusion is defined as the 500 mg/L chloride concentration isocontour at the Subbasin boundary.

Error! Reference source not found. presents the minimum threshold 500 mg/L isocontour, shown in red, for seawater intrusion in the Eastside Aquifer Subbasin. The purple line shows the current extent of seawater intrusion in the 180-Foot Aquifer. The minimum threshold in this GSP

applies to any seawater intrusion into the Subbasin and does not apply to seawater intrusion outside of the Subbasin.

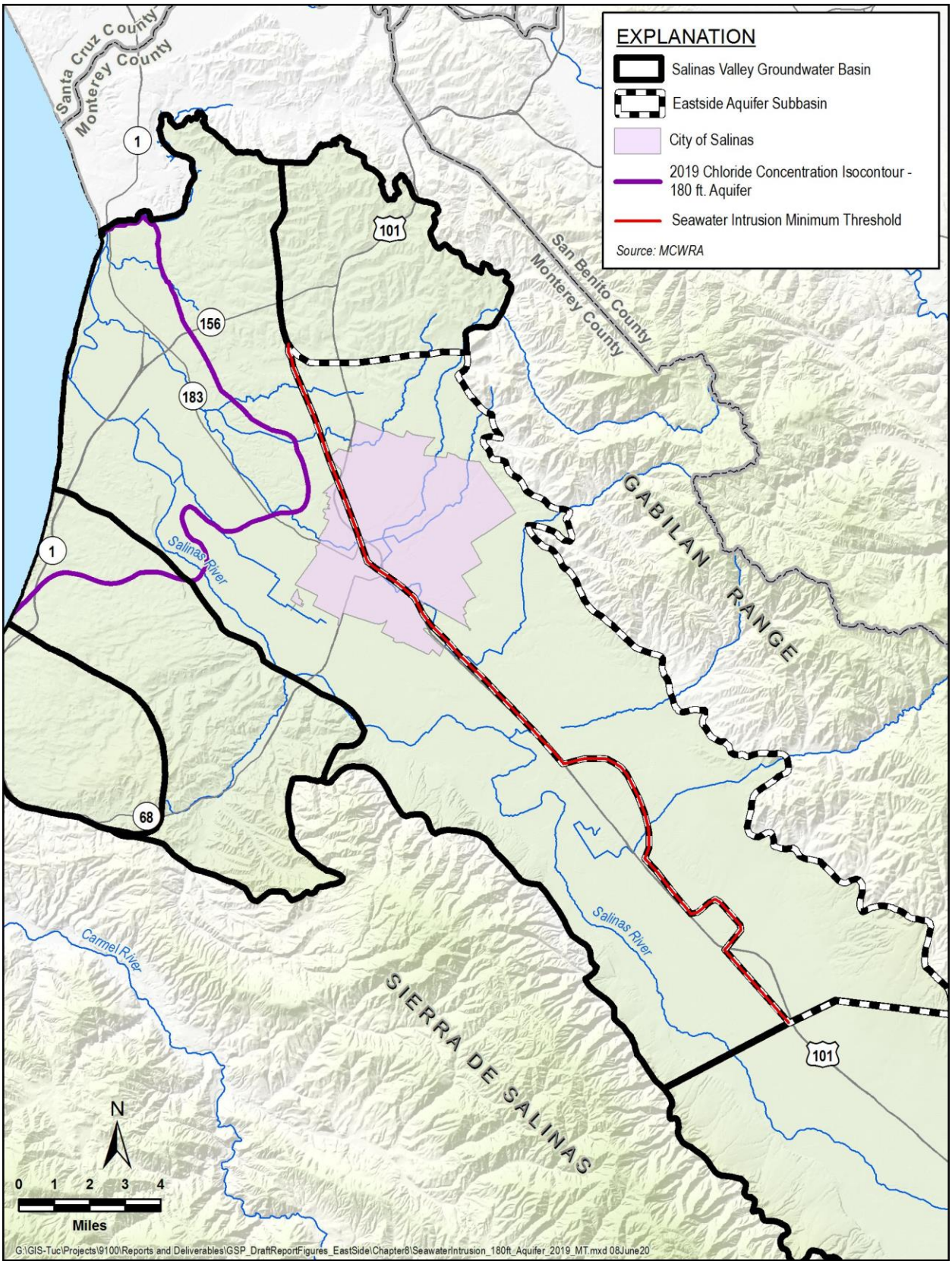

Figure 8-6. Minimum Thresholds for Seawater Intrusion in the 180-Foot Aquifer

8.7.2.1 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 odd-numbered year. The MCWRA maps define the extent of seawater intrusion as the inferred location of the 500 mg/L chloride concentration. These maps are developed through analysis and contouring of groundwater quality measured at privately-owned wells and dedicated monitoring wells near the coast. The map 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 minimum threshold and actions to avoid undesirable results will address sea level rise.

