

Salinas Valley: Eastside Aquifer Subbasin Groundwater Sustainability Plan – Amendment 1

VOLUME 2

Chapter 5. Groundwater Conditions

Chapter 6. Water Budgets

Chapter 7. Monitoring Networks

Chapter 8. Sustainable Management Criteria

Prepared for:

Salinas Valley Basin Groundwater Sustainability Agency

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5 GROUNDWATER CONDITIONS

Chapter 5 describes the Eastside Subbasin groundwater conditions historically and at the beginning of GSP implementation, in accordance with the GSP Regulations § 354.16. This chapter focuses on information required by the GSP regulations and that is important for developing an effective plan to achieve sustainability. Chapter 5 provides a description of groundwater conditions historically and at the start of GSP implementation at a scale and level of detail appropriate for meeting the GSP sustainability requirements under SGMA.

In this GSP, historical conditions are conditions prior to the January 1, 2015, start of SGMA, and current conditions are conditions at the start of GSP implementation – referred to as GSP baseline in this chapter. The GSP baseline includes conditions generally occurring between 2015 and 2019. Where data does not exist for 2015 – 2019, more recent data has been incorporated. Otherwise, more recent data is reported in GSP annual reports and 5-year GSP periodic evaluations.

This chapter is organized to align the groundwater conditions descriptions with the 6 sustainability indicators relevant to this Subbasin, including:

1. Chronic lowering of groundwater levels
2. Changes in groundwater storage
3. Seawater intrusion
4. Groundwater quality
5. Land subsidence
6. Depletion of ISW due to pumping

In addition, in line with GSP Regulations § 356.4 assessment requirements, this chapter includes a section on water use.

5.1 Groundwater Elevations

5.1.1 Data Sources

The assessment of groundwater elevation conditions is largely based on data collected by MCWRA from 1944 through the present. MCWRA's monitoring programs are described in Chapter 3.

Groundwater elevation data are analyzed and presented with 3 sets of graphics:

- Maps of groundwater elevation contours show the geographic distribution of groundwater elevations at a specific time. These contours represent the elevation of the groundwater in feet, using the North American Vertical Datum of 1988 (NAVD88). The contour interval

is 10 feet, meaning each blue line represents an area where groundwater elevations are either 10 feet higher or 10 feet lower than the next blue line (Figure 5-1 to Figure 5-11). These figures are summarized in Table 5-1.

- Hydrographs of individual wells show the variations in groundwater elevations at individual wells over an extended period (Figure 5-13).
- Vertical hydraulic gradients in a single location assess the potential for vertical groundwater flow and its direction, as discussed in Section 5.1.4.

5.1.2 Groundwater Elevation Contours and Horizontal Groundwater Gradients

MCWRA biannually produces groundwater elevation contour maps for the Salinas Valley using data from their annual August trough and fall measurement programs. August groundwater elevations are contoured to assess the driving force of seawater intrusion because this is usually when the aquifer is the most stressed. The August measurements represent seasonal low conditions in the Subbasin.

MCWRA also contours fall groundwater elevations because these measurements are taken from mid-November to December after the end of the irrigation season and before seasonal recharge from winter precipitation increases groundwater levels. The fall measurements represent neutral conditions in the Subbasin. The true seasonal high varies year to year, typically occurring between January and March as a result of winter rain recharge and decreased groundwater pumping from agricultural wells. Some wells monitored during this period may become inaccessible during the rainy season, but the fall measurement program includes more wells and covers a larger geographic extent than the August trough program. Although fall measurements do not represent the true seasonal high, they are used as a surrogate for seasonal high conditions.

In this section, groundwater elevations from 2019 are used to illustrate baseline conditions at the start of GSP implementation and 1995 is used for historical conditions.

Because MCWRA does not produce groundwater elevation contour maps using spring groundwater elevations, new maps of spring groundwater levels were developed for this GSP. Salinas Valley. The MCWRA Quarterly Salinas Valley Water Conditions report demonstrates that in 2019, the seasonal high groundwater elevations occurred in February (MCWRA, 2019). In 1995, data collected in March were more representative of seasonal high groundwater elevations.

The following 12 maps listed in Table 5-1 present the GSP baseline (2019) and historical (1995) groundwater elevation contours for the Shallow and Deep Zones of the principal aquifer. The principal aquifer in the Eastside Subbasin is the Basin Fill Aquifer as it is in other SVBGSA subbasins, but within the Eastside Subbasin it is often referred to as the Eastside Aquifer.

The groundwater elevation contours only cover the portions of the Subbasin monitored by MCWRA. As a result, contours do not always extend to subbasin margins.

Table 5-1. Figures Showing GSP Baseline and Historical Groundwater Elevation Contours

Figure #	Year	Season	Zone
Figure 5-1	GSP Baseline (2019)	Spring	Shallow
Figure 5-2	GSP Baseline (2019)	August Trough	Shallow
Figure 5-3	GSP Baseline (2019)	Fall	Shallow
Figure 5-4	GSP Baseline (2019)	Spring	Deep
Figure 5-5	GSP Baseline (2019)	August Trough	Deep
Figure 5-6	GSP Baseline (2019)	Fall	Deep
Figure 5-7	Historical (1995)	Spring	Shallow
Figure 5-8	Historical (1995)	August Trough	Shallow
Figure 5-9	Historical (1995)	Fall	Shallow
Figure 5-10	Historical (1995)	Spring	Deep
Figure 5-11	Historical (1995)	August Trough	Deep
Figure 5-12	Historical (1995)	Fall	Deep