8.7.2.2 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 Eastside Aquifer Subbasin. Therefore, the seawater intrusion minimum threshold will not result in significant or undesirable groundwater elevations.
- **Change in groundwater storage.** The seawater intrusion minimum threshold does not promote additional pumping in excess of the sustainable yield. 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 water 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.
- **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 interconnected surface water.** The seawater intrusion minimum threshold does not promote additional pumping or lower groundwater elevations adjacent to

interconnected surface waters. Therefore, the seawater intrusion minimum threshold will not result in a significant or unreasonable depletion of interconnected surface waters.

8.7.2.3 Effect of Minimum Threshold on Neighboring Basins and Subbasin

The Eastside Aquifer Subbasin has three neighboring subbasins within the Salinas Valley Groundwater Basin:

- The Langley Area Subbasin to the north
- The Forebay Aquifer Subbasin to the south
- The 180/400-Foot Aquifer Subbasin to the west

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 180/400-Foot Aquifer Subbasin submitted a GSP in 2020 and the Langley Area and Forebay Aquifer Subbasins are in the process of GSP development for submittal in January 2022. Minimum thresholds for the Eastside Aquifer Subbasin will be 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.

8.7.2.4 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 Relevant Federal, State, or Local Standards

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

8.7.2.6 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 isocontour are detailed in Appendix 7C and Appendix 7D.

8.7.3 Measurable Objectives

8.7.3.1 Method for Setting Measurable Objectives

In the Eastside Aquifer Subbasin, the measurable objective for the seawater intrusion SMC is the same as the minimum threshold: preventing the 500 mg/L chloride isocontour from entering the Subbasin.

8.7.3.2 Interim Milestones

Interim milestones show how the GSA anticipates the Subbasin will gradually move from current conditions to meeting the measurable objectives over the next 20 years of implementation. Interim milestones are set for each five-year interval following GSP adoption.

The interim milestones for seawater intrusion are the same as the measurable objective, which is no exceedance of the 500 mg/L chloride isocontour at the subbasin boundary.

8.7.4 Undesirable Results

8.7.4.1 Criteria for Defining Seawater Intrusion Undesirable Results

The seawater intrusion undesirable result is a quantitative combination of chloride concentrations minimum threshold exceedances. Because even localized seawater intrusion is not acceptable, the subbasin-wide undesirable result is zero exceedances of the minimum threshold. For the Subbasin, the seawater intrusion undesirable result is:

> *There shall be zero exceedances of the minimum threshold.*

8.7.4.2 Potential Causes of Undesirable Results

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

- Increased pumping in the Eastside Aquifer Subbasin

- Increased coastal pumping in the adjacent 180/400-Foot Aquifer Subbasin that could draw seawater more inland
- Unanticipated high sea level rise

8.7.4.3 Effects on Beneficial Users and Land Use

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

8.8 Degraded Water Quality SMC

8.8.1 Locally Defined Significant and Unreasonable Conditions

Locally defined significant and unreasonable changes in groundwater quality in the Subbasin are increases in a chemical constituent resulting from direct GSA 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.

8.8.2 Minimum Thresholds

The minimum threshold for degraded water quality is based on the goal of no additional exceedances of the regulatory standards (for potable supply wells) or basin plan objectives (for agricultural supply wells) in existing wells.

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 agricultural supply wells are based on the water quality objectives listed in the Water Quality Control Plan for the Central Coastal Basin (CCRWQCB, 2019). The minimum threshold values for the constituents of concern for all three sets of wells are provided in **Error! Reference source not found.**. 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 constituent of concern.