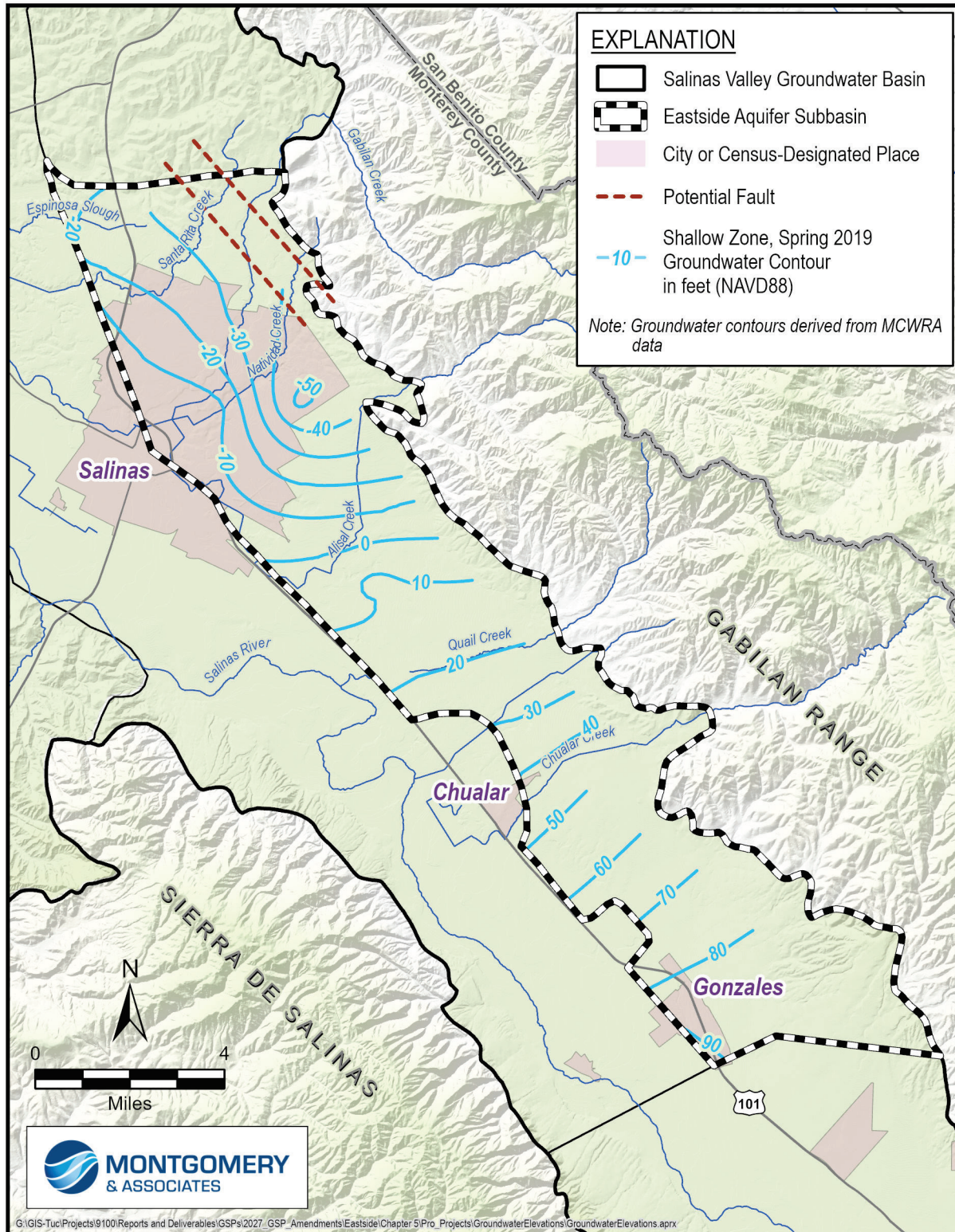


Figure 5-1. Spring 2019 Shallow Zone Groundwater Elevation Contours

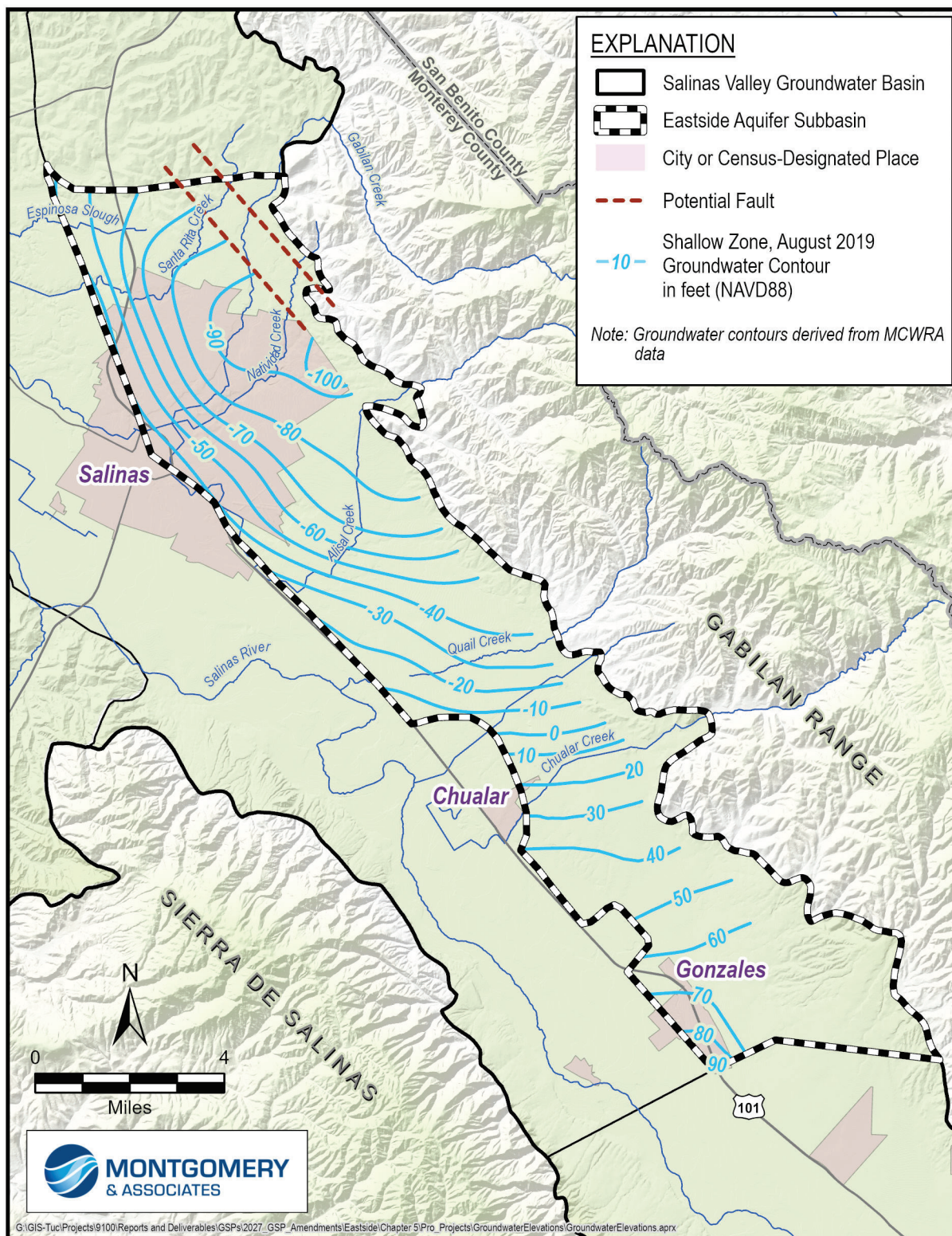


Figure 5-2. August 2019 Shallow Zone Groundwater Elevation Contours

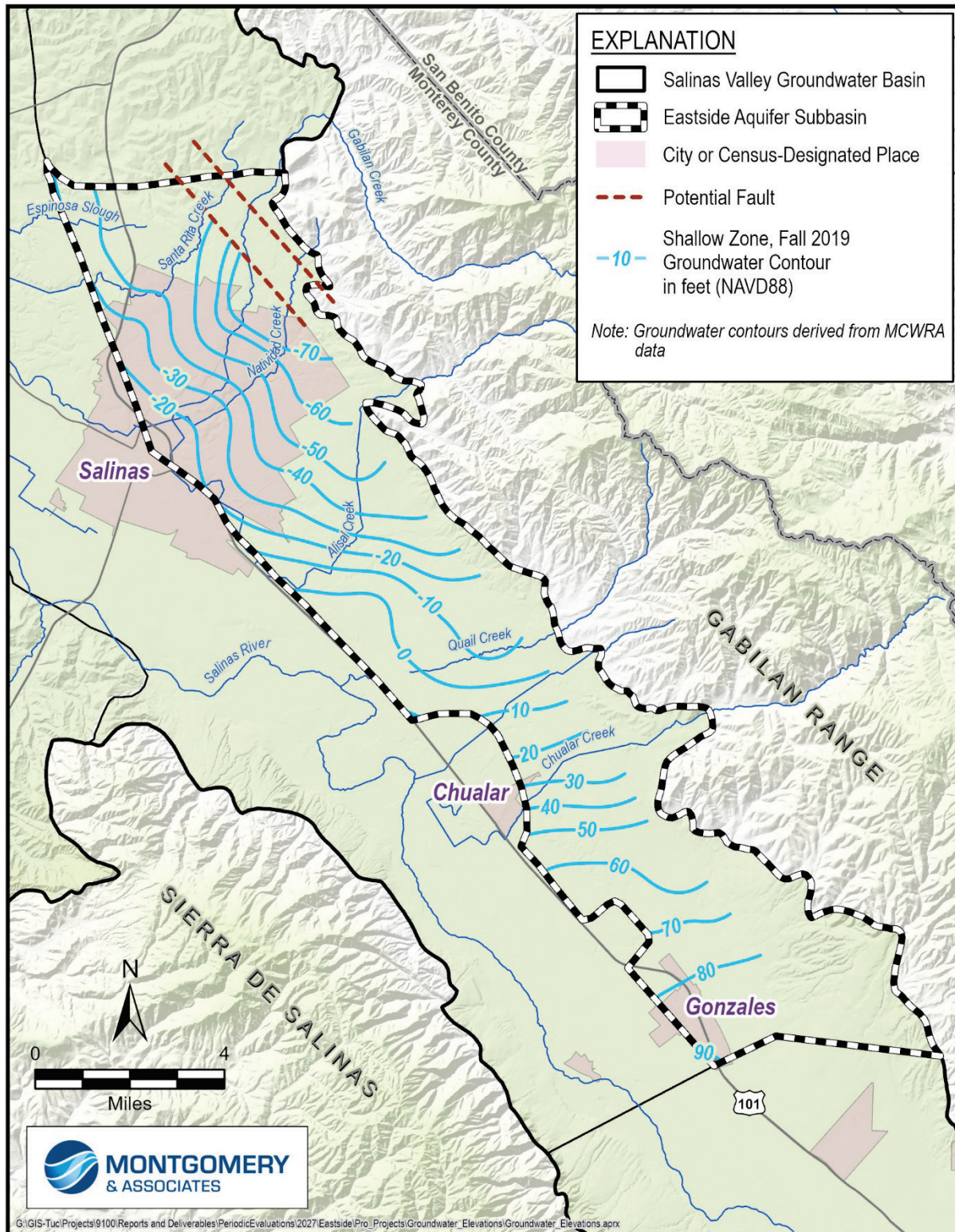


Figure 5-3. Fall 2019 Shallow Zone Groundwater Elevation Contours

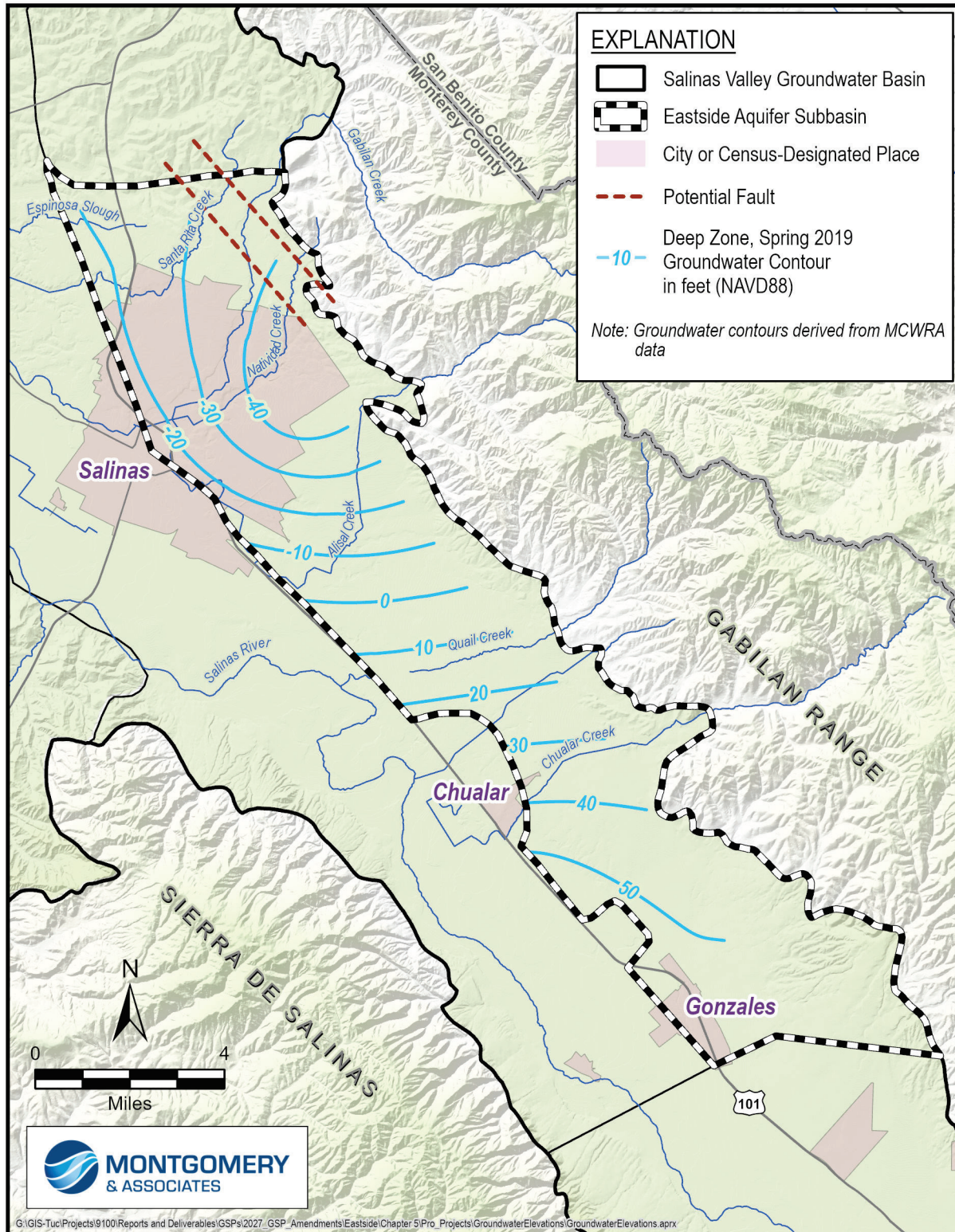


Figure 5-4. Spring 2019 Deep Zone Groundwater Elevation Contours

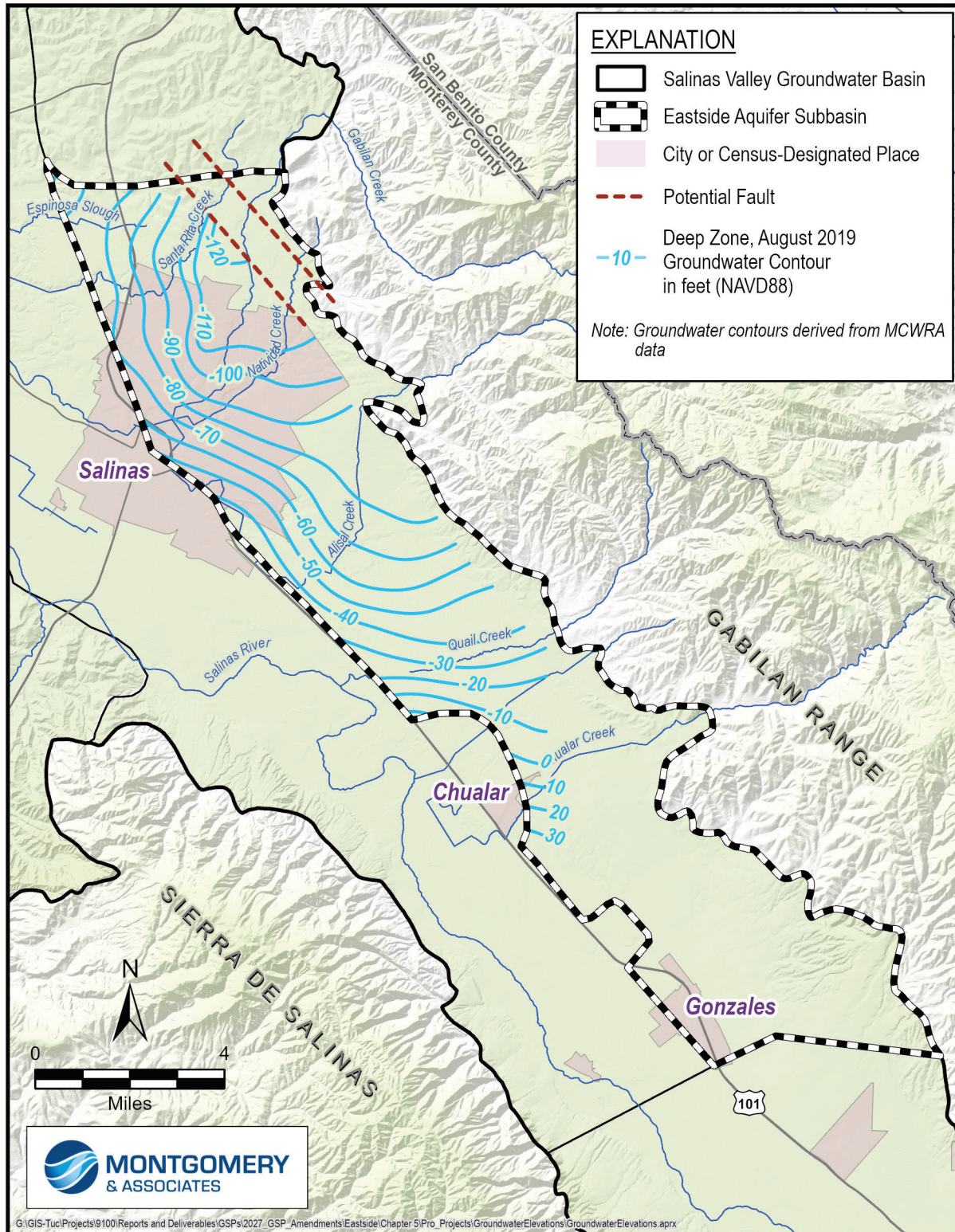


Figure 5-5. August 2019 Deep Zone Groundwater Elevation Contours

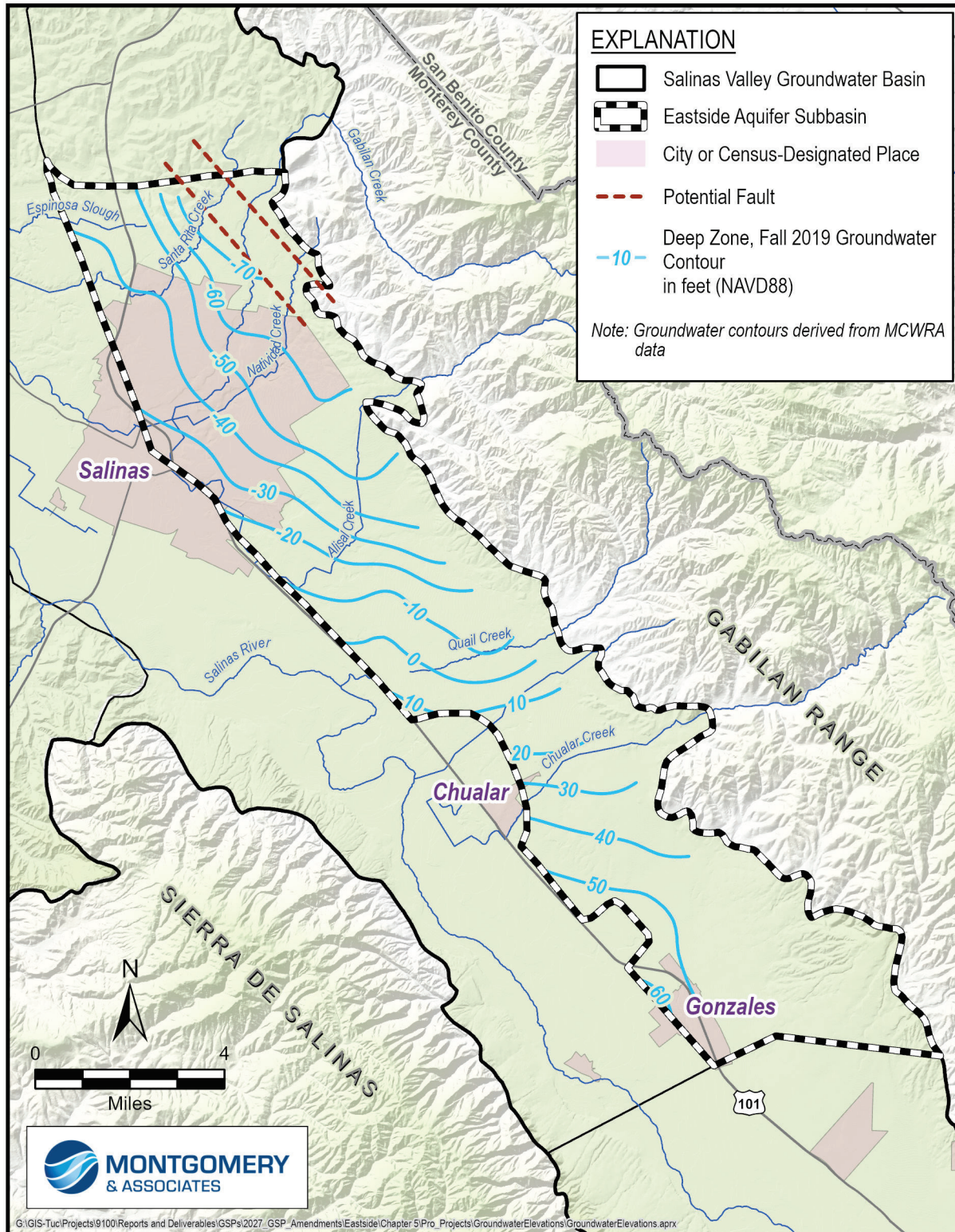


Figure 5-6. Fall 2019 Deep Zone Groundwater Elevation Contours

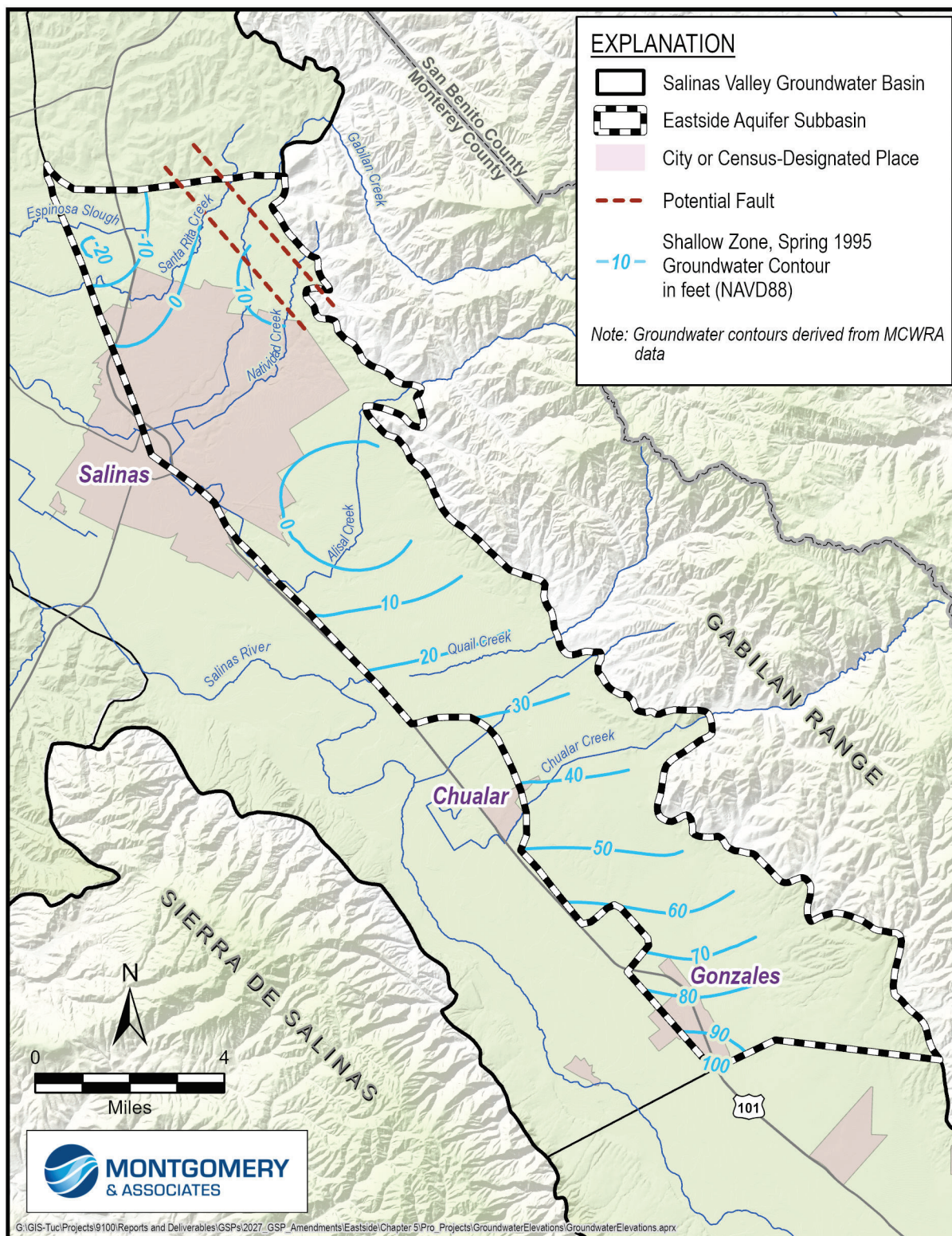


Figure 5-7. Spring 1995 Shallow Zone Groundwater Elevation Contours

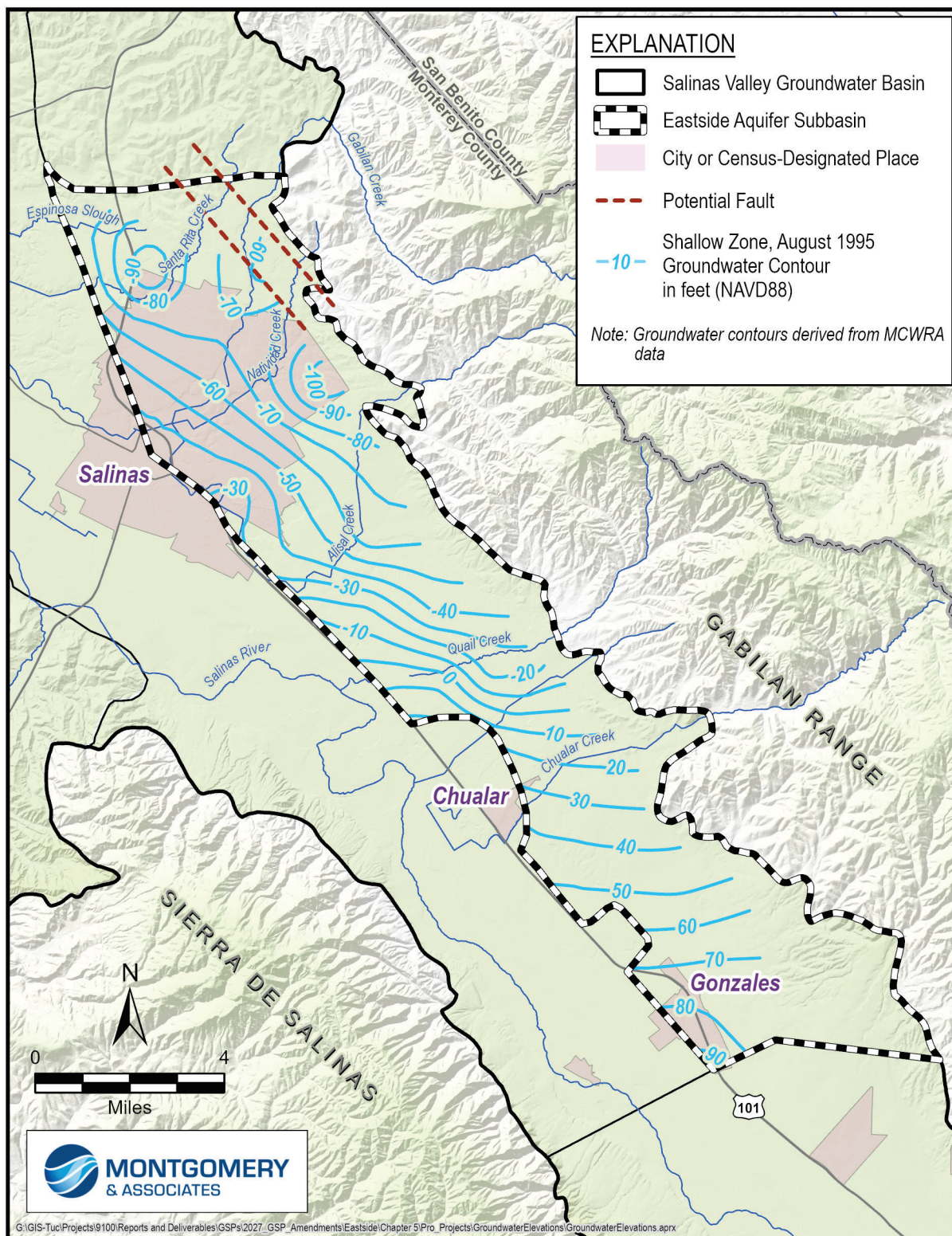


Figure 5-8. August 1995 Shallow Zone Groundwater Elevation Contours

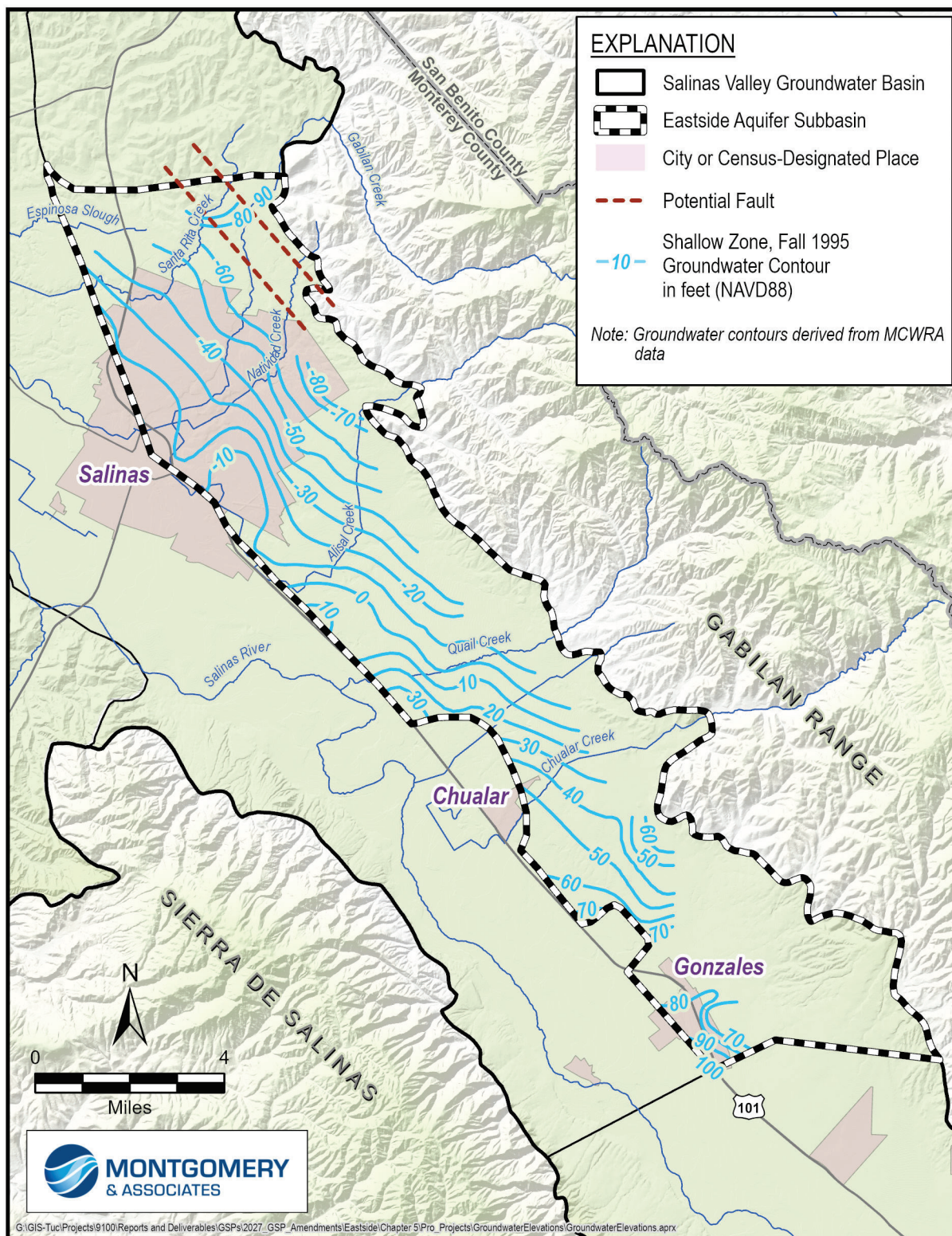


Figure 5-9. Fall 1995 Shallow Zone Groundwater Elevation Contours

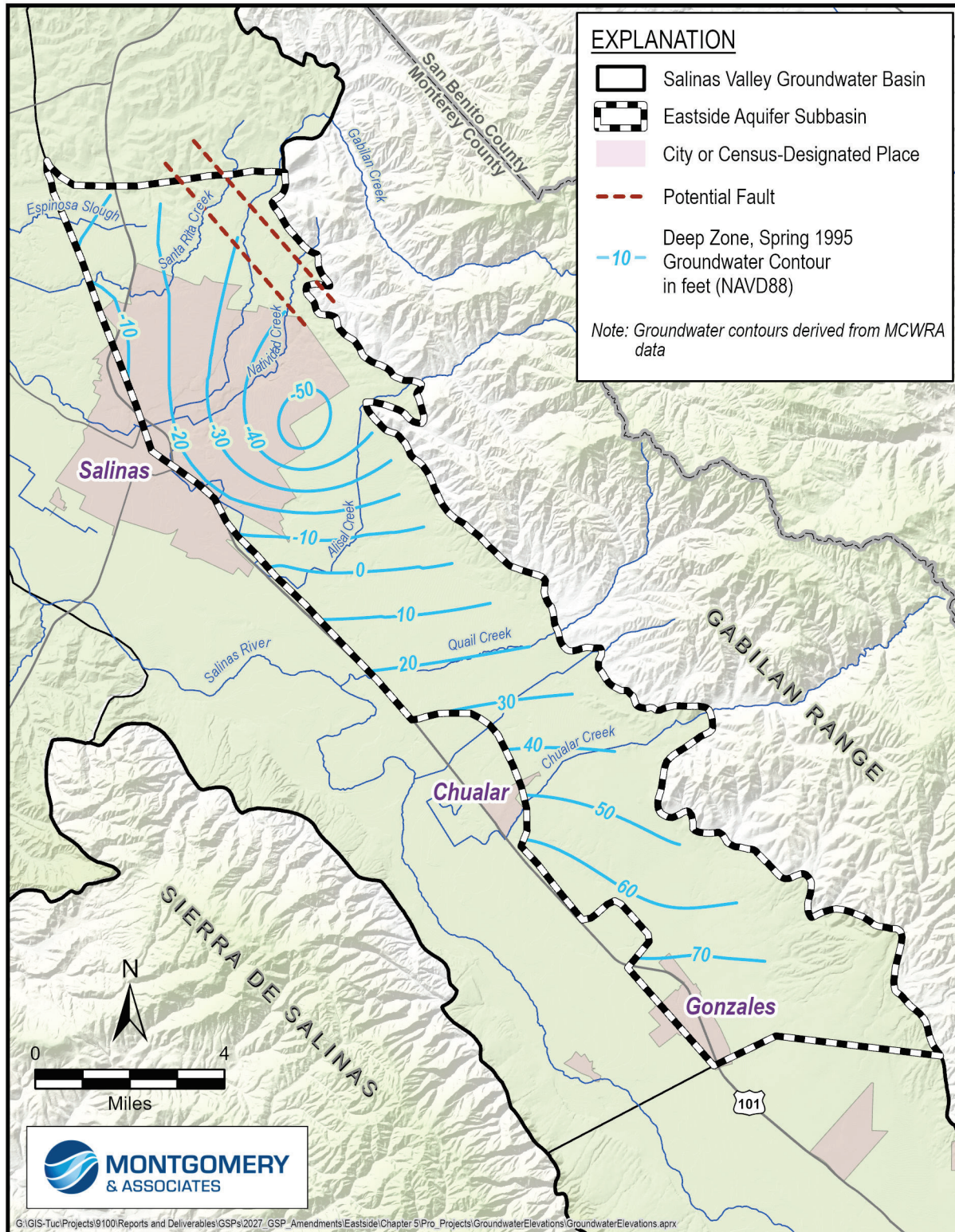


Figure 5-10. Spring 1995 Deep Zone Groundwater Elevation Contours

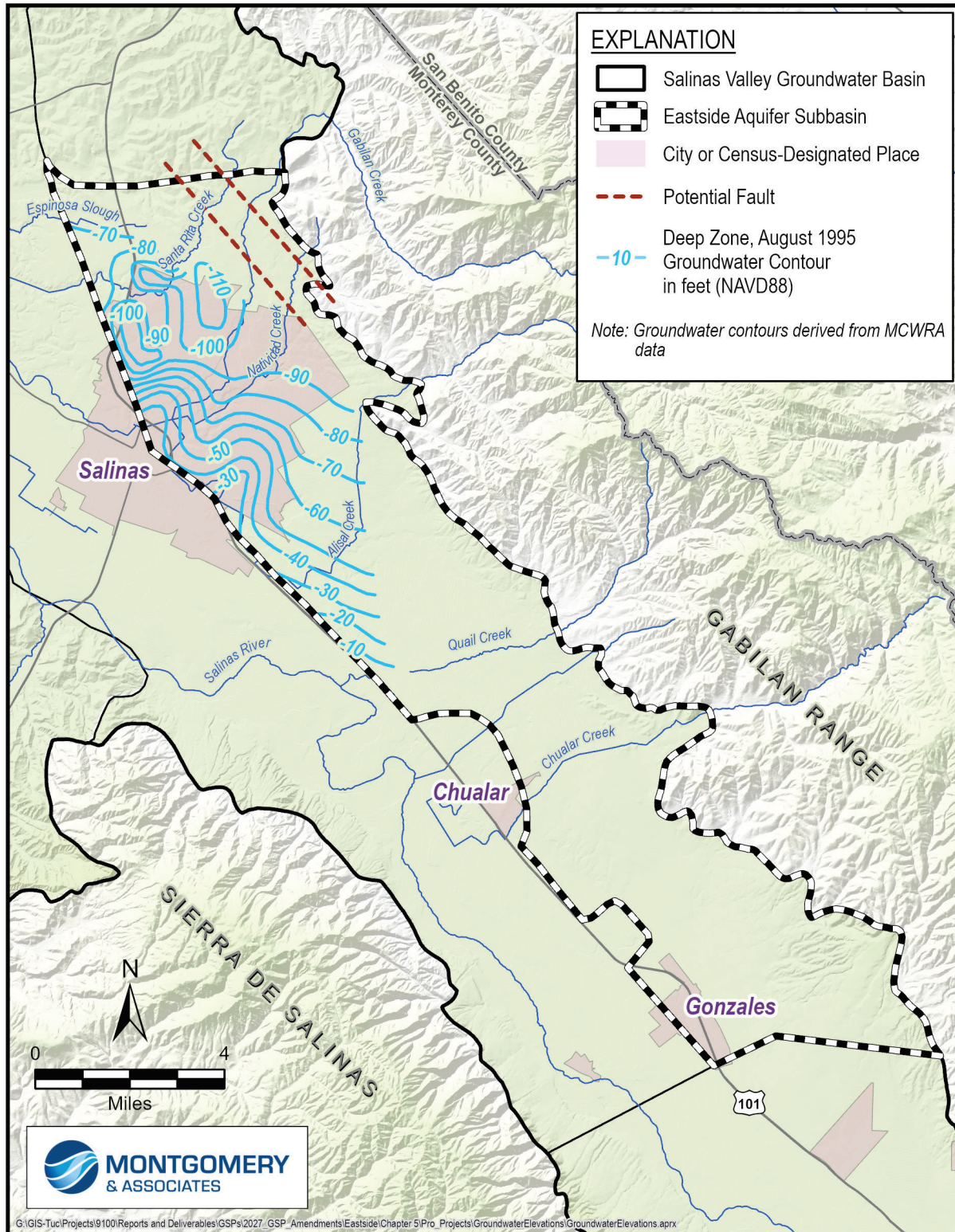


Figure 5-11. August 1995 Deep Zone Groundwater Elevation Contours

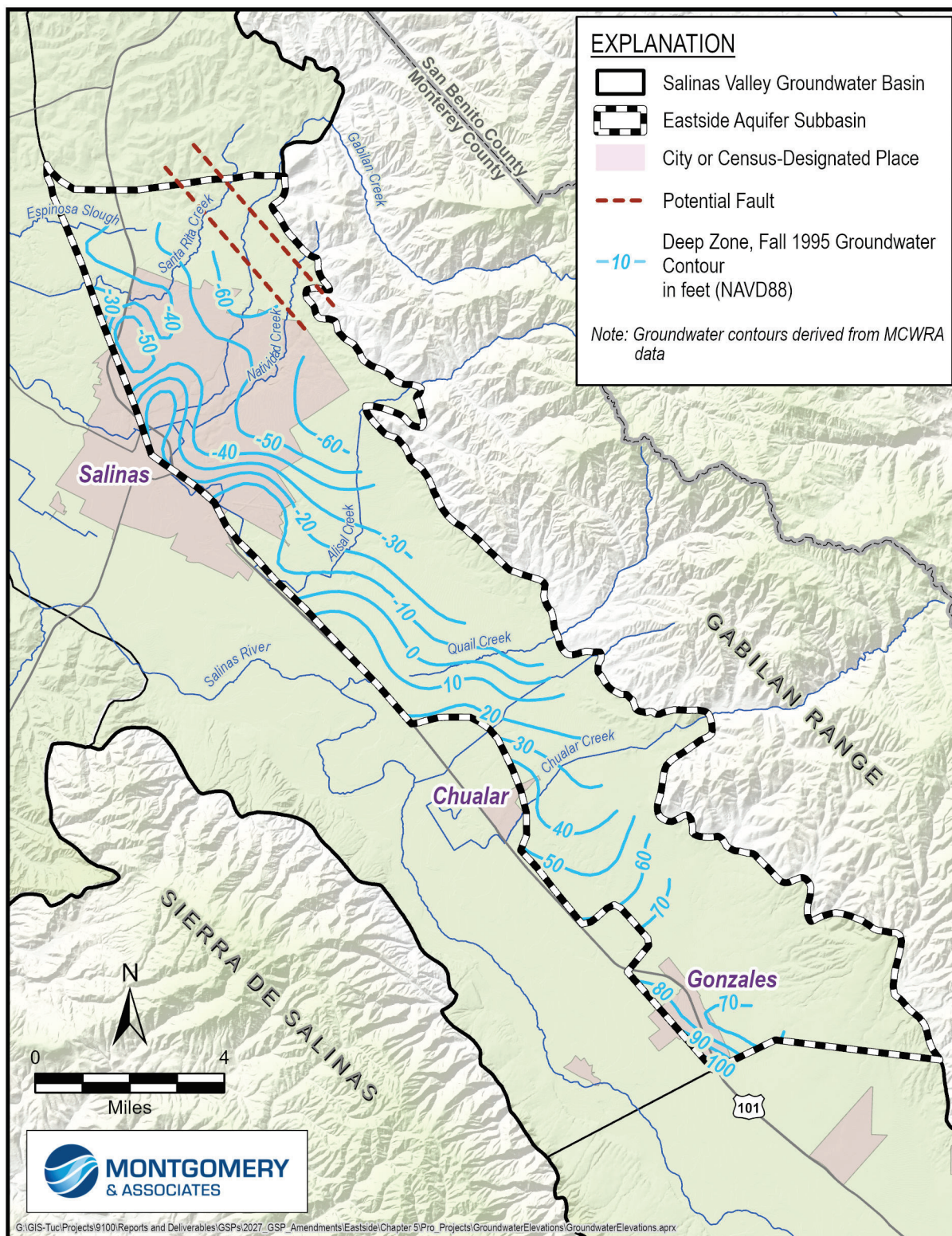


Figure 5-12. Fall 1995 Deep Zone Groundwater Elevation Contours

Groundwater generally flows from the south and from adjacent basins toward the north-northwest, with localized depressions around the pumping centers. The most notable pumping depression is located east of the City of Salinas. The contours indicate that groundwater flow directions are similar in the Shallow and Deep Zones of the Eastside Aquifer. However, based on these contours, groundwater elevations in the Deep Zone are generally lower than groundwater elevations in the Shallow Zone during both 1995 and 2019.

Under GSP baseline conditions (Figure 5-1 to Figure 5-5), groundwater elevations in the northern two-thirds of the Subbasin are below sea level, estimated as zero feet NAVD88, as indicated by the negative values on the contour lines. The lowest groundwater elevations in the Subbasin occur in the pumping depression east of the City of Salinas. In the Shallow Zone, minimum groundwater elevations are approximately -50 feet NAVD88 during the Spring measurements (Figure 5-1) and -100 feet NAVD88 during the August measurements (Figure 5-2). In the Deep Zone, minimum groundwater elevations are approximately -40 feet NAVD88 during the Spring measurements (Figure 5-4) and -120 feet NAVD88 during the August measurements (Figure 5-5). The hydraulic gradient steepens in the vicinity of the pumping trough; however, gradients are difficult to quantify based on highly variable groundwater elevations throughout the Subbasin.

Groundwater elevations in the Eastside Subbasin increase to the west toward the boundary with the adjacent 180/400 Subbasin. They also increase toward the southern boundary with the aquifer in the Forebay Subbasin where groundwater elevations are greater than 90 feet NAVD88 in the Shallow Zone (Figure 5-1 to Figure 5-3) and greater than 50 feet NAVD88 in the Deep Zone (Figure 5-4 to Figure 5-6). The Shallow and Deep Zones represent productive zones that are intermittently confined as a result of the characteristic alluvial fan sediment deposition in the Eastside Subbasin, which extend into the Forebay Subbasin, where it then transitions to more fluvial-dominated sediments.

Under the historical conditions of 1995, a similar flow pattern to that of more recent conditions was present in both the Shallow and Deep Zones of the Eastside Aquifer; however, the magnitude of the pumping trough has varied over time. A discussion of historical groundwater elevation changes is presented in the following section.

5.1.3 Hydrographs

Representative temporal trends in groundwater elevations can be assessed with hydrographs that plot changes in groundwater elevations over time. Groundwater elevation data from wells within the Subbasin are available from monitoring conducted and reported by MCWRA.

Figure 5-13 depicts the locations and hydrographs of example monitoring wells in the Subbasin. Larger versions of the hydrographs for these wells, as well as all Representative Monitoring Sites (RMS), are included in Appendix 5A. Chapter 7 provides more information specific to the wells and the monitoring system.