Table 8-4. Degradation of Groundwater Quality Minimum Thresholds for DDW Public Water System Supply Wells, ILRP On-Farm Domestic Wells, and ILRP Agricultural Supply Wells

Constituent of Concern (COC)	Minimum Threshold/Measurable Objective – Number of Wells Exceeding Regulatory Standard from latest sample
DDW Wells	
Arsenic	4
Lindane	1
Di(2-ethylhexyl)phthalate	1
Benzo(a)Pyrene	1
1,2 Dibromo-3-chloropropane	3
Dinoseb	3
Iron	5
Hexachlorobenzene	1
Manganese	2
Nitrate (as nitrogen)	8
Specific Conductance	1
1,2,3-Trichloropropane	10
Total Dissolved Solids	3
Vinyl Chloride	8
Domestic ILRP Wells	
Chloride	3
Iron	4
Manganese	1
Nitrate (as nitrogen)	91
Nitrate + Nitrite (sum as nitrogen)	17
Specific Conductance	27
Sulfate	2
Total Dissolved Solids	22
Irrigation ILRP Wells	
Chloride	4
Iron	1
Manganese	2

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

As noted in §354.28 (c)(4) of the GSP Regulations, minimum thresholds are based on a degradation of groundwater quality, not an improvement of groundwater quality (CCR, 2016). 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. Constituents of concern must meet two 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 constituents of concern (COCs) that may affect drinking water supply wells include:

- 1,2 dibromo-3-chloropropane
- 1,2,3-trichloropropane
- arsenic
- benzo(a)pyrene
- chloride
- di(2-ethylhexyl)phthalate
- dinoseb
- hexachlorobenzene
- iron
- lindane
- manganese
- nitrate (as nitrogen)
- nitrate + nitrite (sum as nitrogen)
- specific conductance
- sulfate
- total dissolved solids
- vinyl chloride

The constituents of concern for agricultural supply wells that occur in the Subbasin and are known to cause reductions in crop production when irrigation water includes them in concentrations above agricultural water quality objectives include:

- chloride
- iron

- manganese

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

- Public water system supply wells regulated by the SWRCB Division of Drinking Water.
- On-Farm Domestic wells monitored as part of ILRP. This dataset was obtained from the SWRCB through the GeoTracker GAMA online portal. The ILRP data were separated into two data sets, one for domestic wells and the other for agricultural 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 in 2020 with the adoption of Ag Order 4.0. At that time, the new ILRP domestic monitoring network will be incorporated into this GSP, replacing the current network, for water quality monitoring.
- Agricultural supply wells monitored as part of ILRP. As mentioned above, this dataset was obtained from the SWRCB through the GeoTracker GAMA online portal. Like the domestic well dataset, the IRLP agricultural monitoring well network will change with the adoption of Ag Order 4.0.

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 domestic wells but are not detrimental to agricultural irrigation wells. The constituents monitored in each well network are indicated by an X in Table 8-5. An X does not necessarily indicate that the constituents have been found above the regulatory standard in that monitoring network.

Table 8-5. Summary of Constituents Monitored in Each Well Network

Constituent	Public Water System Supply	On-Farm Domestic[1]	Agricultural Supply
Boron	X	X	X
Chloride	X	X	X
Iron	X	X	X
Manganese	X	X	X
Nitrite	X	X	X
Nitrate (as nitrogen)	X	X	X
Nitrate + Nitrite (sum as nitrogen)		X	X
Specific Conductance	X	X	X
Sulfate	X	X	X
Total Dissolved Solids	X	X	X
Silver	X		
Aluminum	X		
Alachlor	X		
Arsenic	X		
Atrazine	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		
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		
1,1,2-Trichloro-1,2,2-Trifluoroethane	X		
Foaming Agents (MBAS)	X		
Glyphosate	X		
Hexachlorocyclopentadiene	X		
Hexachlorobenzene	X		
Heptachlor	X		
Mercury	X		
Molinate	X		
Methyl-tert-butyl ether (MTBE)	X		
Methoxychlor	X		
Nickel	X		
Oxamyl	X		
1,1,2,2-Tetrachloroethane	X		
Perchlorate	X		
Polychlorinated Biphenyls	X		
Tetrachloroethene	X		
Pentachlorophenol	X		
Picloram	X		
Antimony	X		
Selenium	X		

2,4,5-TP (Silvex)	X		
Simazine	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		
Thiobencarb	X		
Thallium	X		
Toxaphene	X		
Vinyl Chloride	X		
Xylenes	X		
Zinc	X		

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

8.8.2.2 Relationship between Individual Minimum Thresholds and Relationship to Other Sustainability Indicators

Preventing migration of poor groundwater quality may limit activities needed to achieve minimum thresholds for other sustainability indicators.