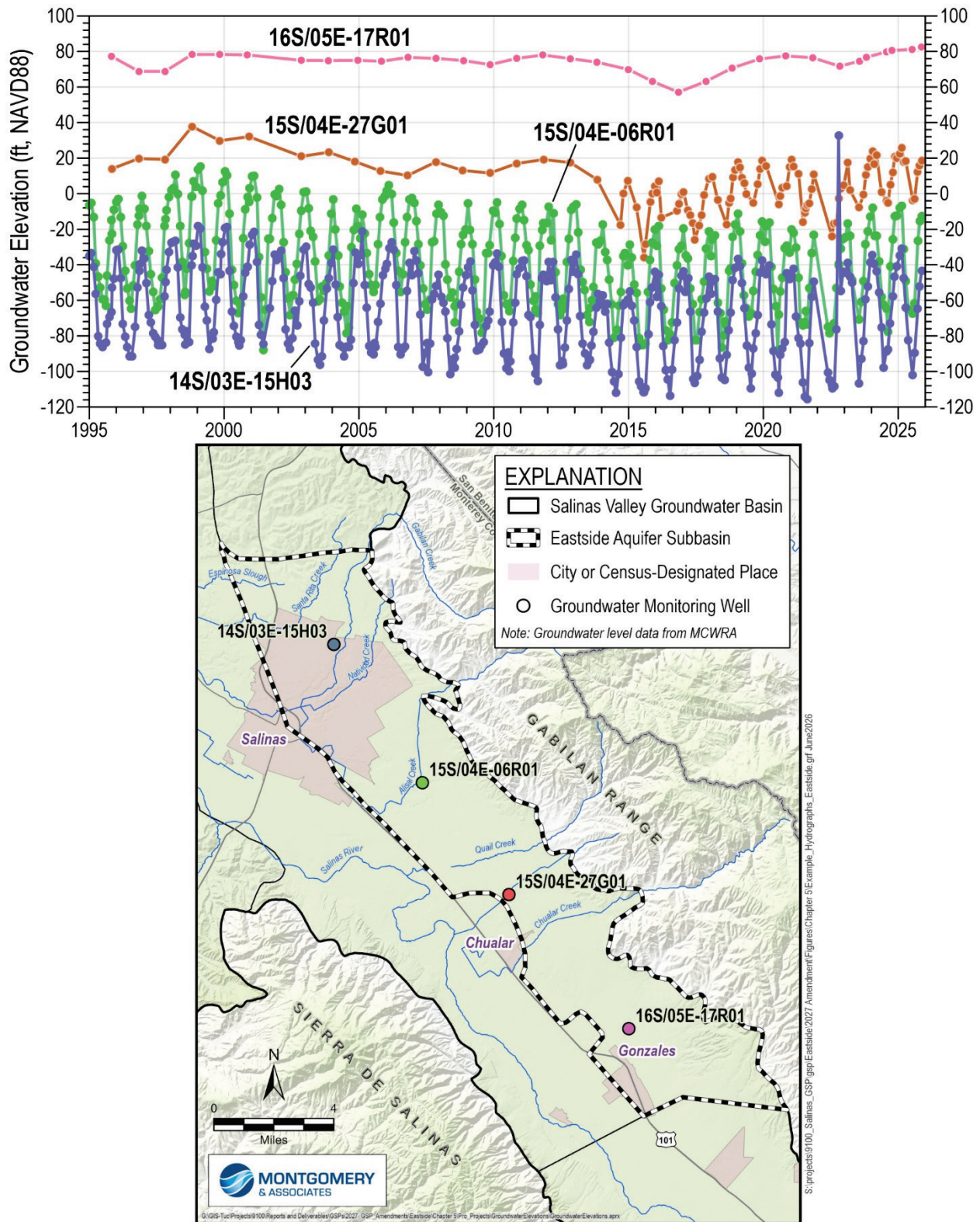
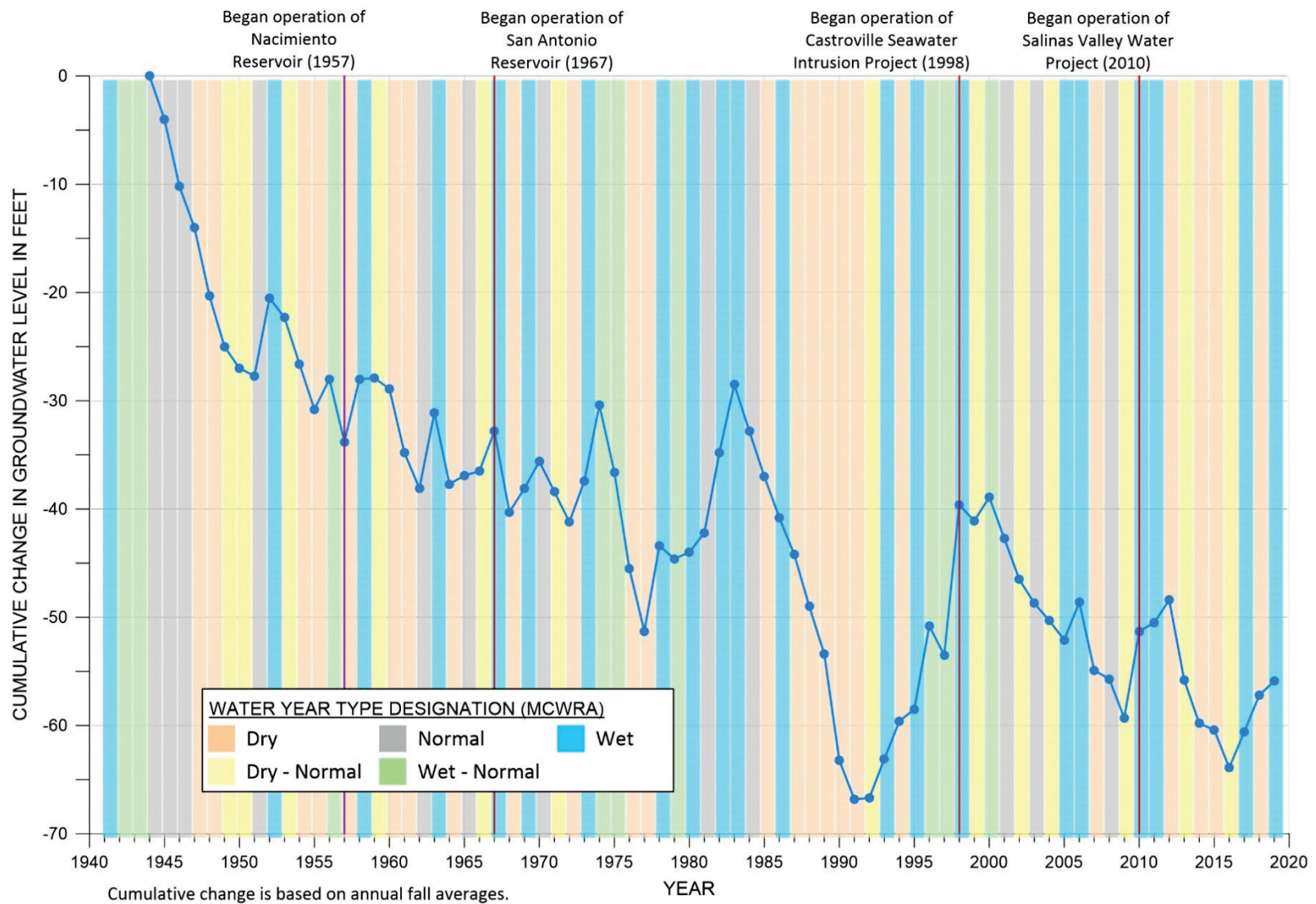


Figure 5-13. Map of Example Hydrographs

Figure 5-14 presents a graph of cumulative groundwater elevation change for the Eastside Subbasin. It was initially developed by MCWRA and is based on average change in fall groundwater elevations for designated wells in the Eastside Subarea each year. MCWRA has historically used the Eastside Subarea for its groundwater elevation change analyses, which overlaps the Eastside Subbasin, as well as parts of the 180/400 and most of the Langley Subbasins, as shown on Figure 3-3. Therefore, what is presented on Figure 5-14 does not exactly match the graph produced by MCWRA. The figure was adapted to reflect the cumulative change in groundwater elevations specific to the Eastside Subbasin.

Fall measurements occur at the end of the irrigation season and before groundwater levels increase due to seasonal recharge by winter rains and/or seasonal decreases in groundwater pumping. These measurements record annual changes in storage reflective of groundwater recharge and withdrawals in the Subbasin. The cumulative groundwater elevation change plot is therefore an estimated average hydrograph for wells in the Subbasin. Although this plot does not reflect the groundwater elevation change at any specific location, it provides a general illustration of how the average groundwater elevation in the Subbasin changes in response to climatic cycles, groundwater extraction, and water resources management at the subbasin scale.

The cumulative elevation change graph and the specific hydrographs presented in Appendix 5A show that groundwater elevations in the Subbasin show a long-term decline over time.



(Adapted from MCWRA, 2018a, personal communication)

Figure 5-14. Cumulative Groundwater Elevation Change Graph for the Eastside Subbasin

5.1.4 Vertical Groundwater Gradients

The Eastside Subbasin is composed of a single aquifer with 2 generalized water-bearing zones, the Shallow Zone and the Deep Zone. There is no identifiable, extensive aquitard separating these zones across most of the Subbasin. However, a small portion of the Deep Aquitard—which separates the 400-Foot Aquifer and Deep Aquifers in the adjacent 180/400 Subbasin—extends into the northwestern corner of the Eastside Subbasin. As mentioned in Chapter 4, the Deep Aquifers are included with the Deep Zone of the Basin Fill Aquifer, which is generally contemporaneous with the 400-Foot Aquifer.

Figure 5-15 shows groundwater elevations at 3 well pairs in the Subbasin. Each well pair consists of 2 adjacent wells of different depths, 1 shallow and 1 deep. In all the well pairs, groundwater elevations in the shallow well are higher than in the deep well, indicating a downward gradient. These hydrographs corroborate the groundwater elevation contour maps, which likewise show higher groundwater elevations in the Shallow Zone than in the Deep Zone.

The northernmost well pair, located within the portion of the Subbasin where the Deep Aquitard extends in from the 180/400 Subbasin, exhibits the greatest vertical gradient between the shallow and deep wells. This is because its deep well is screened below the Deep Aquitard, in the Deep Aquifers, rather than in the 400-Foot Aquifer correlative sediments that make up the Deep Zone elsewhere in the Subbasin. The presence of the aquitard at this location likely limits vertical connectivity between the zones, producing the larger head difference observed at this well pair.

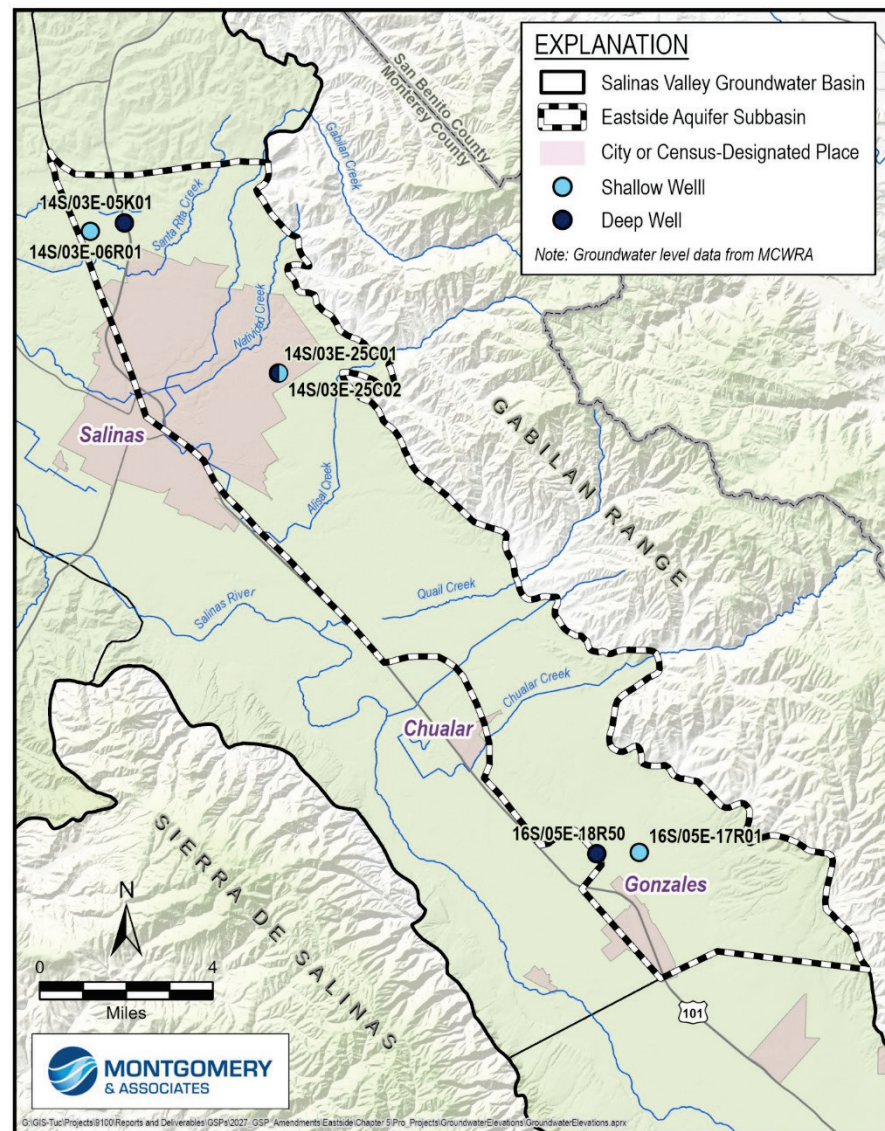
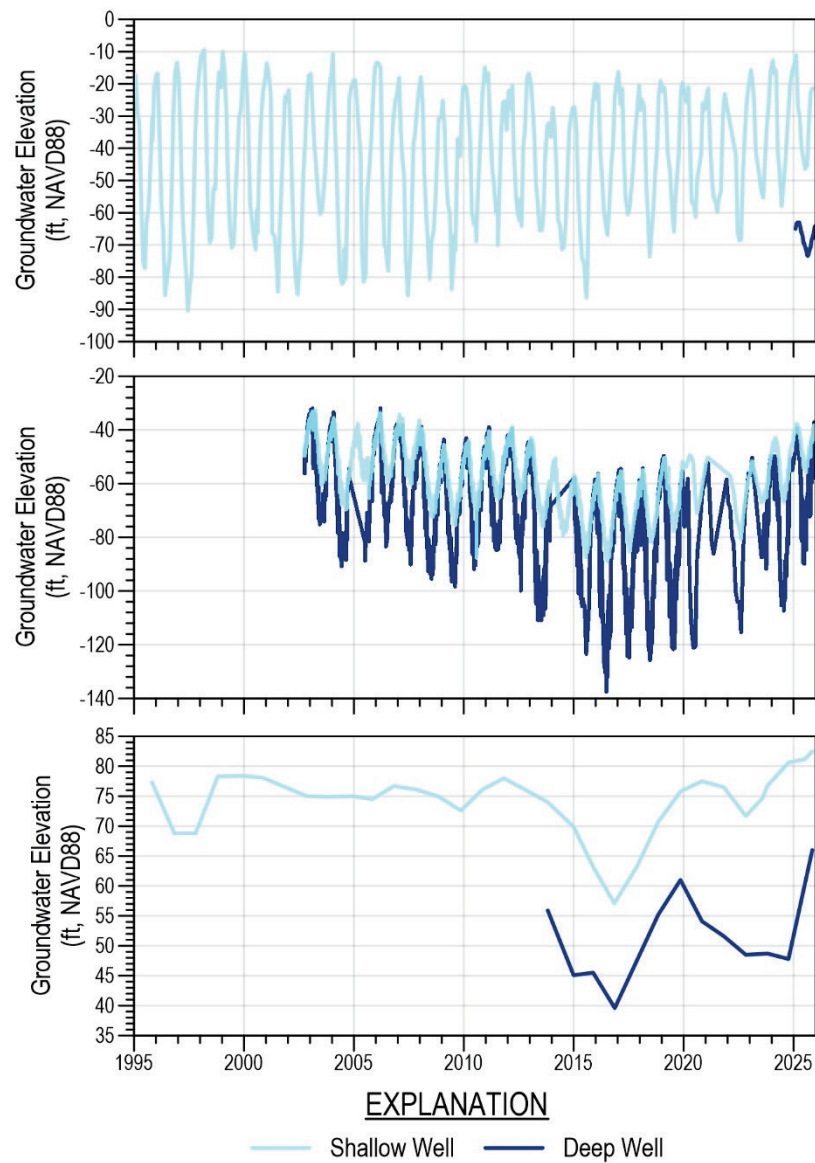


Figure 5-15. Vertical Gradients

5.2 Change in Groundwater Storage

5.2.1 Data Sources

Change in storage is developed based on MCWRA's fall groundwater elevation measurements. Fall groundwater elevations are used because these measurements are taken after groundwater elevations generally recover from the peak irrigation season and before winter precipitation increases groundwater levels. As a result, fall groundwater elevations provide a representative measure of the annual change in groundwater storage. Groundwater elevation measurements are also used to create fall groundwater elevation raster layers that are used to determine the spatial distribution of storage change.

5.2.2 Change in Groundwater Storage

Change in groundwater storage is derived from change in observed groundwater elevations at RMS wells, which are described in more detail in Chapter 7. These groundwater elevation changes are used to estimate the gain and loss of groundwater in storage each year according to the following relationship:

$$\Delta S = \Delta WL \times A \times SC$$

Where: ΔS = Annual change in storage volume in the Subbasin (AF/yr)

ΔWL = Annual change in average groundwater elevation in the Subbasin (ft/yr)

A = Land area of Subbasin (acres)

SC = Storage coefficient (ft³/ft³)

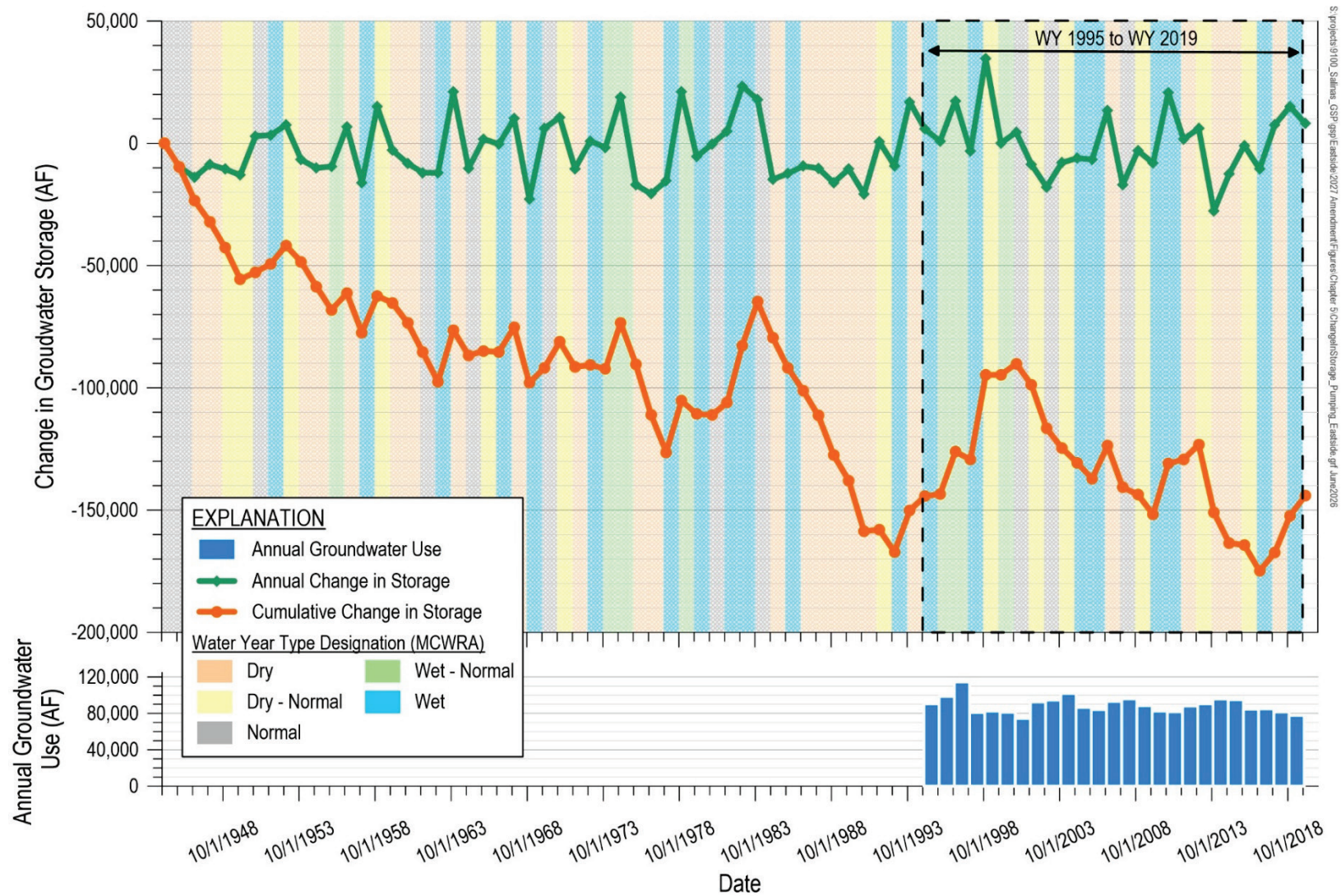
The change in storage is presented below in 2 ways: (1) a timeseries of cumulative and annual change in storage from 1944 through 2019 averaged across the Subbasin (Figure 5-16) and (2) a map showing spatial change in storage across the Subbasin from 1995 to 2019 (Figure 5-17).

The estimated cumulative change in groundwater storage in the Eastside Subbasin shown on Figure 5-16 is derived from the cumulative subbasin-wide average change in groundwater elevations (Figure 5-14). The magnitude of the groundwater storage change is calculated by multiplying the annual groundwater elevation change by a storage coefficient and an area. The storage coefficient used to create this plot is the average storativity of layer 1 of the updated SVIHM (0.0430 ft³/ft³), which is the best available data source for this aquifer property.

Although more than 1 model layer comprises the Eastside Subbasin in the SVIHM, only the storage properties of layer 1 are used because most of the storage change occurs in the upper aquifer zone. The area used in this calculation is 57,100 acres, which is the sum of the cells comprising layer 1 within the Eastside Subbasin.

Method 1: For the first method of estimating change in storage, Figure 5-16 shows groundwater elevations have fluctuated over this historical period, as indicated by annual change in storage; however, the Eastside Subbasin has experienced a long-term decline in groundwater storage due to lowering groundwater elevations. The average annual storage loss due to lowering groundwater elevations in the Eastside Subbasin between 1944 and 2019 is approximately 1,900 AF/yr. From 1995 to 2019, storage decreased at approximately 30 AF/yr which is likely an underestimate of storage loss in the Subbasin. The storage change calculation is a reflection of groundwater elevations in the start and end years, which does not capture groundwater level fluctuations within that period. Figure 5-16 also shows the annual groundwater extractions starting in 1995, which is when groundwater extraction reporting began.

Method 2: For the second method of estimating change in storage, Figure 5-17 shows the spatial distribution of estimated change in groundwater elevation from fall 1995 to fall 2019. To create this map, separate raster layers were generated from interpolated groundwater elevations derived from groundwater elevation contours for fall 1995 and fall 2019 (Figure 5-9 and Figure 5-3, respectively). As demonstrated in Section 5.1.2, the groundwater elevation contours in the Shallow and Deep Zones of the principal aquifer have similar elevations and flow patterns. Therefore, this change in storage calculation only uses the groundwater elevation contours for the Shallow Zone because they are generally representative of overall aquifer conditions of the principal aquifer. After the rasters were created, groundwater elevations were spatially averaged within each SVIHM grid cell that overlaps with the Eastside Subbasin (grid cell size is larger than the raster resolution) and then subtracted from each other. As previously described, the difference in groundwater elevations was multiplied by the storativity of the top layer (layer 1) of the model, then summed together to estimate total change in storage. This yielded an estimated loss in storage of approximately 440 AF/yr. The greatest loss in groundwater storage occurred north of the City of Salinas, where storage decreased by 11.5 acre-feet per acre during the evaluated period. The raster analysis indicates that most of the Subbasin experienced relatively small changes in groundwater storage from WY 1995 to 2019 (Figure 5-17).



(Adapted from MCWRA, 2018a, personal communication)

Figure 5-16. Annual and Cumulative Change in Groundwater Storage and Total Annual Groundwater Extraction in the Eastside Subbasin, Based on Groundwater Elevations

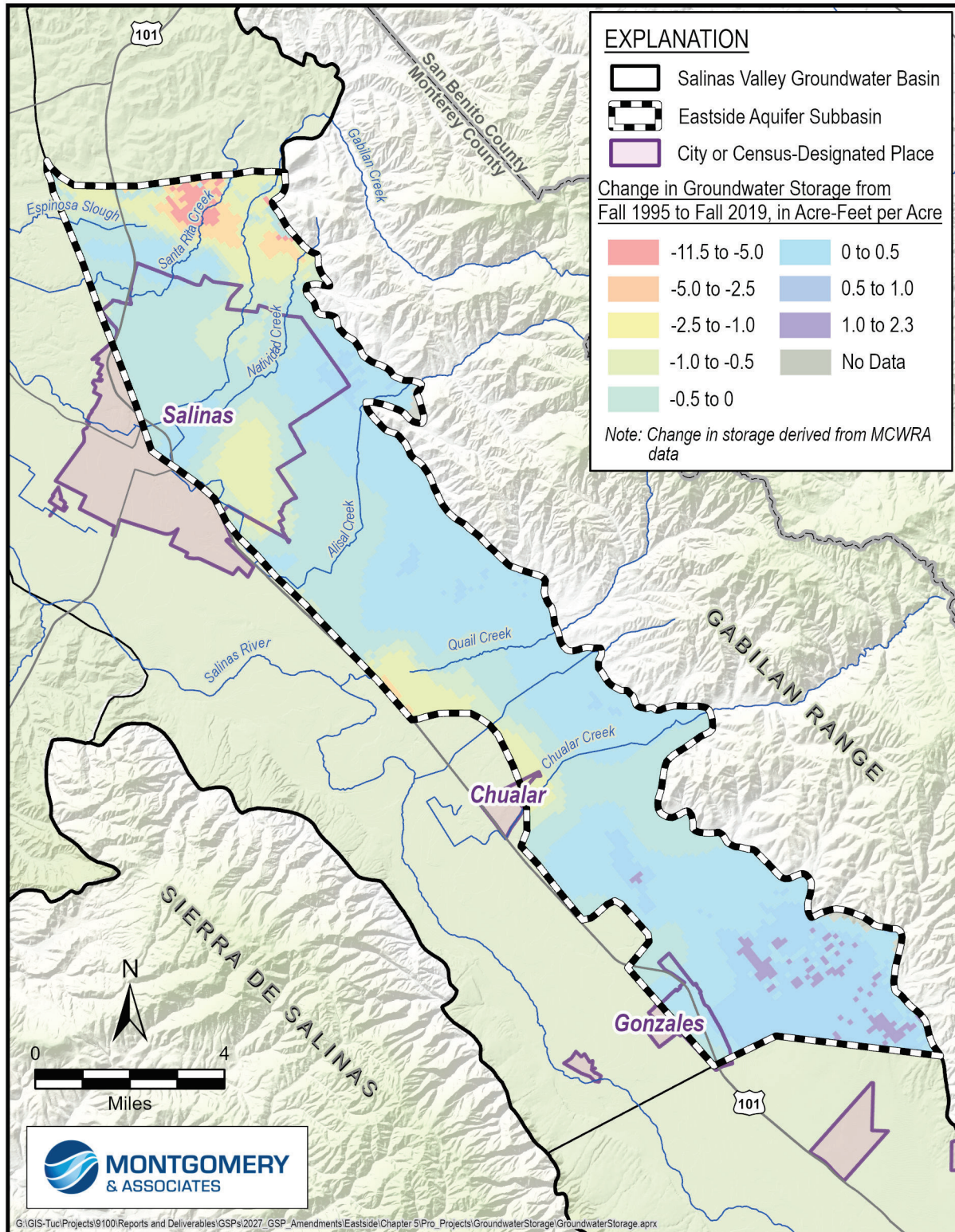


Figure 5-17. Change in Groundwater Storage in the Shallow Zone from Fall 1995 to Fall 2019

5.3 Seawater Intrusion

As of GSP Amendment 1, there is no seawater intrusion in the Eastside Subbasin. However, the adjacent 180/400 Subbasin has been subject to seawater intrusion for more than 70 years. The negative impact of seawater intrusion on local water resources and the agricultural economy has been the primary motivation for many studies dating back to 1946 (DWR, 1946). The seawater intrusion in the 180/400 Subbasin is close enough to the Eastside Subbasin that it is considered an ongoing threat.

5.3.1 Data Sources

The extent and advance of seawater intrusion are monitored and reported by MCWRA. Monitoring seawater intrusion has been ongoing since the Agency formed in 1947, and a network of dedicated monitoring and production wells that are sampled twice annually in June and August. Most of the wells are located in the 180/400 Subbasin; however, 2 monitoring wells are located within the Eastside Subbasin. The water samples are analyzed for general minerals; and the analytical results are used by MCWRA to analyze and report the following:

- Maps and graphs of historical chloride and specific conductivity trends
- Stiff diagrams and Piper diagrams
- Plots of chloride concentration vs. Na/Cl molar ratio trends

MCWRA publishes estimates of the extent of seawater intrusion every year. The MCWRA maps define the extent of seawater intrusion as the location of the 500 mg/L chloride concentration isocontour. This chloride concentration is significantly lower than the 19,000 mg/L chloride concentration typical of seawater; however, it represents a concentration that may begin to impact beneficial uses. The 500 mg/L threshold is considered the Upper Limit SMCL for chloride as defined by the Environmental Protection Agency (EPA) and is approximately 10 times the concentration of naturally occurring chloride in groundwater in the Subbasin.

5.3.2 Seawater Intrusion Maps and Cross Section

Figure 5-18 and Figure 5-19 show the MCWRA mapped extents of GSP baseline and historical seawater intrusion near the Eastside Subbasin and in the neighboring 180/400 Subbasin. Two maps are shown, equating the 180-Foot Aquifer and the 400-Foot Aquifer in the neighboring 180/400 Subbasin. In both figures, the maximum extent of the shaded contours represents the extent of groundwater with chloride exceeding 500 mg/L during the 2019 monitoring period. The historical progression of the 500 mg/L extent is also illustrated on these figures through the colored overlays that represent the extent of seawater intrusion observed during selected years. These maps show that seawater intrusion is close to the Eastside Subbasin but is not observed in

the Subbasin. Further updates will be reported in annual reports and 5-year GSP periodic evaluations.

Figure 5-18 and Figure 5-19 also show the mapped August 2019 groundwater elevations for the Eastside Aquifer and the adjacent 180/400 Subbasin. These maps show the groundwater elevations that are persistently below sea levels that when paired with a pathway, enable seawater intrusion. The groundwater elevation contours show that groundwater travels toward the depression at the northern end of the Eastside Subbasin in both the Shallow and Deep Zones. If the magnitude of this depression increases, it may draw seawater intrusion into the Subbasin. However, the contours themselves are not fully representative of flow between the subbasins. The gradient relationship is not the only influence on groundwater flow between the 180/400 and Eastside Subbasins, and needs to be considered along with all subsurface characteristics. The sediment relationships between the 180/400 Subbasin and the Eastside Subbasin demonstrate a dynamic environment where different sediments were deposited over time and subsequently impact groundwater flow. The boundary between these 2 subbasins generally represents the furthest extents of the alluvial fans that are characterized by clays and other fine sediments. These sediments may act as an impediment to flow, if not fully a barrier in certain locations.

Because there is no seawater intrusion in the Subbasin, no cross sections are presented showing the vertical extent of seawater intrusion.

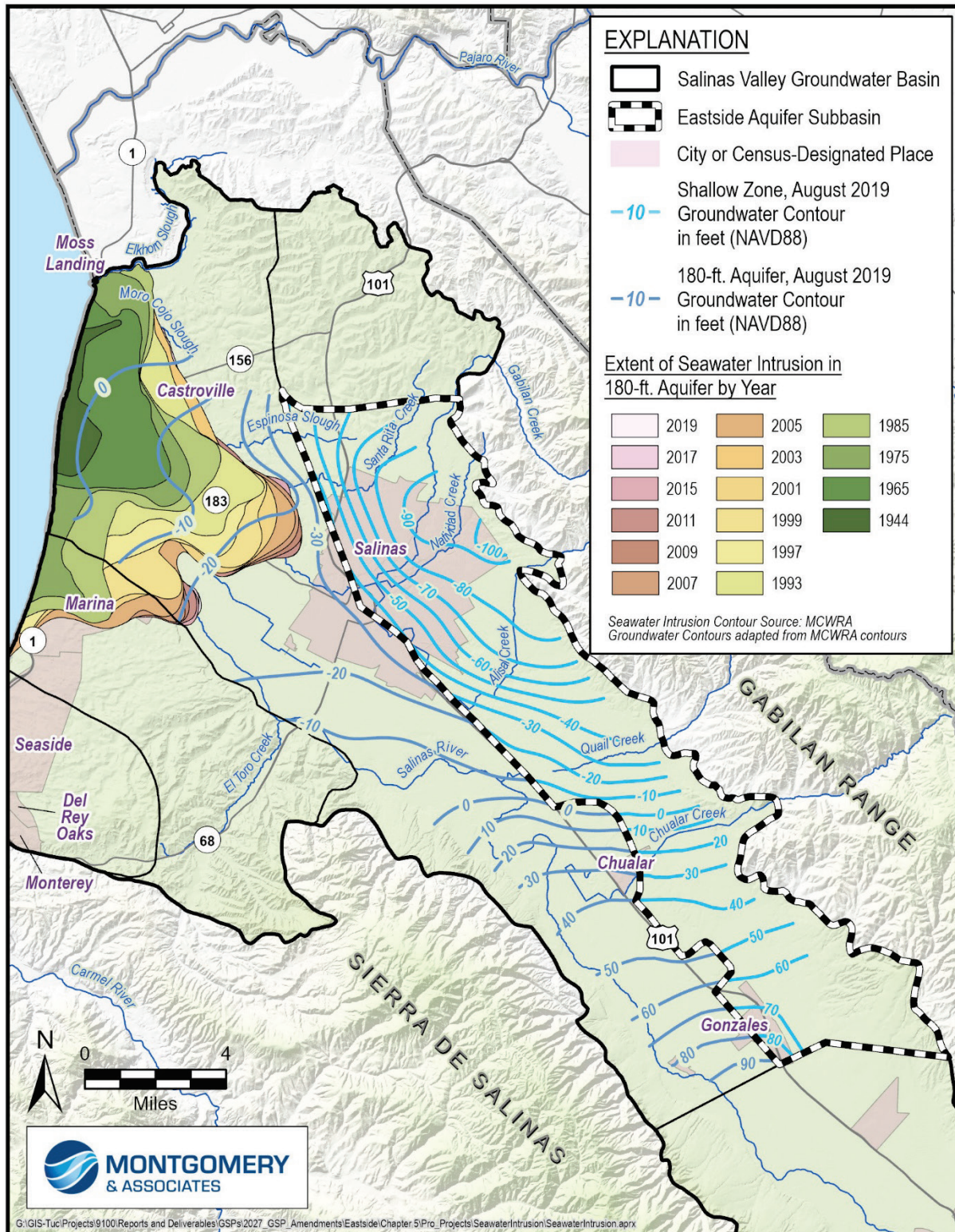


Figure 5-18. Seawater Intrusion in the 180-Foot Aquifer

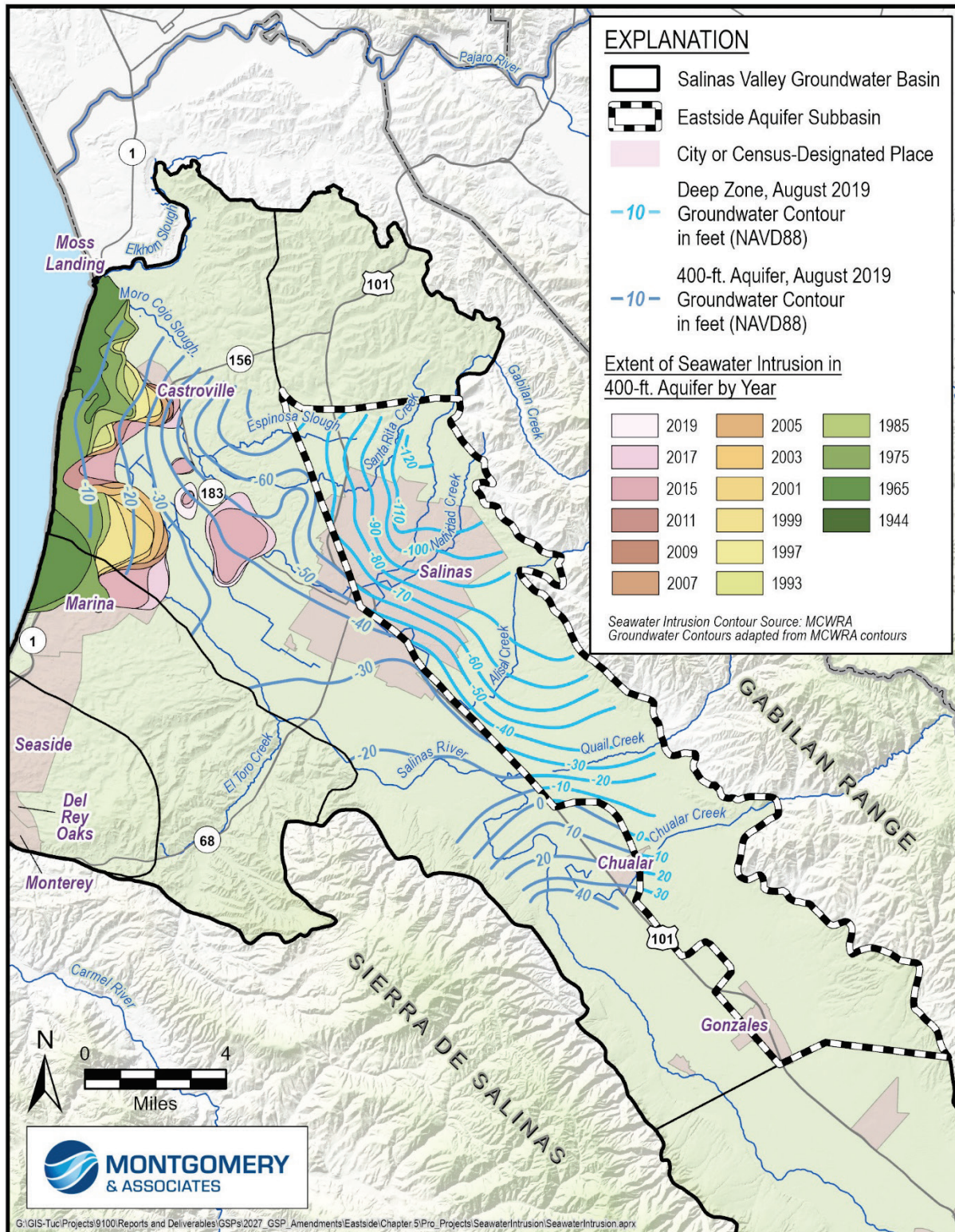


Figure 5-19. Seawater Intrusion in the 400-Foot Aquifer

5.4 Groundwater Quality Distribution and Trends

The SVBGSA does not have sole regulatory authority over groundwater quality and is not charged with improving groundwater quality in the Salinas Valley. Projects and actions implemented by the SVBGSA are not required to improve groundwater quality; however, they must not further degrade it.

5.4.1 Data Sources

Groundwater quality samples have been collected and analyzed in the Subbasin for various studies and programs. Groundwater quality samples have also been collected on a regular basis for compliance with regulatory programs. Groundwater quality data for this GSP were collected from:

- The Northern Counties Groundwater Characterization report (CCGC, 2015)
- The USGS Groundwater Ambient Monitoring and Assessment Program (GAMA) reports (Kulongoski and Belitz, 2005; Burton and Wright, 2018)
- SWRCB GeoTracker Data Management System (SWRCB, 2026a)
- SWRCB GAMA Groundwater Information System (SWRCB, 2020)
- The California Department of Toxic Substances Control (DTSC) EnviroStor data management system (DTSC, 2026)
- CCRWQCB ILP data (CCRWQCB, 2024)

5.4.2 Point Sources of Groundwater Contaminants

Clean-up and monitoring of point source pollutants may be under the responsibility of either the CCRWQCB or the DTSC. GeoTracker is the SWRCB's data management system for sites that may affect water quality, particularly groundwater. It tracks locations that require environmental cleanup, such as leaking underground storage tank (LUST) sites, Department of Defense sites, and other cleanup program sites. GeoTracker also includes information on regulated and unregulated facilities and projects, including irrigated lands, oil and gas production sites, permitted underground storage tanks, and land disposal sites.

EnviroStor is used by the DTSC to track hazardous waste facilities and contaminated sites, including the agency's cleanup, permitting, enforcement, and investigation activities. EnviroStor contains information on sites with known contamination as well as locations that may require further environmental investigation.

Table 5-2 and Figure 5-20 provide a summary of the active clean-up sites within the Subbasin. Not all constituents listed in Table 5-2 are part of the monitoring network described in Chapter 7. However, the status of these constituents at these sites will continue to be monitored by the DTSC or the CCRWQCB.

Table 5-2. Active Contamination Sites

Label	Site Name	Address	City	Site Type	Status	Constituents Found at Site
1	Former Dinn's California Cleaners	437 East Alisal Street	Salinas	Cleanup Program Site	Open - Assessment & Interim Remedial Action	Tetrachloroethylene (PCE), Trichloroethylene (TCE)
2	Johnson Canyon Class III Landfill	31400 Johnson Canyon Rd	Gonzales	Land Disposal Site	Open - Operating	None Specified
3	Johnson Canyon Landfill Compost Facility	31400 Johnson Canyon Road	Gonzales	Land Disposal Site	Open - Operating	None Specified
4	Keith Day Company Compost Facility	27933 Iverson Road	Gonzales	Land Disposal Site	Open - Operating	None Specified
5	SERVICE CENTER	431 Market St E	Salinas	LUST Cleanup Site	Open - Site Assessment	Waste Oil / Motor / Hydraulic / Lubricating
6	Constitution Boulevard Soccer Complex Expansion	1440 Constitution Boulevard	Salinas	Voluntary Cleanup	Active	Arsenic
7	Salinas Airport Core Area	30 Mortensen Avenue	Salinas	Voluntary Cleanup	Active	Arsenic; Total Chromium

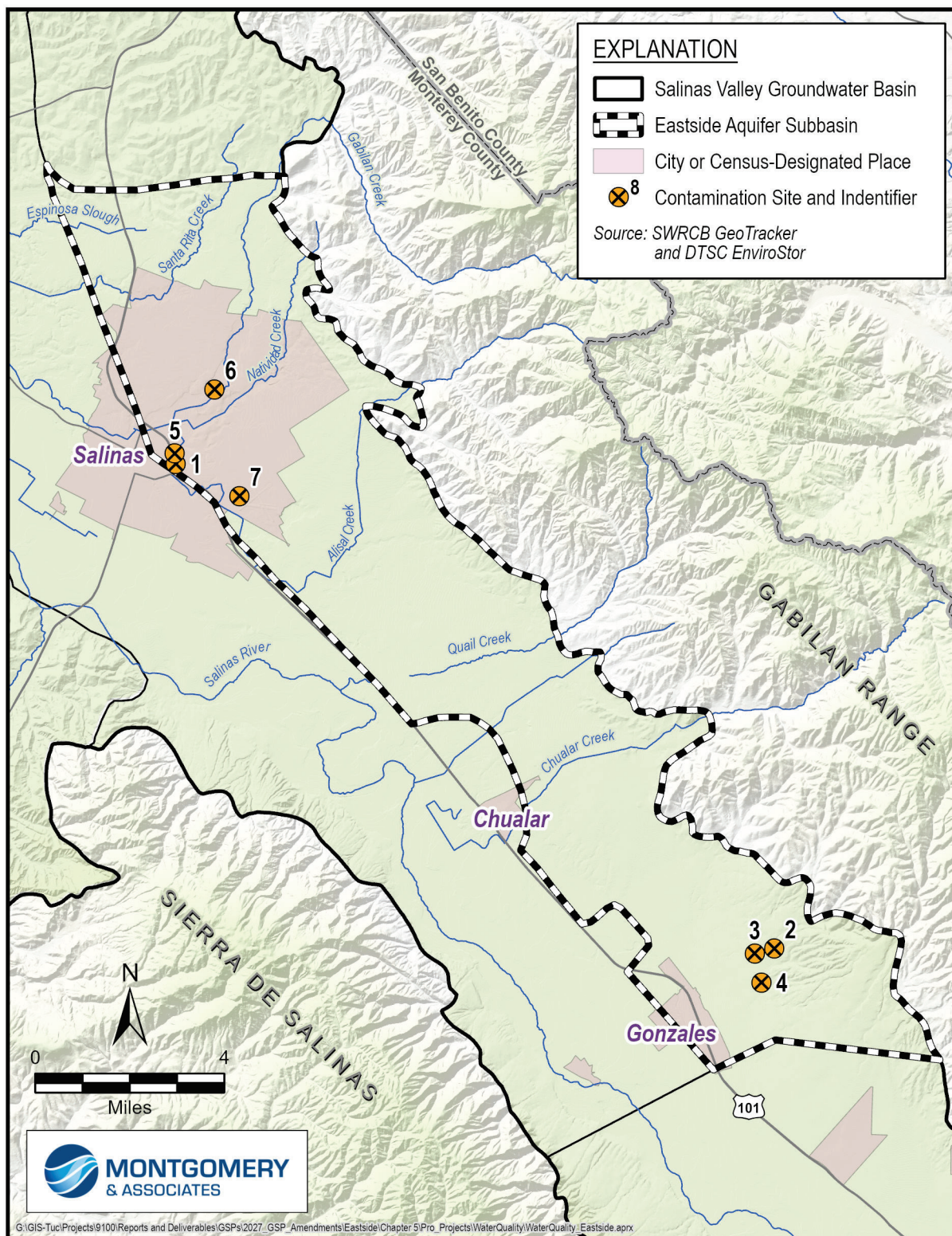


Figure 5-20. Active Contamination Sites as of 2026

5.4.3 Distribution and Concentrations of Diffuse or Natural Groundwater Constituents

In addition to the point sources described above, the CCRWQCB monitors and regulates activities and discharges that can contribute to non-point pollutants that are released to groundwater over large areas.

5.4.3.1 Previous Studies

In the Subbasin, the most prevalent non-point water quality concern is nitrate. The recent distribution of nitrate was extensively monitored and evaluated by the CCGC and documented in a report submitted to the CCRWQCB (CCGC, 2015).

Figure 5-21 shows a map of nitrate distribution in the Subbasin prepared by CCGC. The orange and red areas illustrate the portions of the Subbasin where groundwater has nitrate concentrations above 45 mg/L NO₃, which is above the drinking water MCL of 10 mg/L.

Figure 5-22 shows maps of measured nitrate concentration from 6 decades of monitoring for the entire Salinas Valley. These maps, prepared by MCWRA, indicate that elevated nitrate concentrations in groundwater were locally present in the 1960s, but significantly increased in 1970s and 1980s. Extensive distribution of nitrate concentrations above the drinking water MCL, as shown on Figure 5-21, has been present in the Eastside Subbasin for 20 to 30 years.

A May 2018 staff report to the CCRWQCB included a summary of nitrate concentrations throughout the Central Coast Region, including the Salinas Valley. The staff report includes data from 2008 to 2018, collected at 2,235 wells in the Salinas Valley, during Agricultural Orders 2.0 and 3.0 sampling events. The report states that 58% of on-farm domestic wells in the Eastside Subbasin exceeded the drinking water MCL, with a mean concentration of 139.4 mg/L NO₃. In addition, 61% of irrigation supply wells in the Subbasin exceeded this MCL with a mean concentration of 96.6 mg/L NO₃ (CCRWQCB, 2018).

In response to a Recommended Corrective Action from DWR on the original GSP, SVBGSA analyzed whether groundwater extraction and declining groundwater levels are linked to groundwater quality degradation in the Eastside Subbasin (Montgomery & Associates, 2026a). The analysis included 30 years (1995–2024) of nitrate, gross alpha radioactivity (gross alpha), 1,2,3-trichloropropane (1,2,3-TCP), groundwater elevation, and extraction data using Mann-Kendall trend and Pearson's correlation tests. Results show that 1,2,3-TCP trends are mixed across wells (5% increasing, 50% decreasing, 45% stable), and statistical testing found no significant correlation between 1,2,3-TCP trends and groundwater elevation trends ($r_p = -0.1$, p-value = 0.6) or between 1,2,3-TCP trends and annual average extraction rates ($r_p = -0.3$, p-value = 0.3). Results for gross alpha show that trends are largely stable across wells (18% increasing, 9% decreasing, 74% stable), and statistical testing found no significant correlation between gross

alpha trends and groundwater elevation trends ($r_p = -0.2$, p-value = 0.5) or between gross alpha trends and annual average extraction rates ($r_p = -0.3$, p-value = 0.2). For nitrate, results indicate that trends are largely increasing across wells (58% increasing, 5% decreasing, 36% stable). Statistical testing found no significant correlation between nitrate trends and groundwater elevation trends ($r_p = 0.4$, p-value = 0.08), however, a statistically significant relationship between nitrate trends and annual average extraction rates was identified ($r_p = -0.3$, p-value = 0.04). This statistically significant inverse correlation is primarily driven by 4 wells near Quail Creek that exhibit the highest increasing rates of nitrate concentrations in the Subbasin. Ongoing fertilizer application, combined with local geology may be contributing to the Quail Creek area having the highest increasing nitrate trends in the Subbasin. Thus, the statistically significant inverse correlation between nitrate trends and annual average extraction rates does not represent Subbasin-wide conditions.

Overall, these findings indicate that, at the Subbasin scale, groundwater pumping and groundwater level declines are not driving changes in water quality, suggesting that other factors—such as localized geology or land use practices—likely control water quality variability.

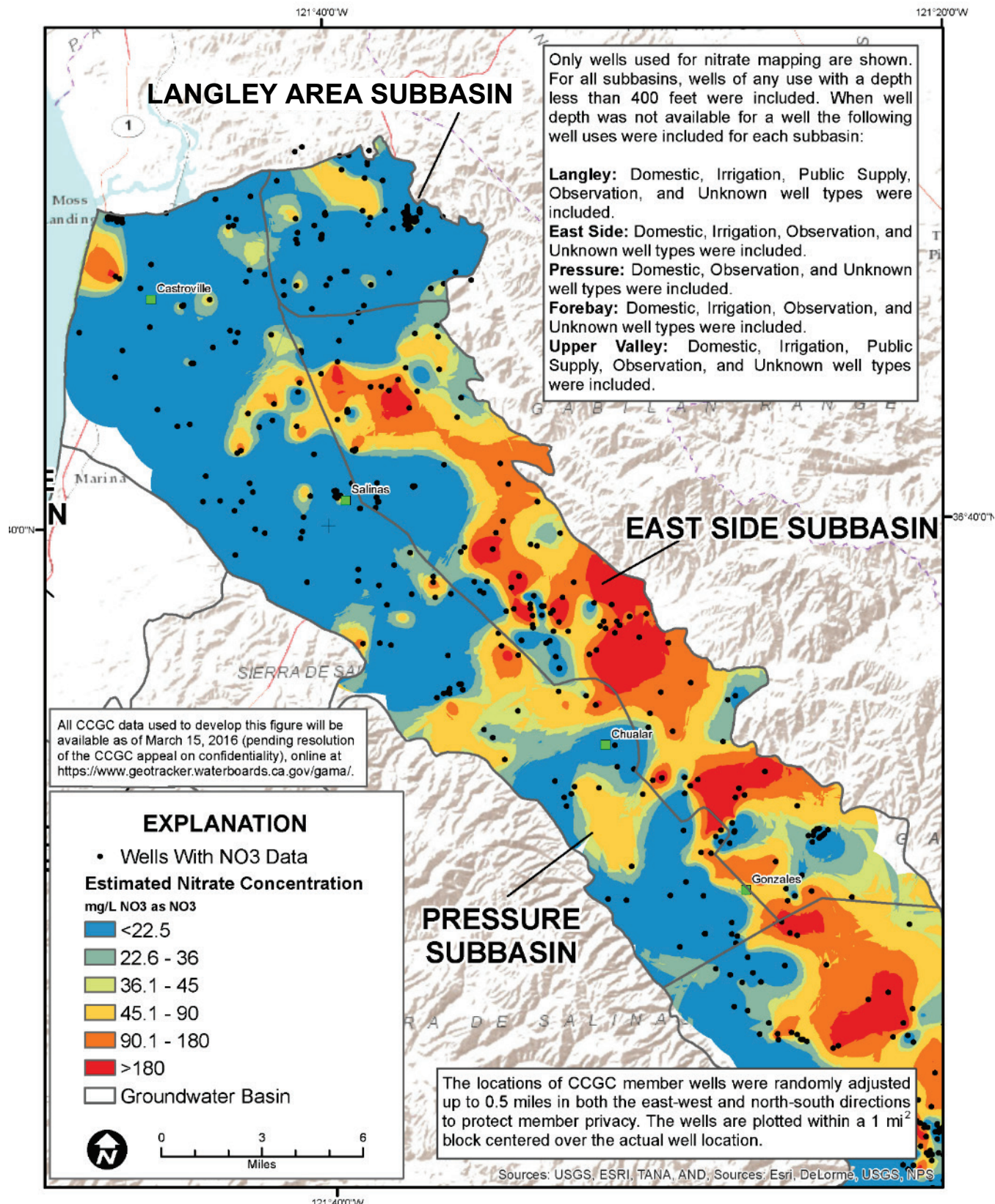
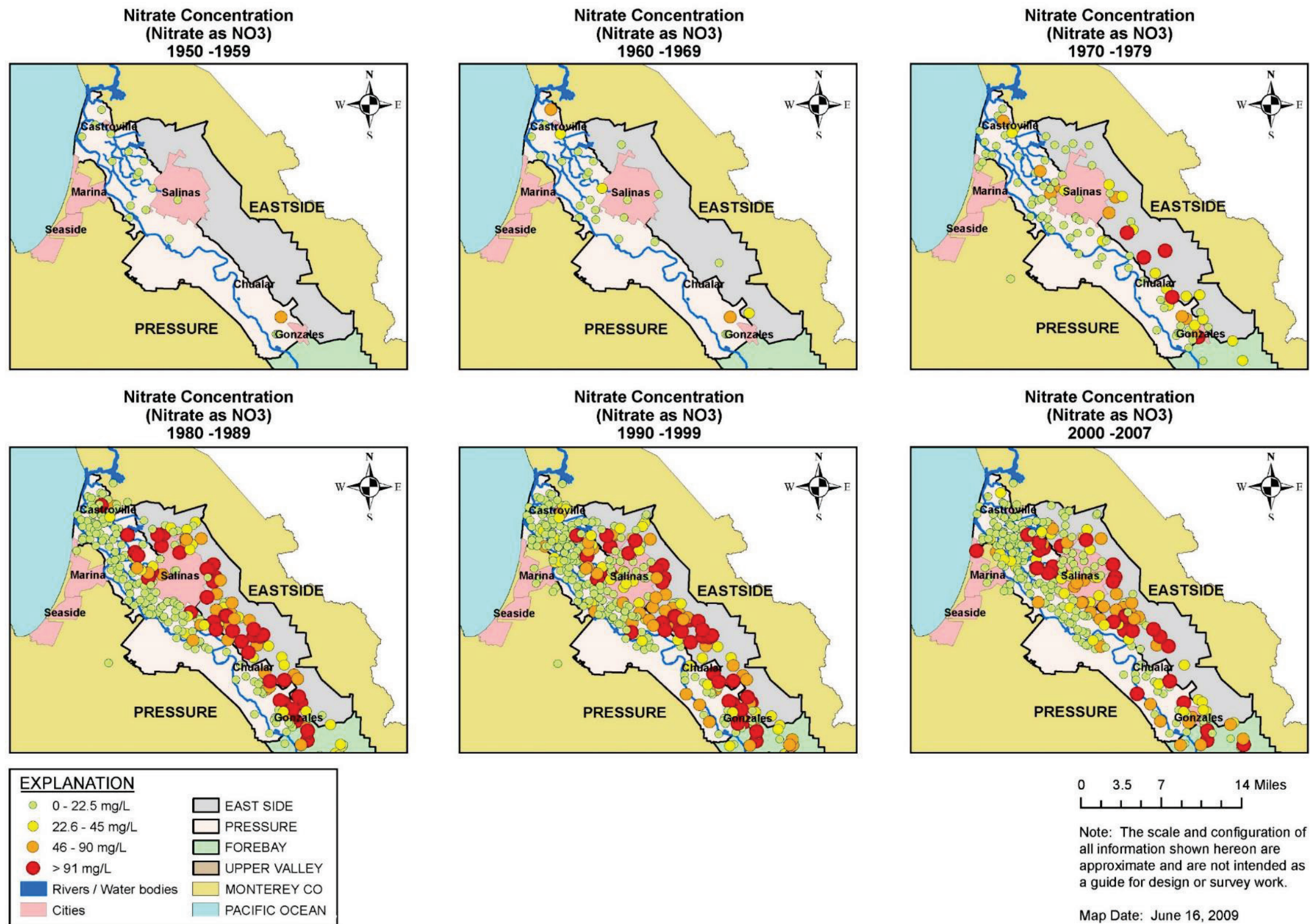


Figure 5-21. Estimated Nitrate Concentrations (from CCGC, 2015)



(from MCWRA)

Figure 5-22. Nitrate Concentrations, 1950 to 2007

Additional groundwater quality conditions in the Basin are summarized in 2 USGS water quality studies in the Salinas Valley. The USGS 2005 GAMA study characterized deeper groundwater resources used for public water supply (Kulongoski and Belitz, 2005). The USGS 2018 GAMA study focused on domestic well water quality (Burton and Wright, 2018). The source data used in these 2 studies and additional publicly available water quality data was accessed through the SWRCB GAMA groundwater information system at:

https://www.waterboards.ca.gov/water_issues/programs/gama/online_tools.html.