- **Chronic lowering of groundwater levels**. Groundwater quality minimum thresholds could influence groundwater elevation minimum thresholds by limiting the types of water that can be used for recharge to raise groundwater elevations. Water used for recharge cannot exceed any groundwater quality standards.
- **Change in groundwater storage**. The groundwater quality minimum thresholds do not promote pumping in excess of the sustainable yield. Therefore, the groundwater quality minimum thresholds will not result in an exceedance of the groundwater storage minimum threshold.
- **Seawater intrusion**. The 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.
- **Subsidence**. The 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 interconnected surface waters.** The groundwater quality minimum thresholds do not promote additional pumping or lower groundwater elevations adjacent to interconnected surface waters. Therefore, the groundwater quality minimum thresholds will not result in a significant or unreasonable depletion of interconnected surface waters.

8.8.2.3 Effect of Minimum Thresholds on Neighboring Basins and Subbasins

The Eastside Aquifer Subbasin has three neighboring subbasins within the Salinas Valley Groundwater Basin:

- The Langley Area Subbasin to the north
- The Forebay Aquifer Subbasin to the south
- The 180/400-Foot Aquifer Subbasin to the west

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 180/400-Foot Aquifer Subbasin submitted a GSP in 2020 and the Langley Area and Forebay Aquifer Subbasins are in the process of GSP development for submittal in January 2022. Minimum thresholds for the Eastside Aquifer Subbasin will be 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.

8.8.2.4 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 from 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 constituents of concern in additional drinking water supply wells from 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 constituents of concern in additional drinking water supply wells from 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 constituents of concern from migrating will prevent unwanted contaminants from impacting ecological groundwater uses.

8.8.2.5 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 Method for Quantitative Measurement of Minimum Thresholds

Degradation of groundwater quality minimum thresholds will be directly measured from existing public water system supply wells, domestic wells, or agricultural supply wells. Groundwater quality will be measured through existing monitoring programs 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 MCLs, SMCLs, and water quality objectives will be centered around the constituents of concern identified above. If during review of the water quality data additional constituents appear to exceed MCLs and SMCLs, minimum thresholds and measurable objectives will be developed for these additional constituents.

8.8.3 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 **Error! Reference source not found.**.

8.8.3.1 Method 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 8.7.2.4.

8.8.3.2 Interim Milestones

Interim milestones show how the GSA anticipates the Subbasin will gradually move from current conditions to meeting the measurable objectives over the next 20 years of implementation. Interim milestones are set for each five-year interval following GSP adoption.

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 Undesirable Results

8.8.4.1 Criteria for Defining Undesirable Results

By regulation, the degradation of groundwater quality undesirable result is a quantitative combination of groundwater quality minimum threshold exceedances. For the Subbasin, any groundwater quality degradation 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 they do not constitute an undesirable result. Therefore, the degradation of groundwater quality undesirable result is:

> *There shall be no additional minimum threshold exceedances beyond existing groundwater quality conditions during any one year as a direct result of projects or management actions taken as part of GSP implementation.*

If the GSA has not implemented any projects in the Subbasin, the GSA shall assume that any minimum threshold exceedances are not be the result of GSA actions and do not constitute an undesirable result. If minimum thresholds are exceeded after the GSA have implemented projects in the Subbasin, the GSA will review other, nearby groundwater quality and groundwater gradients to assess if the exceedance resulted from GSA activities, or was independent of SGMA activities. The general approach to assess if a minimum threshold exceedance is due to GSA action will include:

- If no projects have been initiated in a subbasin, or near the groundwater quality impact, then the SVBGSA will assume 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 changes in groundwater gradients due to GSA activities may have moved existing constituents to exceed 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.

8.8.4.2 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 constituents of concern 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 constituents of concern 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 will lead to an undesirable result.

8.8.4.3 Effects on Beneficial Users and Land Use

The undesirable result for degradation of groundwater quality is avoiding groundwater degradation due to actions directly resulting from GSP implementation. 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, however, only applies to groundwater quality changes directly caused by projects or management actions implemented as part of this GSP. This undesirable result does not apply to groundwater quality changes that occur due to other causes.