5.4.3.2 Water Quality Constituent Assessment

The GAMA groundwater information system includes groundwater quality data for public water system supply wells from the SWRCB DDW, and on-farm domestic wells and irrigation supply wells from CCRWQCB's ILP. This GSP relies on established thresholds for constituents: MCLs and SMCLs established by the State's Title 22 drinking water standards for public water system supply wells and on-farm domestic wells, and levels that may lead to reduced crop production for irrigation supply wells, as outlined in the CCRWQCB's Basin Plan (CCRWQCB, 2019). If a constituent is monitored for Title 22 and the Basin Plan, then the stricter of the 2 limits is used. The Basin Plan only had stricter limits for chloride, sodium, and boron. These drinking water and agricultural water quality criteria are jointly defined herein as concentration level of concern.

Table 5-3 reports the constituents that have historically occurred in the active wells in the Eastside Subbasin. The number of wells that exceed the concentration level of concern for any given constituent is based on the last sample for each well in the monitoring network. Not all wells have been sampled for all constituents. Therefore, the percentage of wells with exceedances is the number of wells that exceed the level of concern divided by the total number of wells that have ever been sampled for that constituent. Additionally, Table 5-3 does not report all of the constituents that are monitored; it only includes the constituents that have historically exceeded a Title 22 regulatory standard or Basin Plan water quality objective. Furthermore, it is possible that the exceedances above the level of concern for both sets of ILP wells are overestimated, because historical changes in well-naming conventions may have caused some wells to be counted more than once. ILP has corrected this issue and has consistent naming conventions for data from WY 2022 forward. The locations of wells that exceeded the level of concern for any of the constituents listed in Table 5-3 are provided in Appendix 5B.

Table 5-3 indicates that nitrate and salinity-related constituents are the primary groundwater quality concerns in the Eastside Subbasin. Nitrate exceedances are particularly prevalent in ILP domestic and irrigation wells, where more than 60% of sampled wells exceed the concentration level of concern. Salinity indicators, including sodium and chloride, also exhibit widespread exceedances, especially in irrigation wells. In contrast, trace constituents such as arsenic, 1,2,3-TCP, fluoride, gross alpha radioactivity, and aluminum exceed applicable standards in relatively

few wells. Overall, groundwater quality impacts are most strongly associated with agricultural land use and are characterized primarily by elevated nitrate and salinity concentrations.

This GSP relies on data from existing monitoring programs to measure changes in groundwater quality. Therefore, the GSA is dependent on the monitoring density and frequency of the DDW and ILP. The monitoring system is further defined in Chapter 7.

Table 5-3. Water Quality Constituents and Exceedances

Constituent	Concentration Level of Concern	Standard Units	Data up to WY 2019		
			Number of Wells Sampled	Number of Wells Exceeding Level of Concern in the Last Sample	Percentage of Wells with Exceedances
			DDW Wells (Data from August 1986 to September 2019)		
1,2,3-Trichloropropane (1,2,3-TCP)	0.005	µg/L	73	6	8%
Aluminum	1,000	µg/L	72	1	1%
Arsenic	10	µg/L	72	2	3%
Chloride	106	mg/L	67	26	39%
Fluoride	2	mg/L	74	1	1%
Gross Alpha Radioactivity	15	pci/L	71	1	1%
Iron	300	µg/L	65	3	5%
Nitrate (as nitrogen)	10	mg/L	78	20	26%
Specific Conductance	1600	µmhos/cm	74	2	3%
Total Dissolved Solids	1000	mg/L	67	4	6%
			ILP On-Farm Domestic Wells (Data from March 2013 to September 2019)		
Nitrate + Nitrite (sum as nitrogen)	10	mg/L	49	30	61%
Specific Conductance	1600	µmhos/cm	37	10	27%
			ILP Irrigation Supply Wells (Data from December 2012 to September 2019)		
Chloride	106	mg/L	81	31	38%
Nitrate + Nitrite (sum as nitrogen)	10	mg/L	22	14	64%
Sodium	69	mg/L	80	38	48%
Specific Conductance	1600	µmhos/cm	68	3	4%
Total Dissolved Solids	1000	mg/L	72	4	6%

5.5 Subsidence

Land subsidence is the lowering of the ground surface elevation. This is often caused by pumping below thick clay layers. Land subsidence can be elastic or inelastic. Elastic subsidence consists of small, lowering and rising of the ground surface is reversible, while inelastic subsidence is generally irreversible and is the focus of this GSP.

5.5.1 Data Sources

To estimate subsidence, DWR has made Interferometric Synthetic Aperture Radar (InSAR) satellite data available on their SGMA Data Viewer web map: <https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer#landsub>. These are the only data used for estimating subsidence in this GSP.

5.5.2 Subsidence Mapping

Figure 5-23 presents a map showing the average annual InSAR subsidence data in the Eastside Subbasin between June 2015 and June 2019 (DWR, 2020c). The yellow area on the map shows measured average annual changes in ground elevation of between -0.1 and 0.1 foot. As discussed in Section 8.9.2.1, because of measurement error in this methodology, any measured ground level changes between -0.1 and 0.1 foot are not considered subsidence. The white areas on the map are areas with no available data. The map illustrates that no measurable subsidence has been recorded anywhere in the Subbasin.

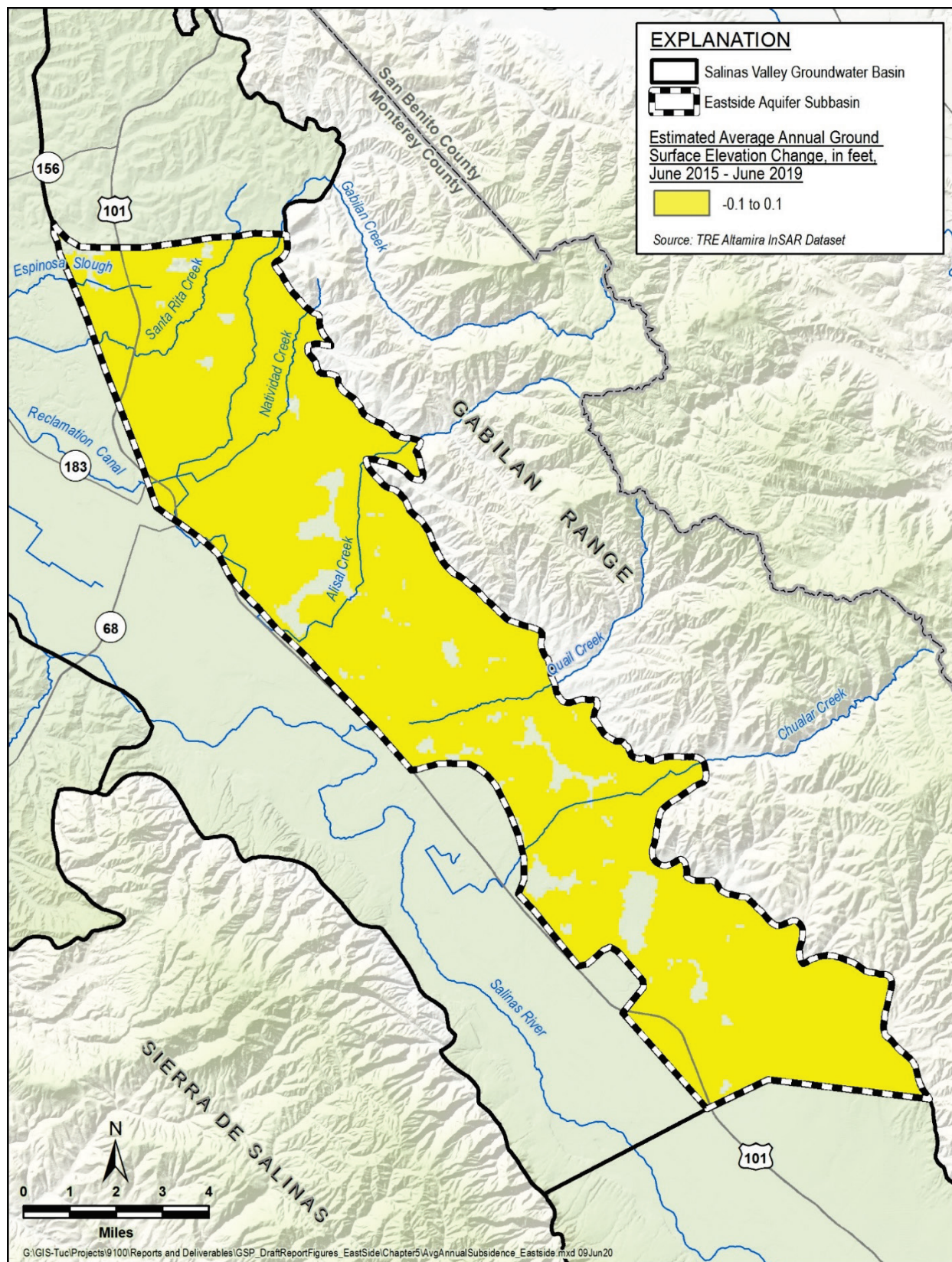
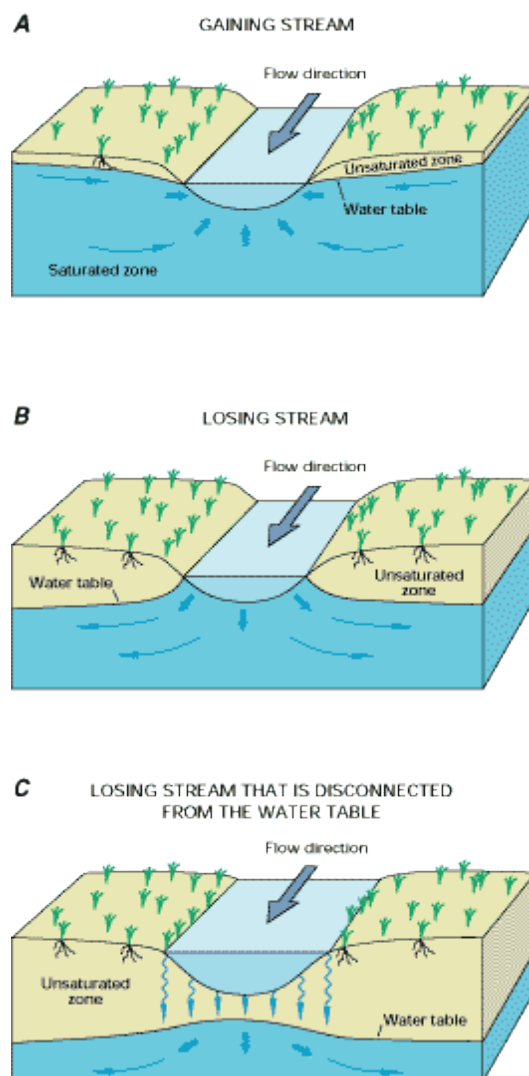


Figure 5-23. Estimated Average Annual InSAR Subsidence in Subbasin 2015-2019

5.6 Interconnected Surface Water

ISW is surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water. If groundwater elevations are higher than the water level in the stream, the stream is said to be a gaining stream because it gains water from the surrounding groundwater. If the groundwater elevation is lower than the water level in the stream, it is termed a losing stream because it loses water to the surrounding groundwater. If the groundwater elevation is below the streambed elevation, the stream and groundwater are disconnected. SGMA does not require that disconnected stream reaches be analyzed or managed. These concepts are illustrated on Figure 5-24.



(Winter *et al.*, 1999)

Figure 5-24. Conceptual Representation of Interconnected Surface Water

Historically, the Salinas River has been a losing stream in the Subbasin, as indicated by net stream exchange going from surface water to groundwater in water budgets presented in Chapter 6. For a losing stream, interconnection is substantially dependent on surface water availability. Groundwater levels, stream stage, and streambed conductance are also factors in interconnection; but surface water availability plays a dominant role in a losing stream system. In addition to winter precipitation, surface water availability along the Salinas River is dependent on water released from upstream reservoirs during the April to October Conservation Release Period. During this period, the reservoirs are managed in part for groundwater recharge. Without reservoir releases, the river would be more disconnected, particularly during the summer season when natural surface water flows are minimal.

5.6.1 Data Sources

The updated SVIHM (Montgomery & Associates, 2025b; version 1) is used to map the potential locations of ISW, as described in Chapter 4 and shown on Figure 4-9, it does not identify any locations of ISW in the Eastside Subbasin, based on both model simulations and observed groundwater levels. However, this GSP describes the process that would be used to evaluate surface water and groundwater interconnection should it exist in the future. There is no observed data that verifies the location and extent of surface water connection to groundwater the Subbasin, nor the extent to which groundwater extraction depletes surface water. Therefore, this section describes the hydraulic principles that establish the relationship between surface water and groundwater, upon which the GSP baseline conditions and monitoring network are based, and summarizes the use of the SVIHM to estimate and evaluate historical ISW depletions due to pumping.

5.6.2 Evaluation of Surface Water and Groundwater Interconnection

Groundwater extraction can alter flows between surface water and groundwater. Flow changes related to interconnected surface and groundwater could be due to reductions in groundwater discharge to surface water or increases in surface water recharge to groundwater. These 2 changes together constitute the change in the amount of surface water depletion due to pumping. However, the hydrology of the Salinas Valley is also influenced by operations of the San Antonio and Nacimiento Reservoirs. Releases from the reservoirs during the MCWRA Conservation Release Period provide water in the river that recharges the aquifer and ensures water is available in downstream reaches for re-diversion and groundwater recharge. Recharge from reservoir releases is an expected result of reservoir operations and is a substantial component of the subbasin's water budget. Less water is present along the river during drought years, especially in the summer, when little is released from the reservoirs. Although the Salinas River does not run through the Eastside Subbasin, groundwater levels in adjacent subbasins are affected by these reservoir releases.

If ISW is identified in the Eastside Subbasin, depletion of ISW will be estimated by evaluating the change in the modeled stream leakage with and without pumping. Stream leakage is water flowing from the stream into the groundwater system. A model simulation without any groundwater pumping in the model (i.e., SVIHM with no pumping) was compared to the model simulation with groundwater pumping (i.e., SVIHM with pumping). The difference in stream leakage between the 2 models is the depletion caused by the groundwater pumping. This comparison was undertaken for the entire area of the Salinas Valley included in the model, which includes most of the Subbasin. The methodology for quantifying ISW depletions is described in detail by Barlow and Leake (2012).

There are no interconnected segments in the Subbasin, as shown on Figure 4-9, but if there is interconnection in the future the stream depletion differences would be estimated for the interconnected segments only.

5.7 Water Use and Supply

Agricultural use accounts for the majority of water demand within the Subbasin, followed by urban and industrial uses, and then rural domestic use. Water use by wetlands and native vegetation represents a relatively small portion of total demand.

Water supplies in the Eastside Subbasin are almost solely derived from groundwater. Some growers also report a small amount of surface water use to the SWRCB. No recycled water is used in the Subbasin.

5.7.1 Data Sources

The extraction data presented in this section was collected by MCWRA through GEMS, which is part of the GMP, under which groundwater extraction data from non-*de minimis* wells within the SVBGSA subbasins are reported to MCWRA. Until WY 2025, agricultural and urban groundwater extraction data was collected for wells with discharge pipes with an internal diameter greater than 3 inches within Zones 2, 2A, and 2B.

Rural domestic pumping is estimated using the number of drinking water connections based on data compiled for water systems and 2024 County of Monterey parcel data. To estimate water use, the approximate number of connections is multiplied by a constant pumping rate of 0.35 AF/yr per connection.

Any surface water diversions reported within the Subbasin are obtained from eWRIMS. In 2025, eWRIMS was replaced by the CalWATRS.

5.7.2 Groundwater Use

Table 5-4 provides groundwater extraction by water use sector for the Eastside Subbasin from 2021 to 2025. Agricultural pumping was historically reported by MCWRA for the period November 1 through October 31, whereas urban pumping was reported on a calendar-year basis. As of WY 2025, groundwater extraction reported under the GMP aligns with the WY (October 1 through September 30). Rural domestic pumping is estimated on a calendar year basis.

Urban use data from MCWRA aggregates municipal wells, small public water systems, and industrial wells. On average, agricultural use accounted for 95% of groundwater extraction; urban and industrial use accounted for 5%. The GMP allows 3 different reporting methods: water flowmeter, electrical meter, or hour meter. On average, 83% of extractions from 2017 to 2020 were calculated using a flowmeter, 16% electrical meter, and <1%-hour meter. MCWRA ordinance number 5426 requires flowmeters be calibrated every 5 years and be accurate to within +/- 10%. The same ordinance requires annual pump efficiency tests for wells using the electrical meter method. SVBGSA assumes an electrical meter accuracy of +/- 5%.

No groundwater was extracted for managed wetlands or managed recharge. Groundwater use by natural vegetation is assumed to be small and was not estimated for this report.

Table 5-4. WY 2021 to 2025 Groundwater Use

	Groundwater Use (AF/yr)				
	2021	2022	2023	2024	2025
Rural Domestic	670	670	670	670	670
Urban (includes industrial)	13,200	13,800	12,900	13,140	14,290
Agricultural	68,800	68,900	67,500	67,730	62,770
Managed Wetlands	0	0	0	0	0
Managed Recharge	0	0	0	0	0
Natural Vegetation	0	0	0	0	0
Total	82,670	83,370	81,070	81,540	77,730

5.7.3 Surface Water Use

Annual Salinas River watershed diversion data can be obtained from the SWRCB's eWRIMS website, which was replaced by CalWATRS in 2025 (SWRCB, 2024 and 2026b). Table 5-5 shows the surface water diversions from WY 2021 to 2025 in the Eastside Subbasin. All surface water is used for irrigation and is reported as a Statement of Diversion and Use.

Table 5-5. WY 2021 to 2025 Surface Water Diversions

	Surface Water Diversions (AF/yr)				
eWRIMS/CalWATRS Diversions	2021	2022	2023	2024	2025
Statement of Diversion and Use	400	500	500	520	440

5.7.4 Total Water Use

Many growers and residents have noted that some irrigation water use is reported both to the SWRCB as Salinas River diversions and to the MCWRA as groundwater pumping. For WY 2024 and earlier, because no direct information on reporting overlap was available, all surface water reported as a Statement of Diversion and Use was assumed to be duplicative and was excluded from the Subbasin total water use calculation. It is possible that not all of the surface water diversions excluded are being reported to both SWRCB and MCWRA, in which case total water use may be up to that amount greater than calculated here. This accounting is done to calculate the total water use and is not meant to imply that SVBGSA classifies any or all the reported diversions as groundwater.

Beginning in WY 2025, MCWRA revised its GMP reporting process to allow reporters to indicate whether they also report surface water use to SWRCB. Based on this self-reported data, approximately 12,750 AF/yr out of the total agricultural groundwater extraction reported to MCWRA was also reported to the SWRCB. Because this amount exceeds the total surface water diversions reported within the Eastside Subbasin to SWRCB, it is assumed that it encompasses those diversions. However, it is possible that this assumption is incorrect, in which case total water use may be up to 440 AF/yr greater than calculated here.

In the Eastside Subbasin, total water use consists entirely of groundwater extractions only and is summarized on Figure 5-25. SVBGSA will continue to work with stakeholders to refine the method used to resolve double counting.

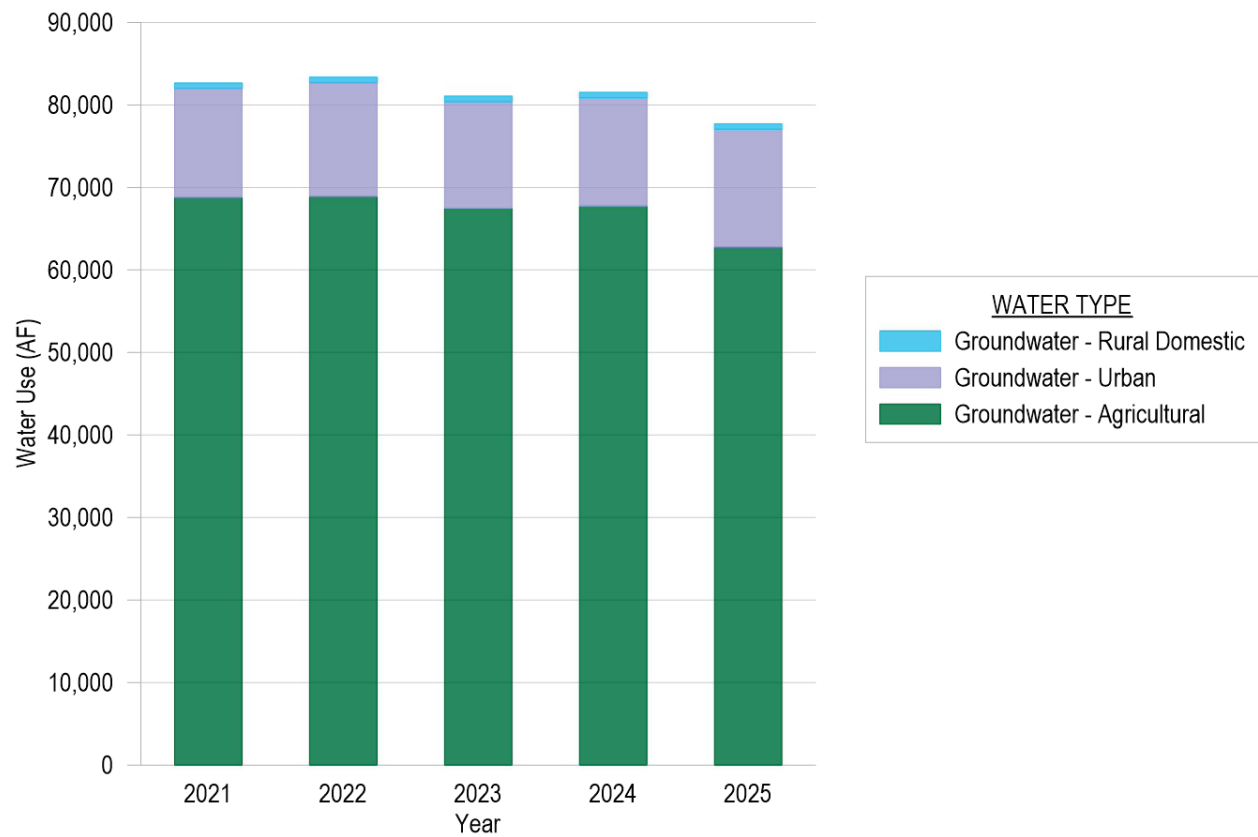


Figure 5-25. WY 2021 to 2025 Total Water Use by Water Source Type and Water Use Sector

6 WATER BUDGETS

This chapter summarizes the estimated water budgets for the Eastside Subbasin, including information required by the GSP Regulations and additional content needed to support effective groundwater sustainability planning. In accordance with the GSP Regulations § 354.18, a water budget provides an accounting and assessment of the total annual volume of surface water and groundwater entering and leaving the basin, including historical, current, and projected water budget conditions, and the change in the volume of groundwater in storage. For the purposes of this chapter, historical is WY 2003-2020 and current is the last 2 years in the SVIHM, WY 2021-2022. Water budgets are reported in graphical and tabular formats, where applicable.

The previous water budgets described in the approved GSP were developed using best tools and methods available at the time. Since the release and approval of the original GSP, groundwater models were updated. Updating the water budgets for this Subbasin using these new, best available tools is important for maintaining consistency with adjacent Subbasins managed by the SVBGSA. This section describes the water budgets for this Subbasin in a manner consistent with GSPs for other subbasins in the Valley.

6.1 Overview of Water Budget Development

Historical/current and projected water budgets are developed using similar methods, but with different groundwater models. For each period, surface water and groundwater budgets are developed together but evaluated and presented separately.

Historical and current water budgets are created using the SVIHM, initially developed by the USGS and subsequently updated by the SVBGSA. The historical and current water budgets presented herein are based on results from the updated SVIHM. The SVIHM is a numerical groundwater-surface water model that is constructed using version 2 of the MODFLOW One-Water Hydrologic Flow Model (MODFLOW-OWHM) code (Boyce *et al.*, 2020). This code is a version of the USGS groundwater flow code MODFLOW that estimates the agricultural supply and demand through the Farm Process (U. S. Geological Survey, 2026).

The model area covers the Salinas Valley from the Monterey-San Luis Obispo County Line in the south to the Pajaro Basin in the north, including the offshore extent of the major aquifers. The model includes operations of the San Antonio and Nacimiento reservoirs.

The SVIHM is supported by 2 submodels: a geologic model known as the Salinas Valley Geologic Model (SVGM) and a watershed model known as the Salinas Valley Watershed Model (SVWM), the latter which uses the Hydrologic Simulation Program – Fortran (HSPF) code. Additional details on the development and calibration of the original model development and

calibration are provided by USGS (2026), and a summary of model updates and recalibration is described in Montgomery & Associates (Montgomery & Associates, 2026b).

Future water budgets are developed using the Salinas Valley Operational Model (SVOM), which was initially developed by the USGS and MCWRA and subsequently updated by SVBGSA. The SVOM uses a similar framework and processes as the SVIHM, but is specifically designed to simulate future scenarios or alternative reservoir operations. It incorporates complex surface water operations through the Surface Water Operations module. Information on model inputs, design, and results is summarized in USGS (2026), and initial updates are documented by Montgomery & Associates (2025b).