8.9 Land Subsidence SMC

8.9.1 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 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.

8.9.2.1 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 (Brezing, 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 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 subsidence minimum threshold will not decrease groundwater elevations and therefore will not result in significant or unreasonable groundwater elevations.
- **Change in groundwater storage**. The 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 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 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 interconnected surface waters**. The subsidence minimum threshold does not promote additional pumping or lower groundwater elevations adjacent to interconnected surface waters. Therefore, the subsidence minimum threshold will not result in a significant or unreasonable depletion of interconnected surface waters.

8.9.2.3 Effect of Minimum Thresholds on Neighboring Basins and Subbasins

The Eastside Aquifer Subbasin has three neighboring subbasins within the Salinas Valley Groundwater Basin:

- The Langley Area Subbasin to the north
- The Forebay Aquifer Subbasin to the south
- The 180/400-Foot Aquifer Subbasin to the west

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 180/400-Foot Aquifer Subbasin submitted a GSP in 2020 and the Langley Area and Forebay Aquifer Subbasins are in the process of GSP development for submittal in January 2022. Minimum thresholds for the Eastside Aquifer Subbasin will be 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.

8.9.2.4 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 Relation to State, Federal, or Local Standards

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

8.9.2.6 Method for Quantitative Measurement of Minimum Threshold

Minimum thresholds will be assessed using DWR-supplied InSAR data.

8.9.3 Measurable Objectives

The measurable objective for ground surface subsidence represents 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.

8.9.3.1 Method for Setting Measurable Objectives

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

8.9.3.2 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 Undesirable Results

8.9.4.1 Criteria for Defining Undesirable Results

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

> *In any one year, there will be zero exceedances of the minimum thresholds for 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.

8.9.4.2 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 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 Depletion of Interconnected Surface Water SMC

Areas with interconnected surface water occur where shallow groundwater may be connected to the surface water system. This SMC applies only to locations of interconnected surface water, as shown in panel A and panel B of Figure 8-7.

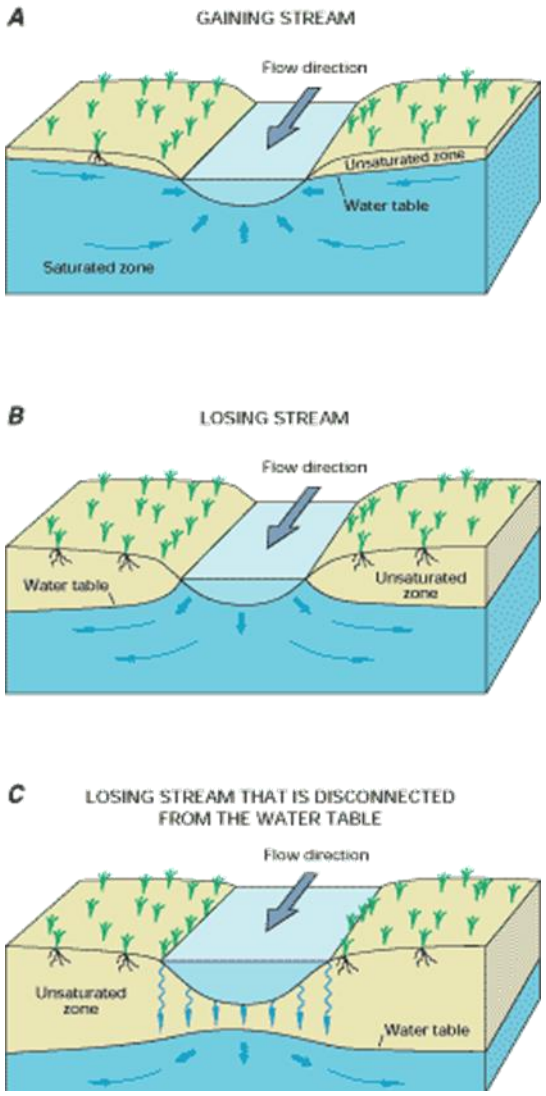

Figure 8-7. Conceptual Representation of Interconnected Surface Water (Winter, et al., 1999)

8.10.1 Locally Defined Significant and Unreasonable Conditions

Locally defined significant and unreasonable depletion of interconnected surface water in the Subbasin is defined as:

- Depletions that would result in an 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 more than observed in 2015, as measured by shallow groundwater elevations near locations of interconnected surface water, is not unreasonable, although it may be significant.