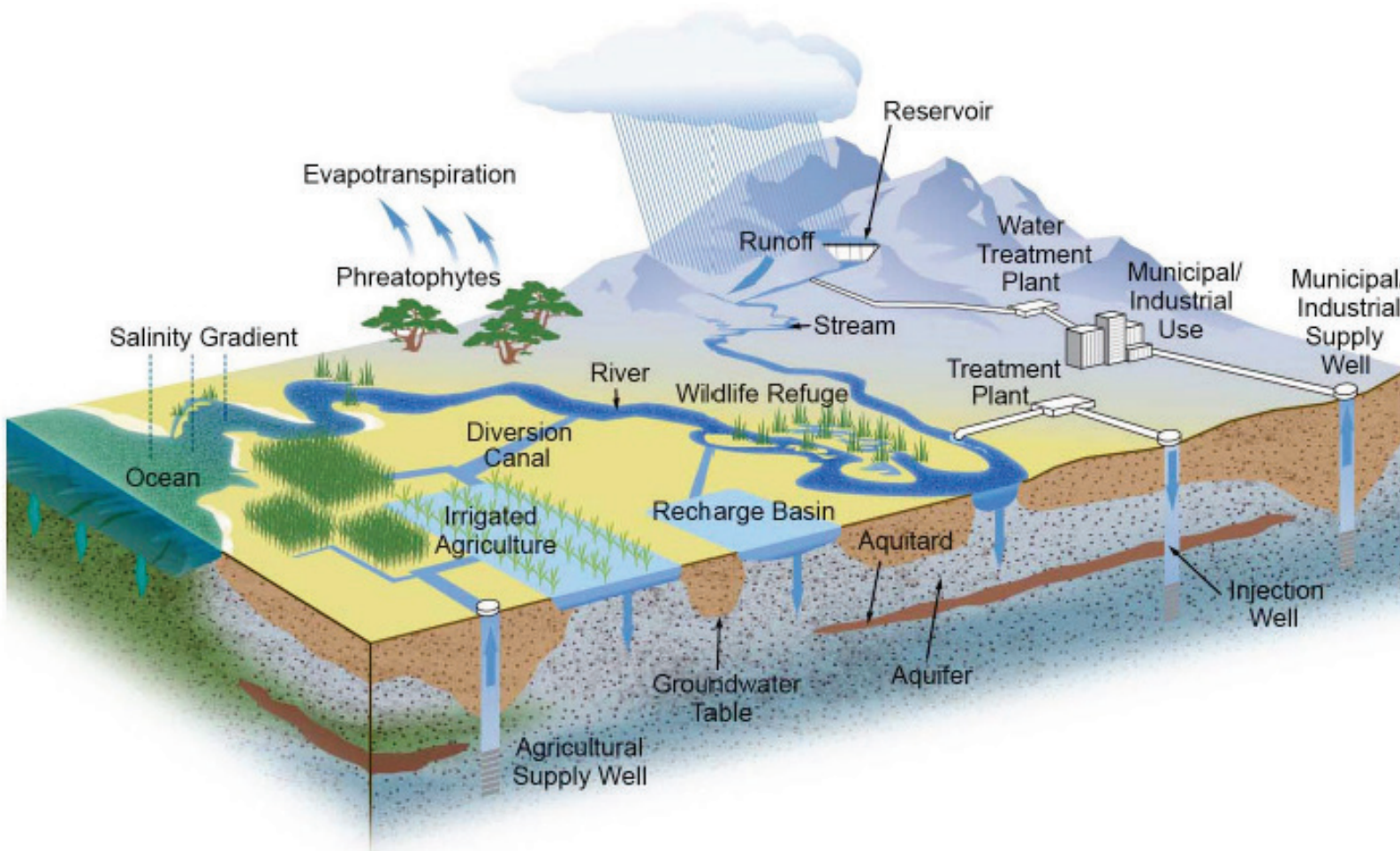
Consistent with GSP Regulations § 354.18, a complete groundwater budget is developed for each principal aquifer for each water budget period. In the Eastside Subbasin, there is a single principal aquifer.

6.1.1 Water Budget Components

The water budget is an inventory of the Subbasin's surface water and groundwater inflows and outflows. Some components of the water budget can be measured, such as groundwater pumping from metered wells, precipitation, and surface water diversions. Other components are not easily measured and can be estimated using groundwater models, such as the SVIHM; these include unmetered agricultural pumping, recharge from precipitation and applied irrigation, and change of groundwater in storage. Figure 6-1 presents a general schematic diagram of the hydrogeologic conceptual model that is included in the water budget (DWR, 2020d).

The water budgets for the Subbasin are calculated within the following boundaries:

- **Lateral boundaries.** The perimeter of the Eastside Subbasin within the SVIHM is shown on Figure 6-2.
- **Bottom.** The base of the groundwater subbasin as described in the HCM, which has been updated with new data, is now defined as the contact with the granite for the portion of the Subbasin that is near the Gabilan Range, and the “usable” portion of the Basin according to the previous model developed by Durbin *et al.* in 1978. In this way, the conceptual model remains focused on the primary areas of groundwater extraction, while acknowledging the very physical boundaries that impact extraction where they are observed. The water budget is not sensitive to the exact definition of this base elevation because the base is defined as a depth below where there is not significant inflow, outflow, or change in storage.
- **Top.** The top of the water budget area is above the ground surface so that surface water is included in the water budget.



(from DWR, 2020d)

Figure 6-1. Schematic Hydrogeologic Conceptual Model

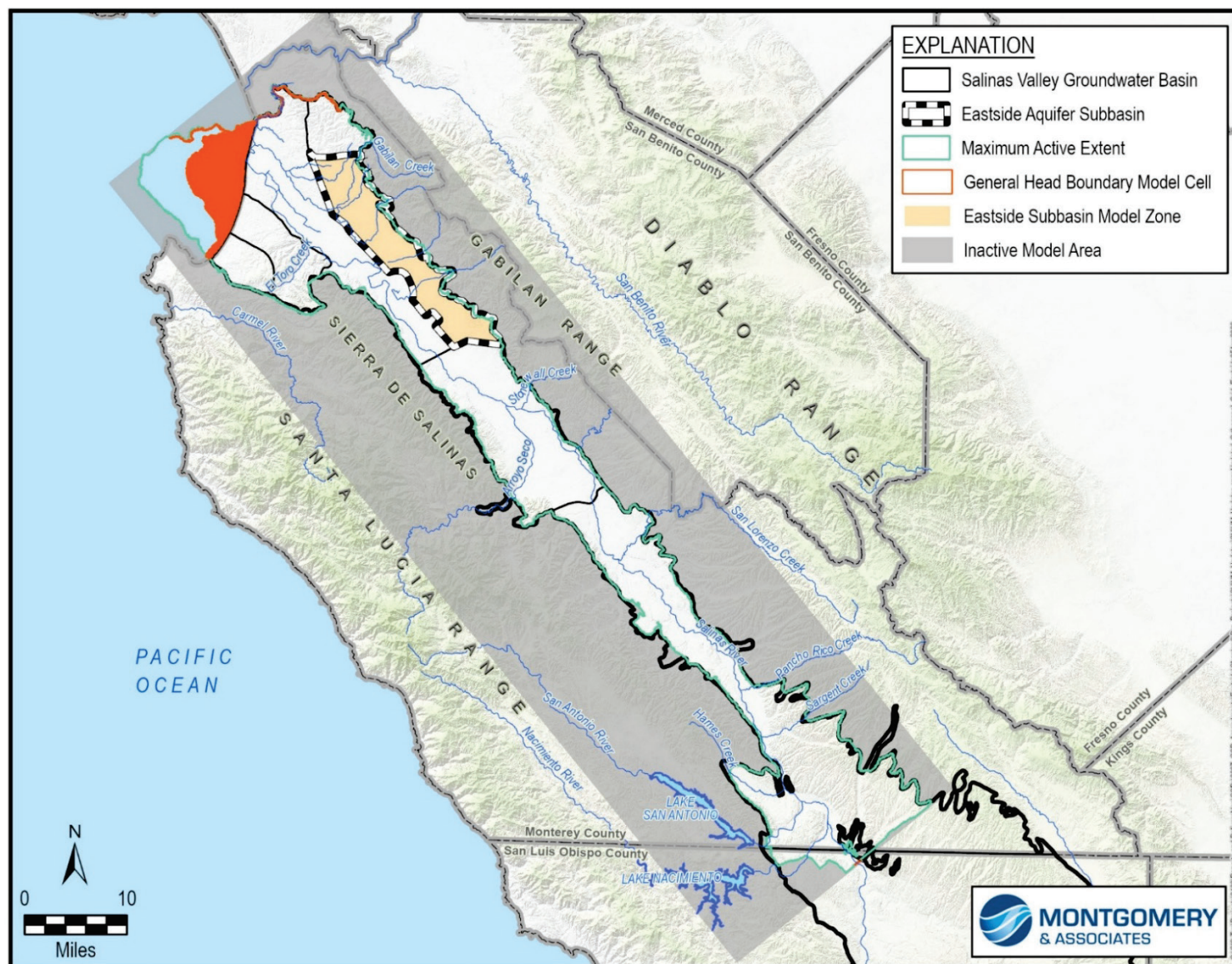


Figure 6-2. Zones and Boundary Conditions for the SVIHM

The Eastside Subbasin water budget includes the following components:

Surface Water Budget:

- Inflows
 - Precipitation runoff
 - Surface water inflows from streams that enter the subbasin, including Chualar Creek, Quail Creek, Alisal Creek, Natividad Creek, Gabilan Creek, Santa Rita Creek, and several other smaller creeks
 - Groundwater discharge to streams
- Outflows
 - Stream discharge to groundwater
 - Outflow to neighboring subbasins along Gabilan Creek, Santa Rita Creek, and other smaller streams

Groundwater Budget:

- Inflows
 - Deep percolation from precipitation and applied irrigation
 - Stream discharge to groundwater
 - Subsurface inflows, including inflow from:
 - Inflow from the Forebay Subbasin
 - Inflow from the Langley Subbasin
 - Inflow from the 180/400 Subbasin
 - Inflow from the surrounding watersheds that are not in other DWR subbasins
- Outflows
 - Evapotranspiration (ET) from groundwater (crop and native vegetation)
 - Groundwater pumping, including urban, industrial, and agricultural
 - Groundwater discharge to streams
 - Subsurface outflows, including outflow to:
 - Outflow to the Forebay Subbasin
 - Outflow to the Langley Subbasin
 - Outflow to the 180/400 Subbasin
 - Outflow to the surrounding watershed that are not in other DWR subbasins

The difference between groundwater inflows and outflows is equal to the change of groundwater in storage.

6.1.2 Water Budget Time Frames

The GSP Regulations require development of water budgets for 3 periods: historical, current, and projected. These time frames are defined as follows, and the specific periods selected are described in Sections 6.1.2.1 to 6.1.2.3:

- The historical water budget evaluates how past water use and supply availability affected aquifer conditions and the ability of groundwater users to operate within the sustainable yield. GSP Regulations require that the historical water budget start with the most recently available information and extend back a minimum of 10 years. DWR's Water Budget Best Management Practice (BMP) document further states that the historical water budget should help develop an understanding of how historical conditions concerning hydrology, water demand, and surface water supply availability or reliability have impacted the ability to operate the basin within the sustainable yield. Accordingly, historical conditions should include the most reliable historical data that are available for GSP development and water budget calculations.
- The current water budget characterizes recent conditions, helping the GSA and DWR understand existing supply, demand, and change in storage under recent population, land use, and hydrologic conditions. While DWR does not define a specific timeframe, current conditions are generally the most recent conditions for which adequate data are available and may include an average over a few recent years with various climatic and hydrologic conditions. Current, as used here in this GSP Amendment 2, is defined by the last 2 years in the SVIHM, WY 2021 and WY 2022. These years were drier than normal and do not represent average hydrologic conditions. More recent periods during GSP implementation will be included in 5-year GSP periodic evaluations.
- The projected water budget is intended to quantify the estimated future baseline conditions without additional PMAs. The projected water budget estimates the future baseline conditions concerning hydrology, water demand, and surface water supply over a 50-year planning and implementation horizon. It is based on historical trends in hydrologic conditions that are used to project forward 50 years, without climate change. Uncertainty associated with climate change is addressed at the end of the chapter.

Although there is a significant variation between wet and dry seasons, the GSP does not consider separate seasonal water budgets for the groundwater budget. All water budgets are developed for complete WYs. Selected periods for the historical and current water budgets are summarized in Table 6-1 and on Figure 6-3. and described in Sections 6.1.2.1 and 6.1.2.2.

Table 6-1. Summary of Historical and Current Water Budget Periods

Period	Proposed Date Range	Water Year Types Represented in Period	Rationale
Historical	WY 2003 through 2020	Dry: 5 Dry-Normal: 5 Normal: 2 Wet-Normal: 0 Wet: 6	Provides insights on water budget response to a wide range of variations in climate and groundwater use over an extensive period of record. Throughout this period, changes in water use efficiency and cropping patterns remain relatively stable.
Current	WY 2021 and 2022	Dry: 1 Dry-Normal: 1	Last years in the SVIHM. Best reflection of current land use and recent water use conditions based on best available data.

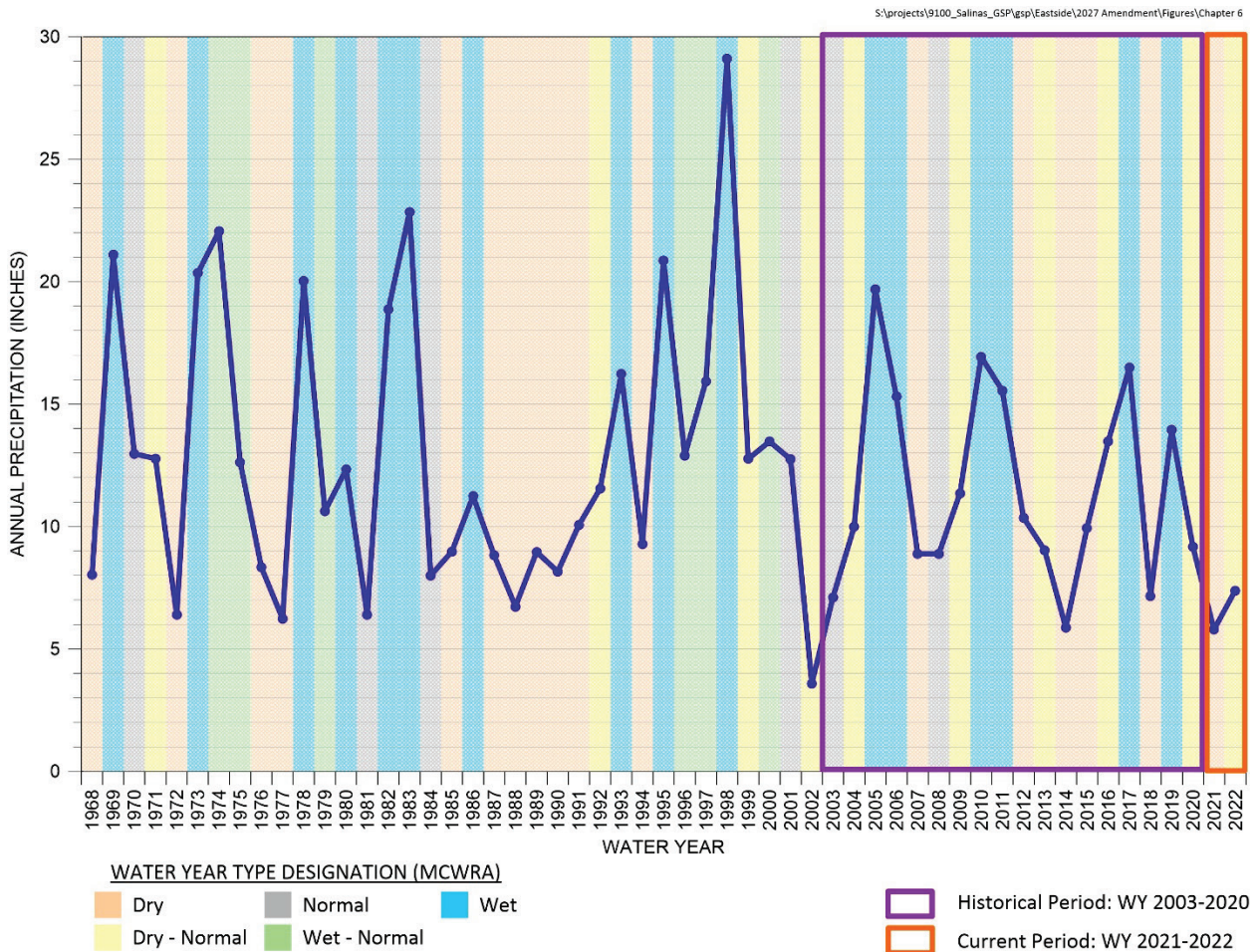


Figure 6-3. Climate and Precipitation for Historical and Current Water Budget Periods

6.1.2.1 Historical Water Budget Period

The historical water budget is developed for the period WY 2003 – WY 2020 (October 2002 through September 2020). Although the SVIHM simulation covers WYs 1968 through 2022, the water budget focuses on WY 2003 through 2020 because this period includes relatively stable water use efficiency and cropping patterns across the Salinas Valley. Therefore, this historical period more closely represents current water use practices. WYs 2003 through 2020 comprise a representative time period with both wet and dry periods in the Subbasin (Table 6-1, Figure 6-3).

6.1.2.2 Current Water Budget Period

The current water budget covers WYs 2021 and 2022, the last 2 years included in the SVIHM. While these years appropriately meet the regulatory requirement for using the most recent hydrology, water supply, water demand, and land use information for which there is data available, the years are classified as dry and dry-normal, respectively, and thus do not represent average hydrology.

6.1.2.3 Future Projected Water Budgets Period

Future projected conditions are based on model simulations using the updated SVOM groundwater flow model, which incorporates current reservoir operation rules and a baseline climate sequence derived from historical conditions. A repeating 25-year projected climate sequence is used to represent long-term variability. Using this approach, Montgomery & Associates developed a projected baseline scenario that represents status quo conditions. This scenario includes estimated sea level rise but does not incorporate broader climate change effects, which are incorporated later in the chapter. The projected baseline serves as the reference for assessing potential PMAs.

6.2 Rop Overview of Data Sources for Water Budget Development

Table 6-2 provides detailed water budget components and known model assumptions and limitations for each. A few water budget components are directly measured, but most water budget components are either estimated as input to the model or simulated by the model. Both estimated and simulated values are underpinned by certain assumptions, which can lead to uncertainty in the water budget. However, inputs to the SVIHM were carefully selected using best available data, reducing the level of uncertainty.

No model is a perfect representation of natural condition and level of calibration. However, the updated SVIHM's calibration error is within reasonable bounds, and it is the best available scientific tool for estimating water budgets for the GSP.

Table 6-2. Summary of Water Budget Component Data Source from the SVIHM

Water Budget Component	Source of Component Data	Limitations
Precipitation	Incorporated in calibrated model as part of land use process	
Surface Water Inflows		
Inflow from Streams Entering Basin	Inputs from watershed models for all creeks	Not all creeks are gaged
Groundwater Discharge to Streams	Estimated by calibrated model	Based on calibration of streamflow to available data from gaged creeks
Overland Runoff	Estimated by calibrated model	Based on land use, precipitation, and soils specified in model
Surface Water Outflows		
Streambed Recharge to Groundwater	Estimated by calibrated model	Based on calibration of streamflow to available data from gaged creeks and groundwater level data from nearby wells
Diversions	Simulated from original model	Some input data are uncertain
Outflow to Streams Leaving Basin	Simulated from calibrated model for all creeks	Not all creeks are gaged
Groundwater Inflows		
Streambed Recharge to Groundwater	Estimated by calibrated model	Based on calibration of streamflow to available data from gaged creeks and groundwater level data from nearby wells
Deep percolation of irrigation water	Estimated by calibrated model based on demands based on crop, acreage, temperature, and soil zone processes	No measurements available; based on assumed parameters for crops and soils
Subsurface Inflow from neighboring basins	Estimated by calibrated model	Limited groundwater calibration data at adjacent subbasin boundaries
Subsurface Inflow from surrounding watershed other than neighboring basins	Estimated by calibrated model	Limited groundwater calibration data at adjacent subbasin boundaries
Groundwater Outflows		
Groundwater Pumping	Reported GEMS data for historical urban pumping, and some small water systems. Estimated data for urban pumping pre-1995. Simulated agricultural pumping calibrated to reported data. Rural domestic pumping for the Langley Subbasin is estimated based on population and per capita assumptions.	Rural residential pumping within MCWRA Zone 2A not simulated in model
Groundwater Discharge to Streams	Estimated by calibrated model	Based on calibration of streamflow to available data from gaged creeks and groundwater level data from nearby wells
Subsurface Outflow to Adjacent Basins	Estimated by calibrated model	Limited calibration data at adjacent subbasin boundaries
ET from Groundwater	Estimated by calibrated model	Based on representative plant group and uniform extinction depth

6.3 Historical and Current Water Budgets

Water budgets for the historical and current periods are presented below. The surface water budgets are presented first, followed by the groundwater budgets.

6.3.1 Historical and Current Surface Water Budget

The surface water budget accounts for the inflows and outflows for the streams within the Subbasin. This includes flows from rivers and tributaries entering and exiting the Subbasin, overland runoff to streams, and stream-aquifer interactions. ET by riparian vegetation along stream channels is estimated by the SVIHM as part of the groundwater system and is accounted for in the groundwater budget.

Figure 6-4 shows the model grid cells for the surface water network simulated in the SVIHM. The model accounts for surface water flowing in and out across the subbasin boundary. For this water budget, boundary inflows and outflows are the sum of all locations that cross the Subbasin boundary. In some instances, a simulated stream might enter and exit the Subbasin boundary at multiple locations, such as Natividad Creek and Alisal Creek.

Figure 6-5 shows the surface water budget for the historical period and current period in acre-feet per year (AF/yr), and Table 6-3 shows the average values for components of the surface water budget for the historical and current periods. Positive values are inflows into the stream system, and negative values are outflows from the stream system. The flow between surface water and groundwater (streamflow exchange) in the Subbasin is net negative, which indicates more deep percolation of streamflow to groundwater than groundwater discharge to streams.

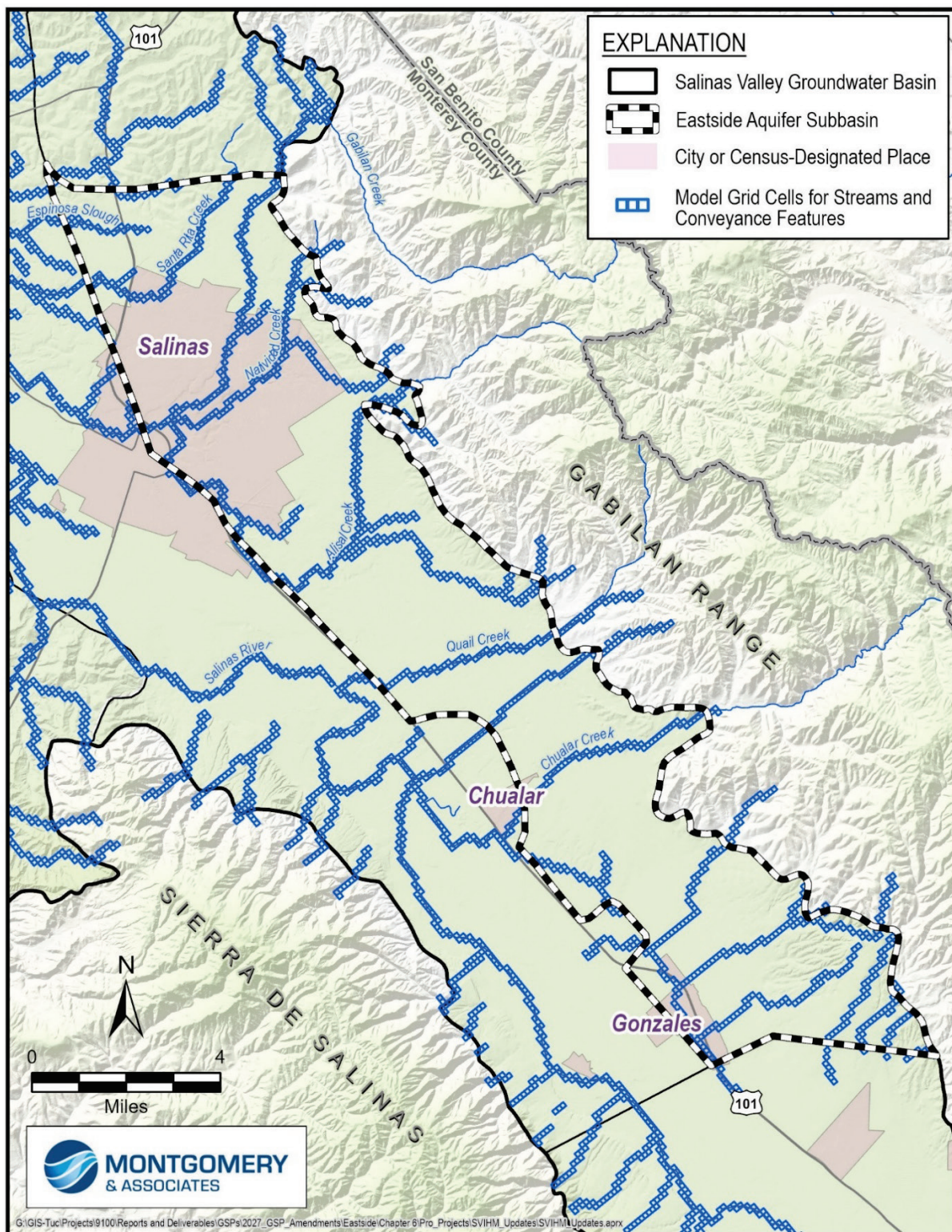


Figure 6-4. Surface Water Network in the Eastside Subbasin from the SVIHM

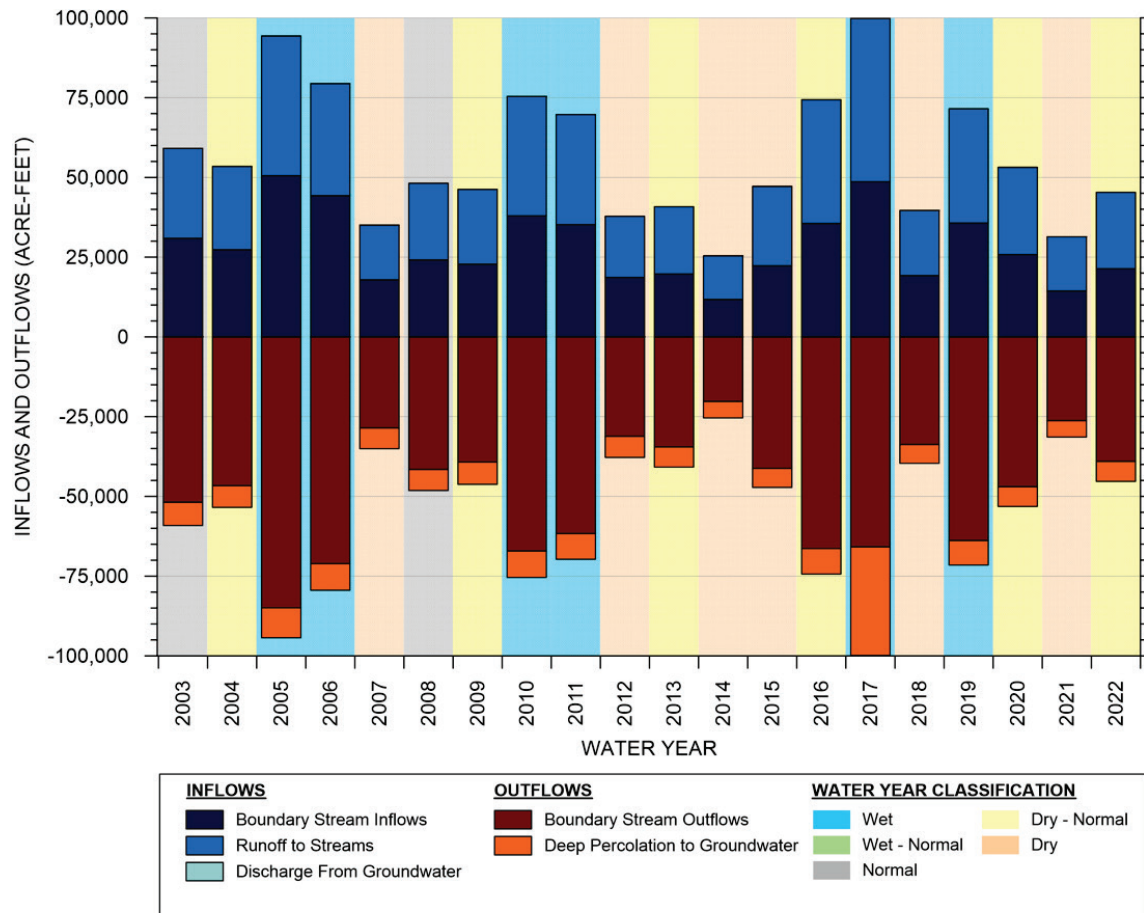


Figure 6-5. Historical and Current Surface Water Budget

Table 6-3. SVIHM-Simulated Surface Water Budget Summary

	Historical Average WY 2003-2020 (AF/yr)	Current WY 2021-2022 (AF/yr)
Boundary Stream Inflows	29,300	17,900
Net Flow between Surface Water and Groundwater	-8,500	-5,700
Overland Runoff to Streams	29,000	20,500
Boundary Stream Outflows	-49,800	-32,700

6.3.2 Historical and Current Groundwater Budget

The groundwater budget accounts for the inflows and outflows to and from the Subbasin's aquifers, based on results from the SVIHM. This includes subsurface inflows and outflows of groundwater at the Subbasin boundaries, recharge, pumping, ET, and net flow between surface water and groundwater. The net effect of these inflows and outflows is reflected in the change in storage.