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

8.10.2 Minimum Thresholds

The minimum threshold for depletion of interconnected surface water is set to the depletion rates observed in 2015, estimated by proxy using shallow groundwater elevations near streams. The locations of interconnected surface water should remain the same as 2015 conditions.

Figure 8-8 shows locations of interconnected surface water in the Eastside Aquifer Subbasin. The blue cells indicate areas where surface water is connected to groundwater for more than 50 percent of the model period and are designated as areas of interconnected surface water. The areas showing interconnection less than 50 percent of the model period require further evaluation to determine whether the minimum threshold applies, these areas are shown as clear cells on Figure 8-8. The gray cells show locations of canals, drains, or connectors and were excluded from the analysis. This map does not show the extent of interconnection which still needs to be estimated for the minimum threshold and measurable objective years when the monitoring network is established.

As discussed in Chapter 7, a monitoring network for interconnected surface water composed of shallow groundwater monitoring wells is in the process of development. Existing shallow wells will be added to the monitoring network where possible and will be supplemented with new shallow wells. The monitoring network is dependent on the location and magnitude of stream reaches determined by the SVIHM. Once the monitoring network is fully established, SMC will be determined using interpolated values from the groundwater elevation contour maps for wells that do not have shallow groundwater elevation measurements for the minimum threshold and measurable objective years.

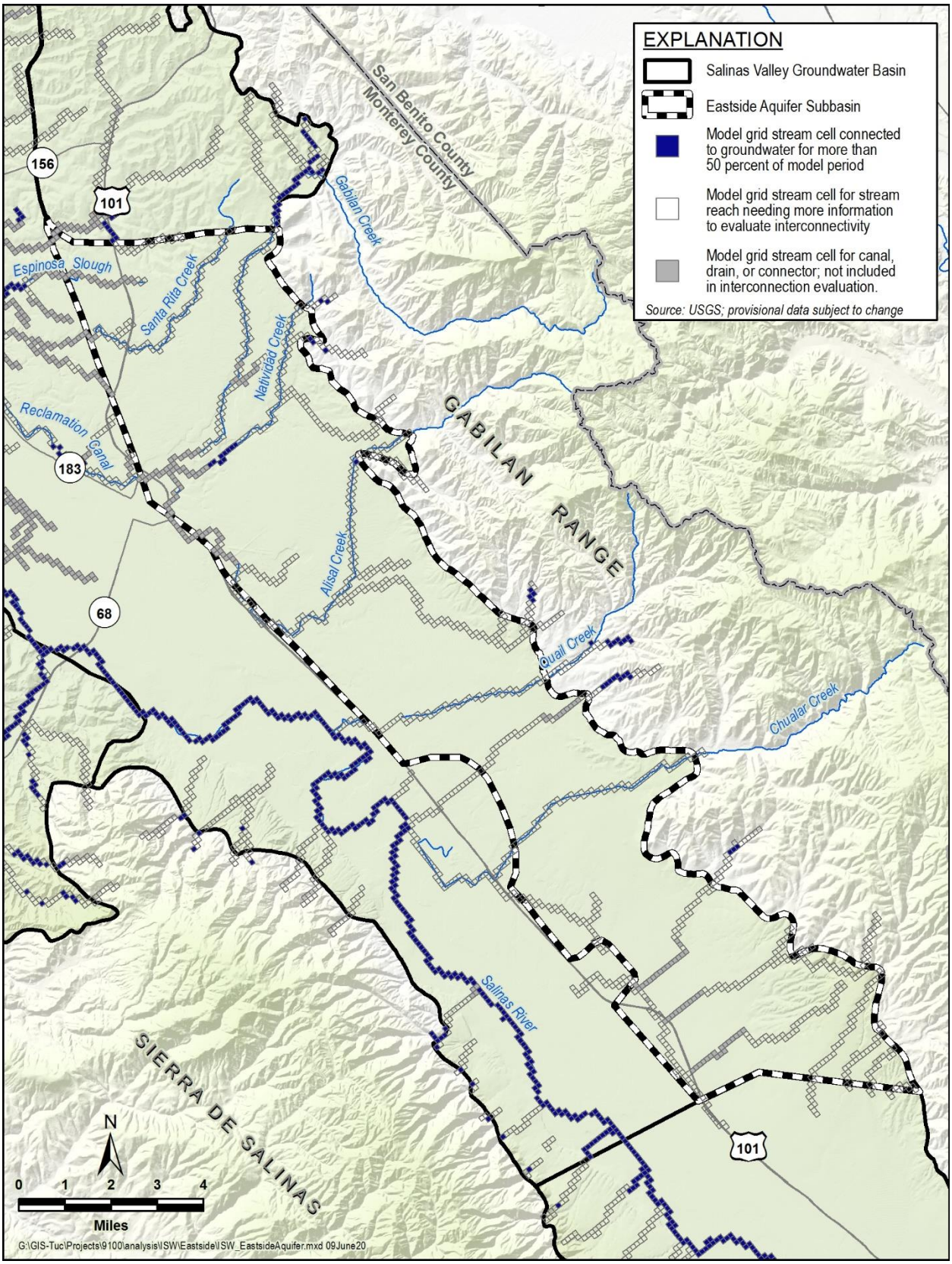

Figure 8-8. Locations of Interconnected Surface Water

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

The various beneficial uses and users of surface waters were addressed when setting the interconnected surface water 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 of 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 interconnected surface waters 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.

Locations of Interconnected Surface Waters

The SVIHM is used to identify the locations of ISWs 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 4.

Riparian water rights holders

Table 8-6 provides a summary of water diversions reported to the SWRCB by water rights holders on the Salinas River and its tributaries within the Eastside Aquifer Subbasin. The diversion data were obtained from queries of the SWRCB eWRIMS water rights management system. The diversion data are elf-reported by water-rights holders with points of diversion located within the Subbasin. Any riparian rights holders are reported in Table 8-6.

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 8-6. Reported Surface Water Diversions in the Eastside Aquifer Subbasin

Diversions (Acre-Feet)	2011	2012	2013	2014	2015	2016	2017	2018	2019
Statement of Diversion and Reported Riparian Diversions	5	0	1,039	1,018	902	751	598	644	548

Appropriative water rights holders

There are no appropriative water right holders in the Eastside 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

There are no known flow prescriptions on any surface water bodies in the Subbasin. Therefore, the current level of depletion has not violated any ecological flow requirements. This is not meant to imply that depletions do not impact potential species living in or near surface water bodies in the Subbasin. However, any impacts that may be occurring have not risen to the level that triggers regulatory intervention. Therefore, the impacts from current rates of depletion on ecological surface water users is not unreasonable.

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 Relationship between Individual Minimum Thresholds and Relationship to Other Sustainability Indicators

The minimum threshold for depletion of surface water will be set in the shallow monitoring wells within the Subbasin at 2015 groundwater elevations. 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 surface water minimum threshold could influence other sustainability indicators as follows:

- **Chronic lowering of groundwater levels**. Capping the amount of surface water depletion could limit the amount of natural streamflow percolation that would otherwise maintain groundwater elevations. However, the surface water depletion minimum thresholds do not directly influence the chronic lowering of groundwater elevations minimum thresholds.
- **Change in groundwater storage**. The depletion of interconnected surface water minimum threshold may require limiting the amount of pumping near rivers and streams. This limitation on pumping could also reduce losses of groundwater storage. The depletion of surface water minimum threshold is therefore consistent with the change in groundwater storage minimum threshold.
- **Seawater intrusion**. The interconnected surface water minimum thresholds do not promote additional pumping that could exacerbate seawater intrusion. Therefore, seawater intrusion will not be affected by the depletion of interconnected surface water minimum thresholds.
- **Degraded water quality**. The interconnected surface water minimum thresholds do not promote decreasing groundwater elevations that lead to exceedance of water quality minimum thresholds. Therefore, water quality will not be affected by the depletion of interconnected surface water minimum thresholds.
- **Subsidence**. The interconnected surface water minimum thresholds do not promote additional pumping that could cause subsidence. Therefore, subsidence will not be affected by the depletion of interconnected surface water minimum thresholds.