6.3.2.1 Groundwater Inflow and Outflow Components

The main groundwater inflows into the Subbasin are subsurface inflow from adjacent DWR-designated groundwater basins and subbasins, deep percolation of precipitation and irrigation water, and stream recharge. Groundwater pumping is the predominant groundwater outflow, followed by subsurface outflows to adjacent subbasins. ET and discharge to streams are negligible in this subbasin.

Figure 6-6 shows SVIHM-simulated annual groundwater inflows for the historical and current periods. Total average inflow for the historical period is about 90,000 AF/yr. Deep percolation of streamflow (stream recharge) and subsurface inflows from adjacent subbasins are relatively stable during the historical period, except for substantially large deep percolation in WY 2017. Deep percolation of precipitation and applied irrigation is variable during the historical period. Table 6-4 provides average groundwater inflows for the historical and current period. Subsurface inflows from adjacent subbasins account for roughly two-thirds of all inflows historically and during the current period. Current deep percolation of precipitation and applied irrigation and deep percolation of streamflow are less than during the average historical period. The average historical deep percolation of streamflow of 8,500 AF/yr is heavily influenced by WY 2017. Without that year's data, average deep percolation of streamflow would be only 7,000 AF/yr, which is still greater than the current period average.

Figure 6-7 shows the SVIHM-estimated groundwater outflows for the historical and current periods. The largest outflow in the Subbasin is groundwater pumping, which includes municipal, industrial, and agricultural water users. Table 6-5 provides the SVIHM-estimated average groundwater outflows of the historical and current periods. In both periods, total outflow averaged about 95,000 AF/yr with pumping accounting for more than 90% of outflows. All outflows are shown as negative values.

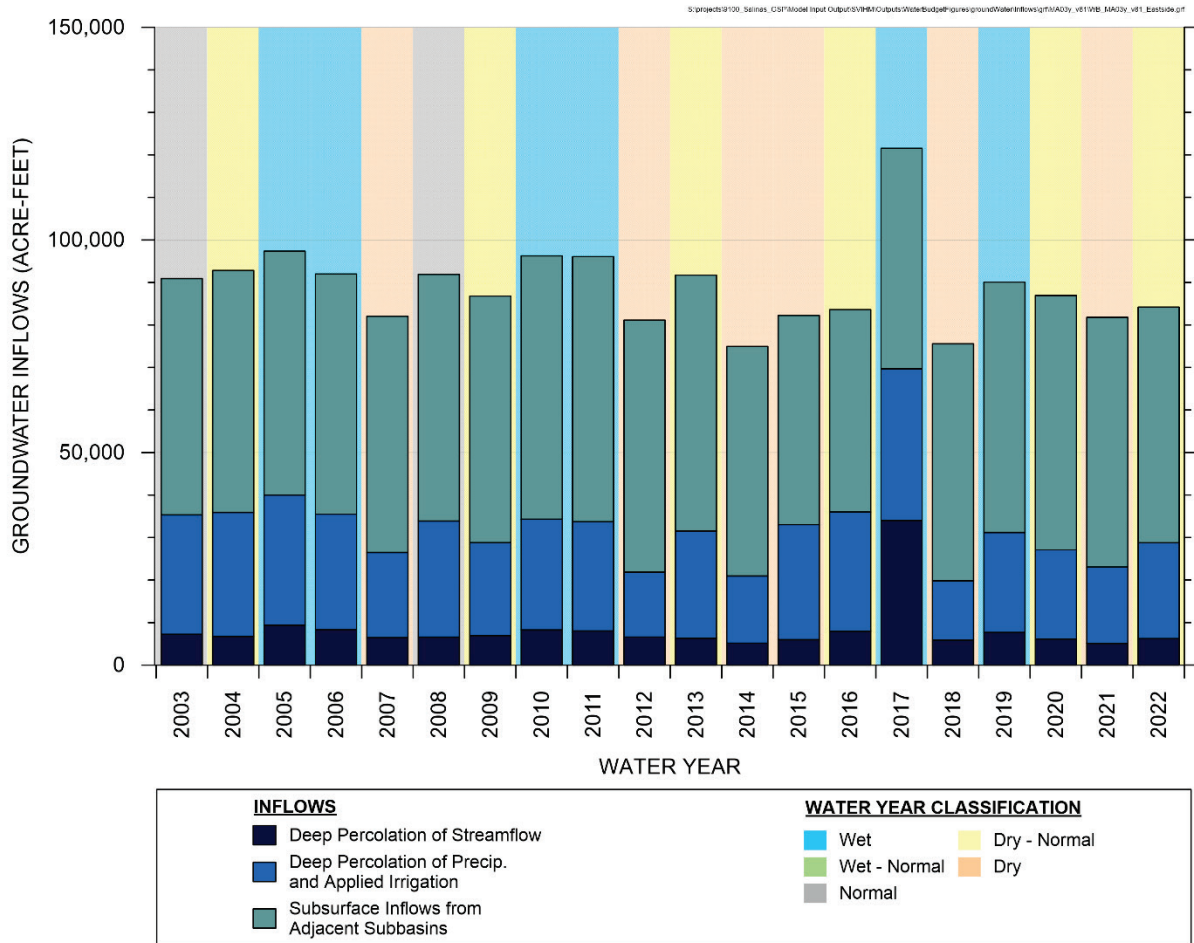


Figure 6-6. SVIHM-Simulated Inflows to the Groundwater System

Table 6-4. SVIHM-Simulated Groundwater Inflows Summary

	Historical Average WY 2003-2020 (AF/yr)	Current WY 2021-2022 (AF/yr)
Deep Percolation of Streamflow	8,500	5,700
Deep Percolation of Precipitation and Applied Irrigation	24,500	20,200
Subsurface Inflow from Adjacent Subbasins	56,600	57,100

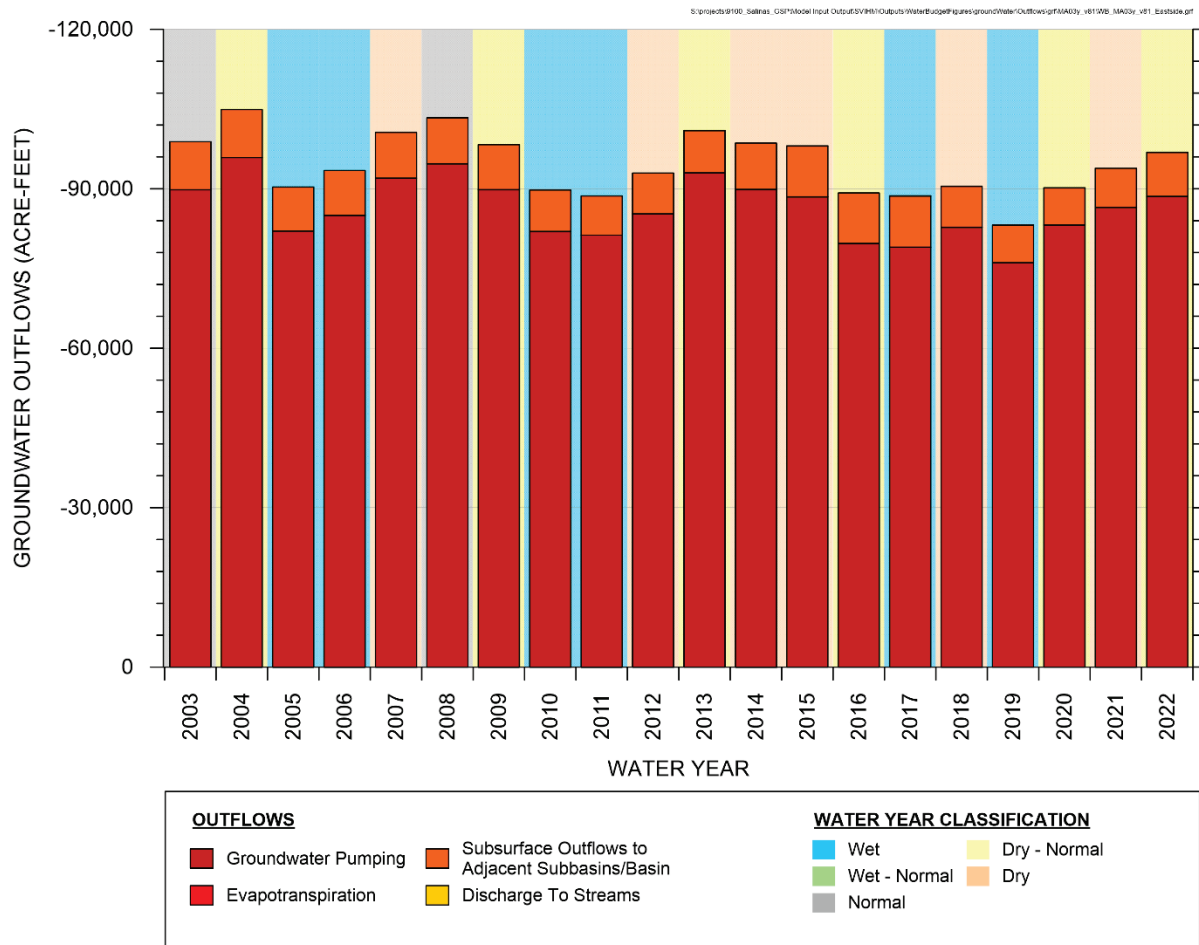


Figure 6-7. SVIHM-Simulated Outflows from the Groundwater System

Table 6-5. SVIHM-Simulated Groundwater Outflows Summary

	Historical Average WY 2003-2020 (AF/yr)	Current WY 2021-2022 (AF/yr)
Groundwater Pumping	-86,100	-87,500
ET from Groundwater	0	0
Subsurface Outflow to Adjacent Subbasins/Basin	-8,400	-7,800
Discharge to Streams	0	0

Figure 6-8 and Table 6-6 show SVIHM-simulated groundwater pumping by water use sector. Groundwater pumping decreased slightly over the historical period. Current period groundwater pumping is similar to the historical average. About 85% of pumped groundwater in the Subbasin is used for agricultural purposes. Urban and agricultural pumping are simulated in the SVIHM;

however, rural domestic pumping, most of which is likely *de minimis* pumping, is not simulated in the model. Rural domestic groundwater use is assumed to be negligible in the Eastside Subbasin, and therefore is not simulated in the model or included in this water budget.

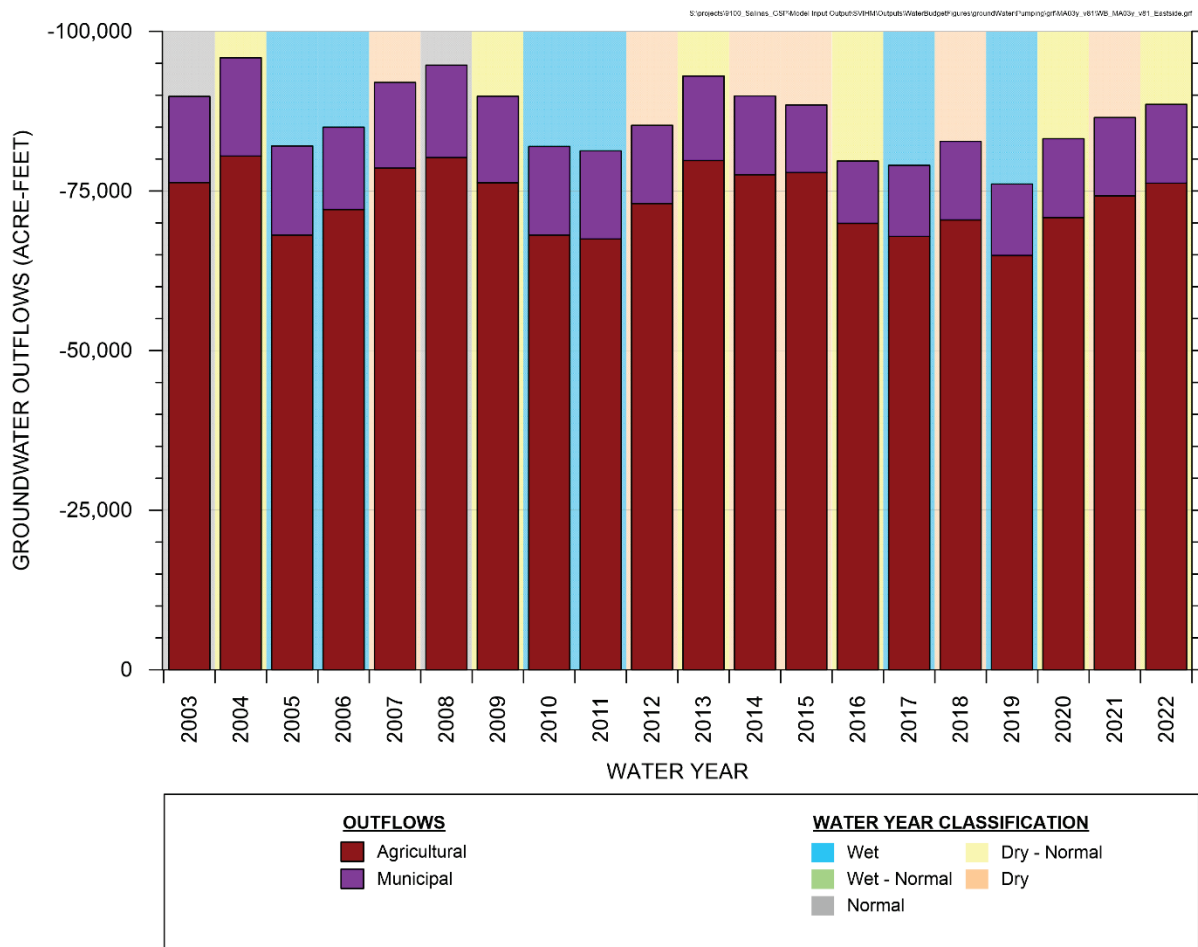


Figure 6-8. SVIHM-Simulated Groundwater Pumping by Water Use Sector

Table 6-6. SVIHM-Simulated Groundwater Pumping by Water Use Sector

	Historical Average WY 2003-2020 (AF/yr)	Current WY 2021-2022 (AF/yr)
Municipal and Industrial	-12,800	-12,300
Agricultural	-73,300	-75,200
Total Pumping	-86,100	-87,500

Figure 6-9 shows the SVIHM-estimated net subsurface flows entering and exiting the Subbasin by watershed and neighboring subbasin. Table 6-7 shows SVIHM-simulated historical and current period subsurface flows. Inflows from Langley, Forebay, and 180/400 Subbasins are several times greater than the outflows to those subbasins. The biggest difference between inflows and outflows is along the border with 180/400 Subbasin, where inflow to Eastside Subbasin is 7 times greater than outflow. Inflow from 180/400 Subbasin averages 45,000 AF/yr and is greater than the absolute values of all other inflows and outflows combined. Groundwater pumping near the city of Salinas has created a groundwater depression (Figure 5-1 through Figure 5-5) that draws groundwater into the Eastside Subbasin from the 180/400 Subbasin, reversing the natural groundwater gradient on the coastward side of Salinas. The other subbasins and the mountain front bordering Eastside that does not belong to any subbasin are all naturally upgradient of Eastside Subbasin.

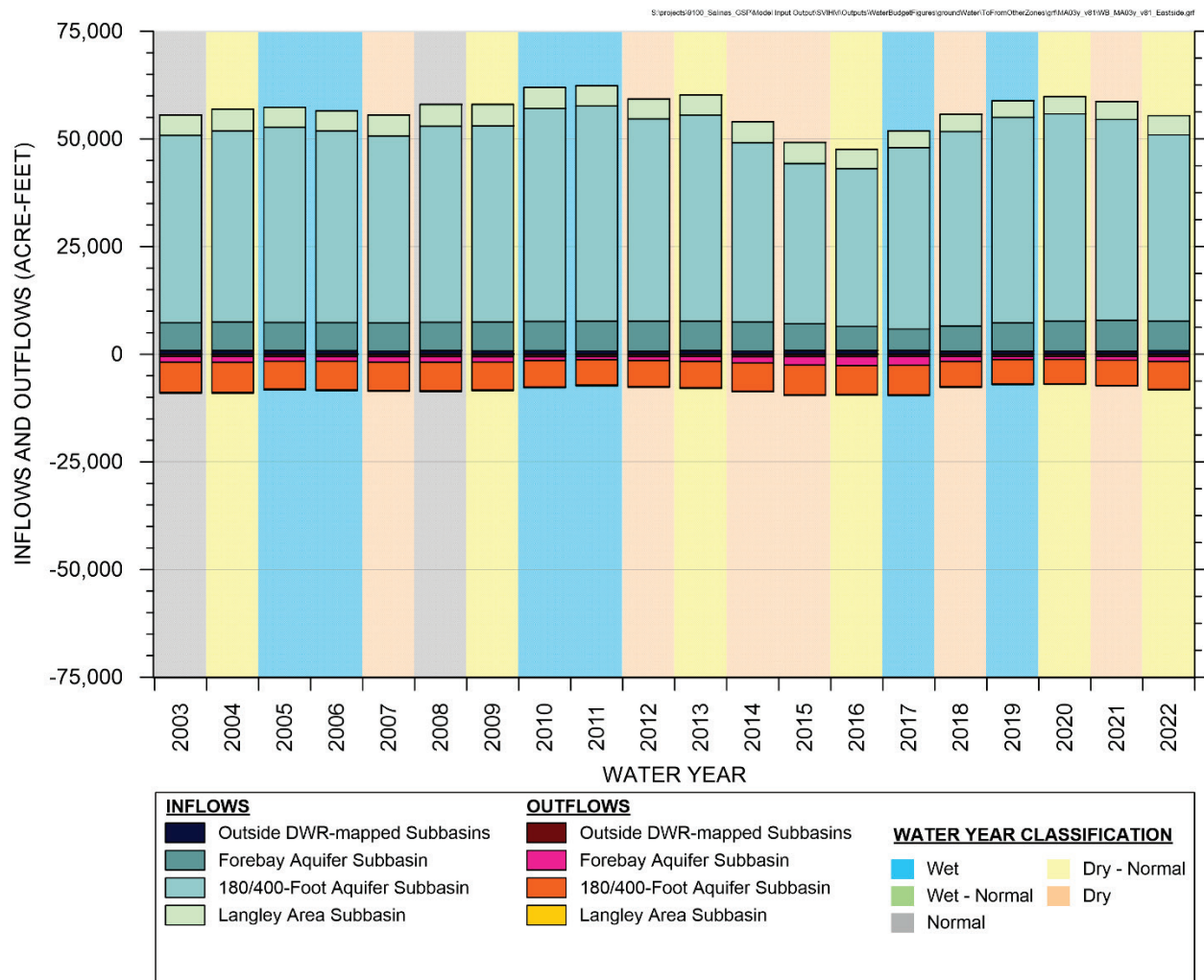


Figure 6-9. SVIHM-Simulated Subsurface Inflows and Outflows from Watershed Areas and Neighboring Basins/Subbasins

Table 6-7. SVIHM-Simulated Net Subbasin Boundary Flows

	Historical Average WY 2003-2020 (AF/yr)	Current WY 2021-2022 (AF/yr)
Langley Subbasin	4,400	4,200
180/400 Subbasin	38,300	38,900
Forebay Subbasin	5,300	6,000
Outside Areas	200	200

6.3.2.2 Change in Groundwater in Storage

Figure 6-10 shows the cumulative and annual change in storage along with the entire annual groundwater budget from the SVIHM. Change in groundwater storage is equal to total groundwater inflows (deep percolation of precipitation and irrigation water, stream recharge, and subsurface inflows) minus total groundwater outflows (pumping and subsurface outflows).

In wet years, deep percolation of precipitation and deep percolation of streamflow increase and pumping decreases, usually resulting in a groundwater storage surplus for that particular year. Groundwater storage loss occurs in all non-wet years on Figure 6-10. Estimated cumulative change dropped about 110,000 AF over the 20 years of the historical and current periods.

A comparison of the historical and current groundwater budgets is shown in Table 6-8. The values in the table are based on the inflows and outflows presented in previous tables. Negative values indicate outflows or depletions. Particularly, a negative change in groundwater storage value indicates groundwater storage depletion associated with lower groundwater levels, while a positive value indicates groundwater storage accretion associated with higher groundwater levels. Averaged over the historical period, the SVIHM estimates that the Eastside Subbasin is in overdraft by 4,800 AF/yr.

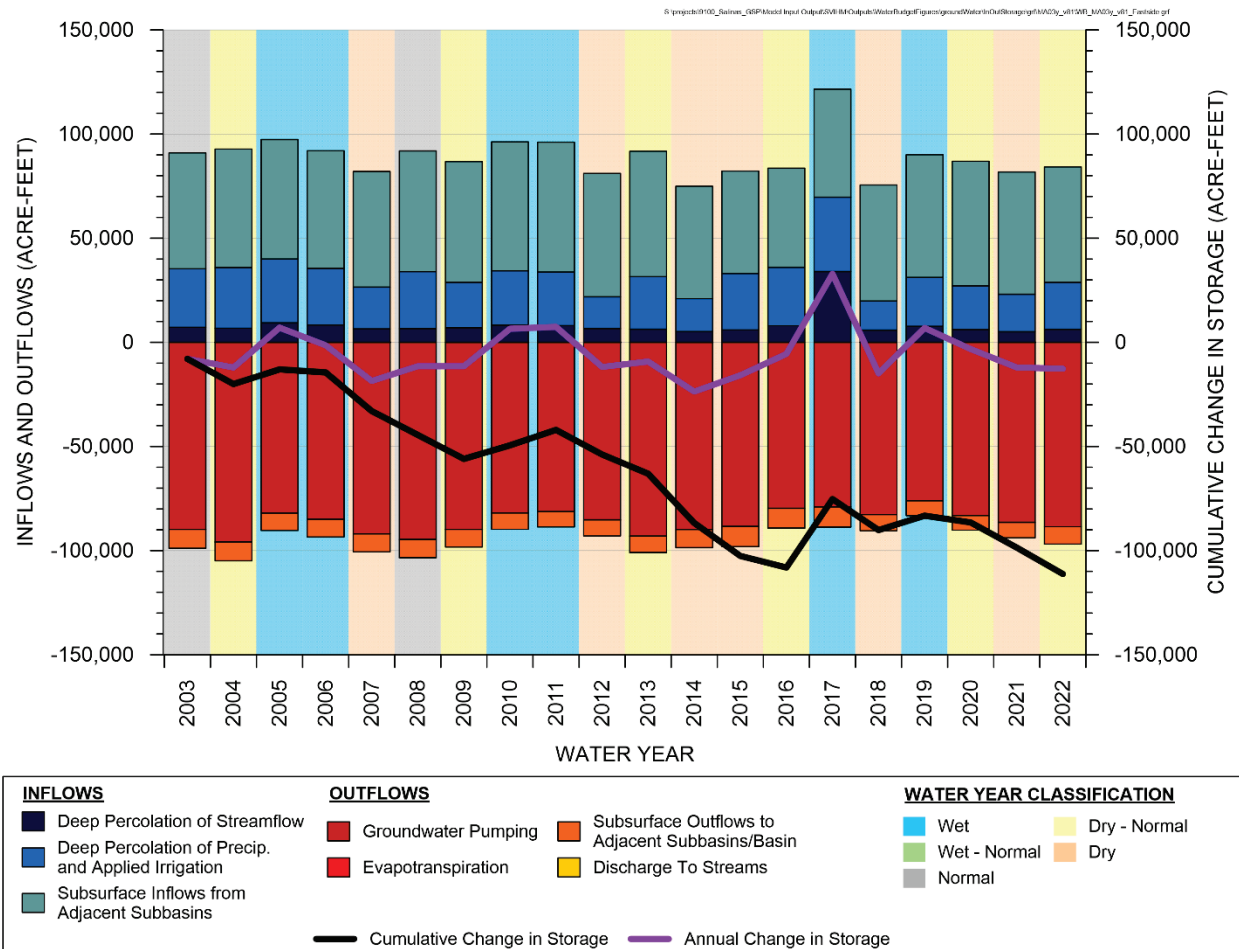


Figure 6-10. SVIHM-Simulated Historical and Current Groundwater Budget

Table 6-8. Summary of Groundwater Budget

	Historical Average WY 2003-2020 (AF/yr)	Current WY 2021-2022 (AF/yr)
Groundwater Pumping	-86,100	-87,500
Net Stream Exchange (gain from streams)	8,500	5,700
Deep Percolation of Precipitation and Applied Irrigation	24,500	20,200
Net flow to Adjacent Subbasins/Basin	48,200	49,300
ET from Groundwater	0	0
Net Storage Gain (+) or Loss (-) (Change in Storage)	-4,800	-12,400

Note: Due to rounding, net storage values may differ by 100 AF/yr from sum of inflows and outflows.

6.3.3 Historical and Current Sustainable Yield

The sustainable yield is the amount of groundwater that can be withdrawn without causing long-term harm to the aquifer. Thus, when undesirable results are avoided, it is the pumping that can be sustained without causing a net decrease in storage. There is no true estimate of the historical and current sustainable yield because elimination of pumping would have caused other flows to change. However, an approximation of the subbasin-wide historical and current sustainable yields can be calculated based on water budget components. The historical and current sustainable yields reflect the amount of Subbasin-wide pumping reduction needed to balance the water budget, resulting in no net decrease in storage. The sustainable yield can be estimated as:

$$\text{Sustainable yield} = \text{pumping} + \text{change in storage}$$

Since the Eastside Subbasin has groundwater level undesirable results in some years, this calculation may overestimate the sustainable yield. Further, as a subbasin-wide calculation, the sustainable yield obscures geographic differences within the Subbasin. To avoid undesirable results, greater pumping reductions may need to occur in some parts of the subbasin and less in other parts. More refined analysis of the projected sustainable yield will be done in conjunction with demand management feasibility studies.

For this sustainable yield discussion and associated computations, groundwater pumping outflows are reported as positive values, which is opposite of how the values are reported in the water budget tables.

Table 6-9 shows the estimated historical and current period sustainable yields for the Subbasin, both of which are less than historical and current period pumping. These estimates reflect total simulated storage change in the Subbasin, and do not relay geographic variability in groundwater levels, nor the ability to meet SMC.

Table 6-9. Historical and Current Sustainable Yield

	Historical Average WY 2003-2020 (AF/yr)	Current WY 2021-2022 (AF/yr)
Total Subbasin Pumping	86,100	87,500
Change in Storage	-4,800	-12,400
Estimated Sustainable Yield	81,300	75,100

Note: Pumping is shown as positive value for this computation.

6.4 Projected Water Budgets

Projected water budgets are extracted from the updated SVOM, which simulates future hydrologic conditions for a representative sequence of potential climate years. Using a repeating 25-year projected climate period, a projected baseline scenario represents status quo conditions. The SVOM simulation period extends from the end of the historical model and runs from WY 2023 through WY 2072.

The baseline averaging period is defined as WY 2040 through 2064, a 25-year window during which PMAs are anticipated to be operational. This baseline water budget serves as the reference condition against which potential PMAs are evaluated. The baseline scenario reflects a single plausible climate sequence. Although evaluating multiple climate sequences would provide a broader understanding of potential future variability, this approach establishes a consistent baseline that allows project simulations to be directly compared to isolate project-specific effects.