8.10.2.3 Effect of Minimum Thresholds on Neighboring Basins and Subbasins

The Eastside Aquifer Subbasin has three neighboring subbasins within the Salinas Valley Groundwater Basin:

- The Langley Area Subbasin to the north
- The Forebay Aquifer Subbasin to the south
- The 180/400-Foot Aquifer Subbasin to the west

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 180/400-Foot Aquifer Subbasin submitted a GSP in 2020 and the Langley Area and Forebay Aquifer Subbasins are in the process of GSP development for submittal in January 2022. Minimum thresholds for the Eastside Aquifer Subbasin will be 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.

8.10.2.4 Effect on Beneficial Uses and Users

The depletion of surface water minimum thresholds may have varied effects on beneficial users and land uses in the Subbasin. Creeks in the Eastside Aquifer Subbasin are ephemeral, so uses and users of any ISW are seasonal.

Agricultural land uses and users. The depletion of surface water minimum threshold prevents lowering of groundwater elevations adjacent to certain parts of streams. This has the effect of limiting the amount of groundwater pumping in these areas. Limiting the amount of groundwater pumping may limit the quantity and type of crops that can be grown in these adjacent to streams.

Urban land uses and users. The depletion of surface water minimum threshold prevents lowering of groundwater elevations adjacent to certain parts of streams. This may limit the amount of urban pumping near streams, which could limit urban growth in these areas. If pumping is limited, 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 surface water minimum threshold may benefit existing domestic land users and uses by maintaining shallow groundwater elevations near streams and protecting the operability of relatively shallow domestic wells. However, these minimum thresholds may limit the number of new domestic wells that can be installed near rivers or streams to limit the additional drawdown from the new wells.

Ecological land uses and users. The depletion of surface water minimum thresholds likely benefits ecological uses and users by preventing further degradation of ecological impacts from groundwater pumping. Additionally, by setting future groundwater levels at or above recent lows, there should be less impact to GDEs than has been seen to date. Therefore, GDEs are protected from future significant and unreasonable impacts due to low groundwater levels, regardless of the GDE location.

8.10.2.5 Relation to State, Federal, or Local Standards

The minimum thresholds are developed in accordance with NMFS streamflow requirements and known water rights litigation and enforcement complaints.

8.10.2.6 Method for Quantitative Measurement of Minimum Threshold

The SVIHM is used to preliminarily identify areas of interconnected surface waters. Groundwater elevations measured in shallow wells adjacent to these areas of interconnected surface water will serve as the primary approach for monitoring depletion of surface water. 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 Eastside 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 Measurable Objectives

The measurable objective for depletion of interconnected surface water is the same as the minimum threshold. The measurable objective is set at the 2015 shallow groundwater levels.

8.10.3.1 Method for Setting Measurable Objectives

The Eastside Aquifer Subbasin generally does not have large areas where interconnected surface water occurs. Therefore, there is no need to set a measurable objective different than the minimum threshold.

8.10.3.2 Interim Milestones

Depletion of interconnected surface water measurable objectives are set at recent conditions; there is no anticipated increase or decrease in surfaced water depletion during GSP implementation. Therefore, the expected interim milestones are identical to 2015 conditions.

8.10.4 Undesirable Results

8.10.4.1 Criteria for Defining Undesirable Results

By regulation, the depletion of interconnected surface water undesirable result is a quantitative combination of minimum threshold exceedances. For the Subbasin, the undesirable result is:

> *During average hydrogeologic conditions, and as a long-term average over all hydrogeologic conditions, the depletion of interconnected surface waters shall not exceed the minimum threshold in more than 15% of wells used to monitor shallow groundwater. This percentage will be reevaluated when the monitoring network if fully established.*

The undesirable result is established for average year conditions, and as a long-term average over all hydraulic conditions. Depletion of interconnected surface water during unanticipated future droughts or unanticipated climatic conditions do not constitute and undesirable result. This is in alignment with the SMC BMP (DWR, 2017) which states, "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."

8.10.4.2 Potential Causes of Undesirable Results

Conditions that may lead to an undesirable result for the depletion of interconnected surface waters 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.
- **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 Effects on Beneficial Users and Land Use

The depletion of surface water undesirable result is to have no net change in surface water depletion during average hydrologic conditions and over the long-term, as determined by shallow groundwater elevations. Therefore, during average hydrologic conditions and over the long-term, the undesirable result will not have a negative effect on the beneficial users and uses of groundwater. However, pumping during dry years could temporarily increase rates of surface water depletions. Therefore, there could be short-term impacts on all beneficial users and uses of the surface water during dry years.