Model information and assumptions are summarized in a model summary report by Montgomery & Associates (2025b). Since the SVOM does not simulate seawater intrusion, the Salinas Valley Seawater Intrusion Model (SWIM) is used for the projection of advancement of seawater intrusion and loss of usable storage due to seawater intrusion (Montgomery & Associates, 2026b)

6.4.1 Assumptions Used in Projected Water Budget Development

The assumptions incorporated into the SVOM for the projected water budget simulations include:

- **Land Use:** Agricultural land use is assumed to be static, aside from a semi-annual change to represent crop seasonality. The annual pattern repeats 2022 land use every year in the model.
- **Urban growth** according to Association of Monterey Bay Area Governments (AMBAG) projections is included in this simulation. It assumes urban growth is infill, keeping the same urban footprint. If urban growth replaces agriculture, the effect on extraction will also depend on the location of agricultural water use replaced.
- **Reservoir Operations:** The reservoir operations reflect MCWRA's current approach to reservoir management, as described in MCWRA's Nacimiento Dam Operation Policy (MCWRA, 2018b). The implementation of MCWRA operational rules in the previous SVOM is described in Wood Environment & Infrastructure Solutions (2023); only minor modifications were made in the current update. Those refinements were intended to better represent natural variability in stream inflow, align operational rules with MCWRA's

operational approach, and remain consistent with MCWRA's preparation of the Salinas River Operations HCP.

- **Stream Diversions:** The SVOM explicitly simulates only 2 stream diversions in the Salinas Valley Basin: Clark Colony and the SRDF. The Clark Colony diversion is located along Arroyo Seco and diverts stream water to an agricultural area nearby. The SRDF came online in 2010 and rediverts stored reservoir water to the Castroville Seawater Intrusion Project (CSIP) area. Clark Colony diversions are repeated from the historical record to match the WY. SRDF diversions are made throughout the duration of the SVOM whenever reservoir storage and streamflow conditions allow during the period from April through October. For purposes of the projected water budgets, SRDF diversions occur at up to a rate of 36 cubic feet per second.
- **Recycled Water Deliveries:** Recycled water has been delivered to the CSIP area since 1998 as irrigation supply. The SVOM continued these recycled water deliveries throughout the duration of the model similar to the last years of the historical model.

6.4.2 Projected Surface Water Budget

As with the historical and current periods, the projected surface water budget accounts for the inflows and outflows for the streams within the Subbasin. This includes flow from streams entering and exiting the Subbasin, precipitation that falls directly onto streams, overland runoff to streams, and stream-aquifer interactions. ET by riparian vegetation along stream channels is estimated by the updated SVOM as part of the groundwater system and is accounted for in the groundwater budget.

Figure 6-11 shows the surface water budget for the projected period. Table 6-10 shows the average values for components of the surface water budget for the projected period. Positive values are inflows to the stream system, and negative values are outflows from the stream system. Overall trends are the same as the historical surface water budget. Both inflow components (boundary inflows and overland runoff to streams) are about equal. The sum of those 2 inflows is slightly greater than boundary outflows, because some surface water is lost to groundwater.

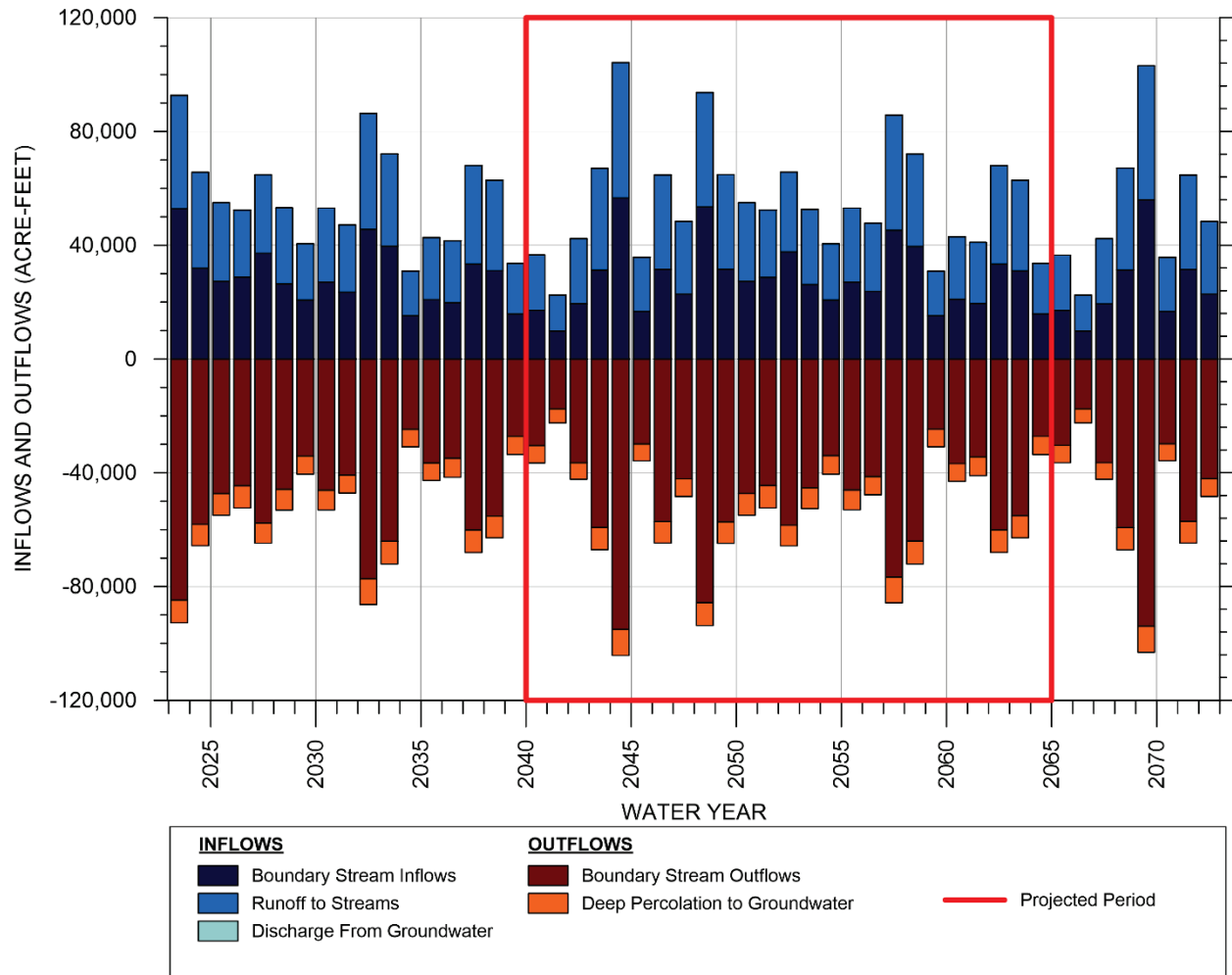


Figure 6-11. SVOM-Simulated Projected Surface Water Budget

Table 6-10. SVOM-Simulated Projected Surface Water Budget Summary

Surface Water Budget Components	Average Flow WY 2040-2064 (AF/yr)
Boundary Inflows	28,100
Boundary Outflows	-48,300
Net Flow Between Surface Water and Groundwater	-7,100
Overland Runoff to Streams	27,300
Diversions from Streams	0

6.4.3 Projected Groundwater Budget

Figure 6-12 shows the SVOM-simulated projected groundwater budget. Average groundwater budget components for the projected period are quantified in Table 6-11. The relative size of each component is consistent throughout the years. The largest outflow is groundwater pumping, and the largest inflow is subsurface inflows from adjacent subbasins. Deep percolation from precipitation and applied irrigation also form a significant inflow. Overall, average change in groundwater storage is projected to be -900 AF/yr.

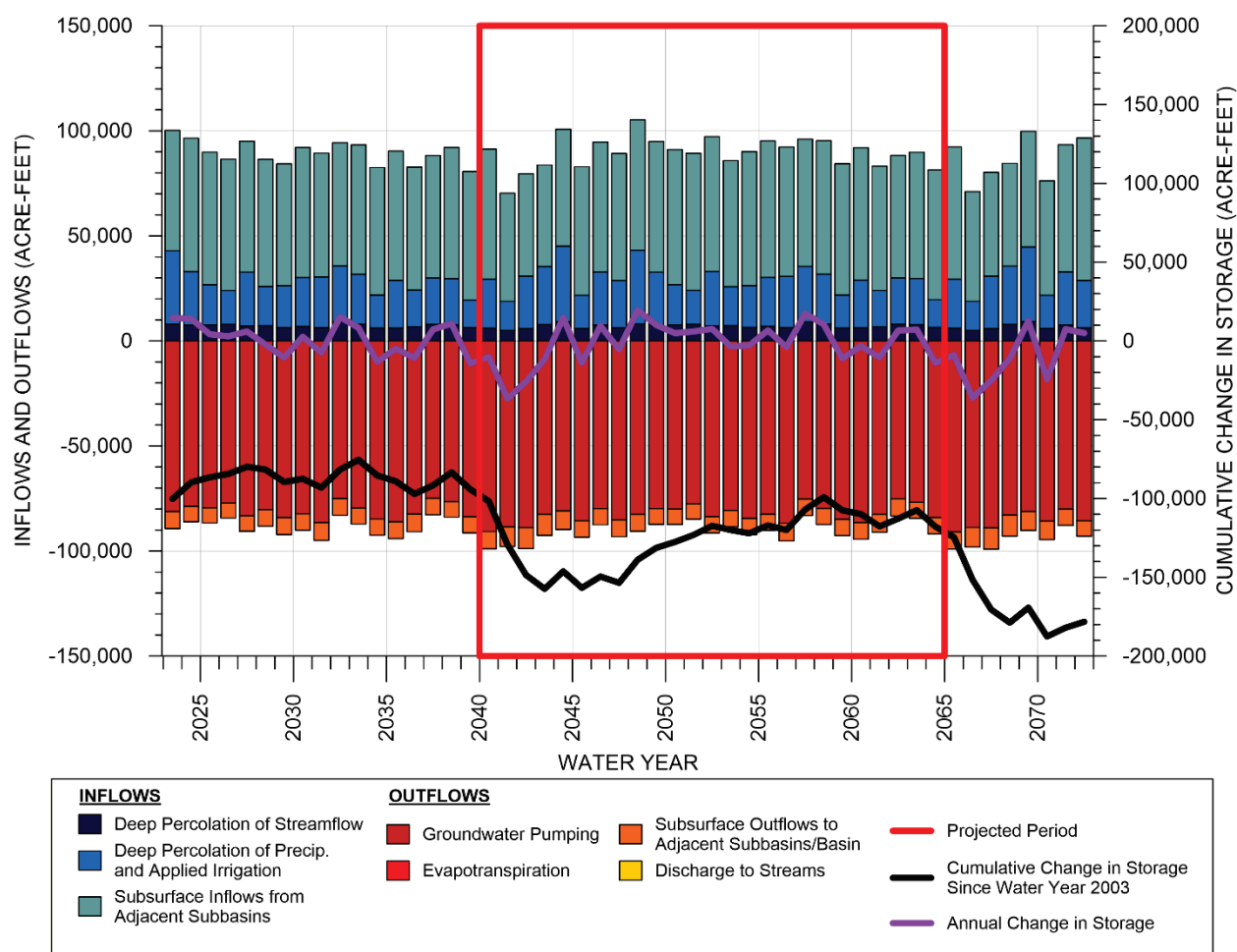


Figure 6-12. SVOM-Simulated Projected Groundwater Budget

Table 6-11. SVOM-Simulated Projected Groundwater Budget Summary

Groundwater Budget Components	Average Flow WY 2040-2064 (AF/yr)
Groundwater Pumping	-82,600
Deep Percolation of Precipitation and Irrigation	22,400
Net Stream Exchange	7,100
ET from Groundwater	0
Net Flow from 180/400 Subbasin	41,400
Net Flow from Forebay Subbasin	6,400
Net Flow from Langley Subbasin	4,200
Net Flow from Outside Areas	200
Net Storage Gain (+) or Loss (-)	-900

SVOM projected groundwater pumping by water use sector is summarized in Table 6-12. As in the historical and current periods, agricultural use is expected to account for more than 84% of pumping.

Table 6-12. SVOM-Simulated Projected Groundwater Pumping

Water Use Sector	Average Pumping WY 2040-2064 (AF/yr)
Agricultural	-69,700
Municipal & Industrial	-13,000
Total Pumping	-82,600

The water budget inflows and outflows listed above only account for the change in storage due to groundwater level changes. However, based on the SWIM baseline run, which does not include any potential projects, seawater intrusion will advance into the Eastside Subbasin by approximately 2045 in both the shallow and deep zones of the aquifer system. Therefore, an estimation of usable change in storage is included in Table 6-13. Total change in usable groundwater storage is estimated as the sum of (1) change in storage due to the advancement of seawater intrusion and (2) change in storage due to groundwater level changes outside the seawater-intruded area. The estimate of usable change in storage should not be directly compared to the SVOM water budget which represents an accounting of flows across Subbasin boundaries. Furthermore, the usable change in storage is calculated over the period from WY 2023 to 2072. While the future extents of seawater intrusion are uncertain, accounting for the total loss of useable storage provides a conservative estimate of the sustainable yield for the subbasin.

Change in usable storage is calculated separately for the seawater intruded areas and non-seawater intruded areas, as shown in Table 6-13. The SVOM remains the basis for this analysis; however, since it does not simulate seawater intrusion, the advancement of the 500 mg/L

chloride isocontour is derived from the SWIM (version 4). Storage change due to groundwater levels is based on simulated groundwater levels in the principal aquifer outside of the seawater intruded extent from the SVOM. The SWIM was not used for both estimates because it does not encompass the entire Subbasin.

Projected average decline in usable storage (overdraft) is 2,910 AF/yr, which is the sum of the storage loss due to seawater intrusion (about 1,570 AF/yr loss) and storage change due to groundwater level changes (about 1,340 AF/yr loss) as summarized in Table 6-13. Storage change due to groundwater level change is different from Table 6-11 largely due to the different averaging period.

Table 6-13. Summary of Projected Change in Usable Groundwater Storage

	Average Change WY 2023-2072 (AF/yr)
Storage Change from Groundwater Levels	-1,340
Storage Change from Seawater Intrusion	-1,570
Change in Usable Storage (Net Storage Gain (+) or Loss (-))	-2,910

Note: The storage loss due to the advancement of seawater intrusion is calculated based on the simulated 500 mg/L chloride isocontour from the SWIM. Storage loss due to groundwater levels is based on the SVOM's simulated groundwater level change in the principal aquifers outside of the seawater intruded extent. All loss of storage due to seawater intrusion occurs after 2045.

6.4.4 Projected Sustainable Yield

The projected sustainable yield is the amount of groundwater that can be withdrawn without causing long-term harm to the aquifer. Thus, when undesirable results are avoided, it is the pumping that can be sustained without causing a net negative change in storage. However, it is not the amount of pumping needed to stop undesirable results before sustainability is reached. The SVBGSA recognizes that depending on the success of various proposed PMAs there may be some years when pumping must be held at a lower level to achieve necessary rises in groundwater elevation. The actual amount of pumping that can be sustained in the future will depend on climate, reservoir operations, and the success of management actions and projects.

To maintain consistency with the historical sustainable yield, projected sustainable yield can be estimated by summing all the average groundwater extractions and subtracting the average loss in storage. This represents the change in pumping that results in no change in storage, assuming no other projects or management actions are implemented. For this sustainable yield discussion and associated calculations, groundwater pumping outflows are reported as positive values, which is opposite of how the values are reported in the water budget tables.

Although the sustainable yield values provide guidance for achieving sustainability, simply reducing pumping to within the sustainable yield is not proof of sustainability and will not stop the expansion of seawater intrusion. Table 6-14 provides an estimate of the future sustainable yield using estimated future pumping and storage values. It is based on the climate, streamflow, and land use assumptions within the baseline modeling scenario, and if future conditions vary, the projected sustainable yield may differ. However, sustainability must also be demonstrated through the SMC. This approximation of the subbasin-wide projected sustainable yield does not capture geographic variation, nor account for the dynamic interaction between pumping, groundwater levels, and recharge.

Table 6-14. Projected Period Sustainable Yield

	Average Flow WY 2023-2072 (AF/yr)
Groundwater Pumping	82,520
Change in Storage due to Seawater Intrusion	-1,570
Change in Storage due to Groundwater Levels	-1,340
Projected Sustainable Yield	79,610

The sustainable yield estimate can further be constrained using results from Demand Management scenarios with the SVOM (Montgomery & Associates, 2026c). Multiple scenarios were developed using the SVOM, where agricultural pumping was reduced in each subbasin in approximately 10% intervals. Additional model simulations were completed where multiple subbasins had reduced pumping. The sustainable yield based on groundwater levels can be estimated from these model runs by identifying the amount of reduced pumping that results in a zero change in storage for the Subbasin. Depending on whether only the Eastside Subbasin alone has pumping reductions, or other subbasins also reduce pumping, a zero change in storage occurs when pumping is between 75,000 and 80,000 AF/yr. These estimates do not factor in loss of usable water due to seawater intrusion so the sustainable yield would likely be on the order of a few thousand AF/yr less than these values. Additional details on this analysis are provided in Appendix 6A.

6.5 Climate Change Scenarios

To better understand the sensitivity of future conditions to climate change, SVBGSA applied the DWR (2018) 2070 climate scenarios to the projected baseline scenario.

6.5.1 Climate Change Method

The projected water budget was developed based on future hydrologic conditions representative of historical conditions. To help understand the potential effect of climate change on future conditions, 3 sets of climate change factors were applied to the projected baseline:

1. Central Tendency,
2. Wet-Moderate Warming, and
3. Dry-Extreme Warming.

These future climate change scenarios used DWR-provided datasets consisting of monthly scaling factors for precipitation, reference evapotranspiration (ET_o), and streamflow. Scaling factors were also applied to tributary inflows and reservoir inflows to maintain alignment across all hydrologic inputs. These factors were applied multiplicatively to the future baseline model climate (precipitation and ET_o) or hydrologic (tributary and reservoir inflows) inputs. These scaling factors vary both spatially and temporally (year to year). This approach preserves the temporal sequencing of wet and dry periods from the baseline model while adjusting the magnitude of precipitation, ET_o, and surface water inputs to reflect projected future conditions. Since the DWR scaling factors are provided for climate change at 2070, the scaling factor applied in a given WY was calculated as a linear interpolation between baseline and 2070 conditions. The linearized monthly precipitation and ET_o change factors from DWR were provided spatially as a grid with a lower resolution than the future baseline model grid whereas surface water inputs were scaled based on 8-digit hydrologic unit code (HUC-8) watersheds, which are much larger than the baseline model grid resolution.

6.5.2 Results of Climate Change Scenarios

Table 6-15 shows the average annual water budget for the Eastside Subbasin for WYs 2040-2064 for the projected baseline and 3 climate scenarios run with the SVOM. Positive values represent groundwater inflows and negative values represent groundwater outflows from the subbasin. All 3 climate scenarios have greater deep percolation and groundwater extraction than the baseline scenario. Of the 4 climate scenarios tested, the Dry-Extreme Warming scenario represents the worst-case scenario for sustainability. Deep percolation is greater in the Dry-Extreme scenario due to higher overall precipitation, as well as increased return flow from increased irrigation pumping. Increased pumping drives a greater loss in storage than the other 3 scenarios. The Central Tendency scenario shows a similar annual change in storage compared to the baseline, whereas the Wet-Moderate Warming scenario shows an increase in annual change in storage. However, regardless of the scenario, the annual change in storage is a small percentage of the total inflows and outflows. These scenarios represent potential futures to help understand the uncertainty associated with climate change; however, the exact variation of future years is unknown.

Table 6-15. Average Water Budget Comparison for Climate Change Scenarios

Water Budget Component	WY 2040-2064 (AF/yr)			
	Baseline	Central Tendency	Dry-Extreme Warming	Wet-Moderate Warming
Deep Percolation	22,400	23,800	24,000	26,800
Net Stream Exchange	7,100	7,100	7,000	7,300
Net Seawater Exchange	0	0	0	0
Net Subsurface Inflows	52,200	53,900	55,000	51,100
Groundwater Evapotranspiration	0	0	0	0
GW Extraction	-82,600	-85,900	-88,600	-84,300
Net Storage Change	-900	-1,000	-2,600	900

6.6 Overdraft Assessment

Groundwater level trends in the Eastside Subbasin were evaluated using several annual metrics — annual maximum, minimum, and autumn water levels — over the most recent 15 and 20 years. This window is long enough to give a dependable view of long-term trends rather than short-term variability, yet short enough to reflect current conditions. A 10-year window was judged to be too short, as it begins in the trough of a drought and largely tracks recovery from it rather than longer-term conditions. Similarly, periods of 25 years or more were excluded, as unusually high 1990s levels paired with drought-driven lows of the 2010s can also produce misleading long-term trends.

Water level observations indicate that the Eastside Subbasin is experiencing overdraft. Of the 78 wells with sufficient data, the majority (64%) show no clear trend. Among the remainder, the number of wells with declining water level trends (26%) considerably outnumber wells with increasing trends (10%). Spatially, declining trends occur throughout the Subbasin. The increasing water level trends observed are concentrated in and near the City of Salinas; however, there are also wells with declining trends in this area. In addition, estimates of change in groundwater in storage based on observed groundwater levels as well as simulated groundwater levels both show a long-term decrease. Taken together, the weight of evidence showing a long-term decline in groundwater levels and storage indicate the Subbasin is in overdraft. For more details, see Appendix 6B.

6.7 Subbasin Water Supply Availability and Reliability

Water is not imported into the Eastside Subbasin from other basins, and the Salinas River does not flow through the Eastside. The Salinas River recharges the groundwater upgradient of the Eastside Subbasin. This upgradient recharge is derived from reservoir releases that regulate a portion of Salinas River streamflow. The historical water budget incorporates years when there

was little availability of surface water flow. The annual variability of stream flow does not directly affect the annual Eastside groundwater elevations and therefore does not directly affect the ability to operate within the sustainable yield. Although there is not a direct effect, Salinas River flows do affect long-term water supply availability. The projected water budgets are developed with the SVOM, which is based on historical surface water flows and groundwater conditions, and therefore projected water budgets incorporate reasonable fluctuations in water supply availability. MCWRA is preparing a Salinas River Operations HCP, which may change the current reservoir release schedule and could influence the reliability of groundwater recharge.

6.8 Uncertainties in Water Budget Calculations

Models are mathematical representations of physical systems, and as such cannot perfectly replicate real-world conditions. Their accuracy is limited both by the simplifications inherent in representing complex physical processes and by constraints in the available input data. There is also inherent uncertainty in groundwater flow modeling itself, models can only approximate physical systems and have limitations in how they compute data. However, as recognized by DWR (2018), despite these limitations, models remain powerful tools that provide valuable insights into system behavior and support informed water resources management decisions.

The level of accuracy and certainty is highly variable between water budget components. A few water budget components are directly measured, but most water budget components are either estimated inputs to the model or simulated by the model. Additional model uncertainty stems from an imperfect representation of natural conditions and this is reflected by the model calibration error. However, inputs to the models are carefully selected using best available data, the model's calculations represent established science for groundwater flow. The model calibration error is within acceptable bounds.

There is additional inherent uncertainty involved in projecting water budgets given that actual future climate conditions and the sequence of wet and dry years are unknown. The 25-year repeated projected climate sequence was based on historical data. Because the SVOM is not intended to forecast specific future weather events, model projections should not be interpreted as year-by-year predictions; instead, multi-year averages should be used to evaluate how groundwater levels and basin water budgets may respond to average future climate conditions. The model only represents a single climate realization. This baseline serves as a best-available reference against which potential PMAs can be evaluated.

7 MONITORING NETWORKS

This chapter describes the networks that will monitor the SMC explained further in Chapter 8. This description of the monitoring networks has been prepared in accordance with the GSP Regulations § 354.32 *et seq.* to include monitoring objectives, monitoring protocols, and data reporting requirements.

7.1 Introduction

7.1.1 Monitoring Network Objectives

SGMA requires monitoring networks to collect data of sufficient quality, frequency, and distribution to characterize groundwater and related surface water conditions in the Subbasin, and to evaluate changing conditions that occur as the Plan is implemented. The monitoring networks are intended to:

- Monitor changes in groundwater conditions relative to measurable objectives and minimum thresholds.
- Demonstrate progress toward achieving measurable objectives.
- Monitor impacts to the beneficial uses or users of groundwater.
- Quantify annual changes in water budget components.

7.1.2 Approach to Monitoring Networks

Monitoring networks are developed for each of the following 6 sustainability indicators that are relevant to the Eastside Subbasin:

1. Chronic lowering of groundwater levels
2. Reduction in groundwater storage
3. Seawater intrusion
4. Degraded water quality
5. Land subsidence
6. Depletion of ISW

Other monitoring networks, such as groundwater extraction, which are necessary to comply with GSP Regulations are also included in this chapter. RMS wells are a subset of the monitoring network to provide the most representative information about groundwater conditions in the Subbasin.

The SVBGSA estimated the density of monitoring sites and the frequency of measurements required to demonstrate short-term, seasonal, and long-term trends. The results indicate that all monitoring networks have sufficient site density and measurement frequency. The SVBGSA will review the monitoring network during each 5-year evaluation, including identifying any new data gaps that could affect the Plan's ability to achieve the Subbasin's sustainability goal.

7.1.3 Management Areas

No management areas are defined within the Eastside Subbasin.

7.2 Groundwater Level Monitoring Network

The sustainability indicator for chronic lowering of groundwater levels is evaluated by assessing groundwater elevations in a designated well network. GSP Regulations require a network of monitoring wells sufficient to demonstrate groundwater occurrence, flow directions, and hydraulic gradients between principal aquifers and surface water features.

Figure 7-1 shows 65 wells in the Subbasin monitored by MCWRA for groundwater elevations that are used to develop groundwater elevation contours and that have publicly available data on the SVBGSA Web Map. Of these wells, 39 are selected as groundwater level RMS wells. As agreed to by DWR, RMS wells are monitored biannually in the fall and August. SVBGSA will report spring groundwater level measurements, but will not monitor all RMS wells in the spring. Generally, the criteria for selecting RMS wells include:

- RMS wells must have known depths and well completion data.
- RMS wells should have a relatively long period of historical data. If no other nearby wells exist, wells that do not meet this requirement may be used.
- Hydrographs of RMS wells should be visually representative of the hydrographs from surrounding wells.
- RMS locations must cover the basin and provide data near basin boundaries.
- RMS should be selected for each aquifer. There is only 1 principal aquifer in the Eastside Subbasin.
- Data from RMS wells is public data and will be used for groundwater elevation maps and analysis. SVBGSA notified well owners of intent to include their wells in the monitoring network.

The RMS wells in the groundwater level monitoring network are shown in Table 7-1 and on Figure 7-1. Only RMS wells are labeled on Figure 7-1. Both the table and map include the 4 new monitoring wells the SVBGSA installed since the original 2022 GSP. They are marked with an

asterisk in Table 7-1. For simplicity, the new wells will also be referred to as RMS wells although they do not have SMC yet. Appendix 5A provides well construction information and historical hydrographs for each RMS well.

As established in the Salinas Valley Deep Aquifers Study, the Deep Aquifers extend slightly into the Eastside Subbasin (Montgomery & Associates, 2024). Furthermore, there are many deep wells in the Subbasin's principal aquifer that are screened in the sediments adjacent to the Deep Aquifers. Since the 400/Deep Aquitard that delineates the Deep Aquifers does not exist in most of the Subbasin and Deep Aquifers extraction within the Subbasin is limited, the Deep Aquifers are not considered separate principal aquifer for SGMA purposes. However, SVBGSA installed 2 monitoring wells (ES-1-A and ES-DA-2) to fill data gaps identified in the Deep Aquifers Study.

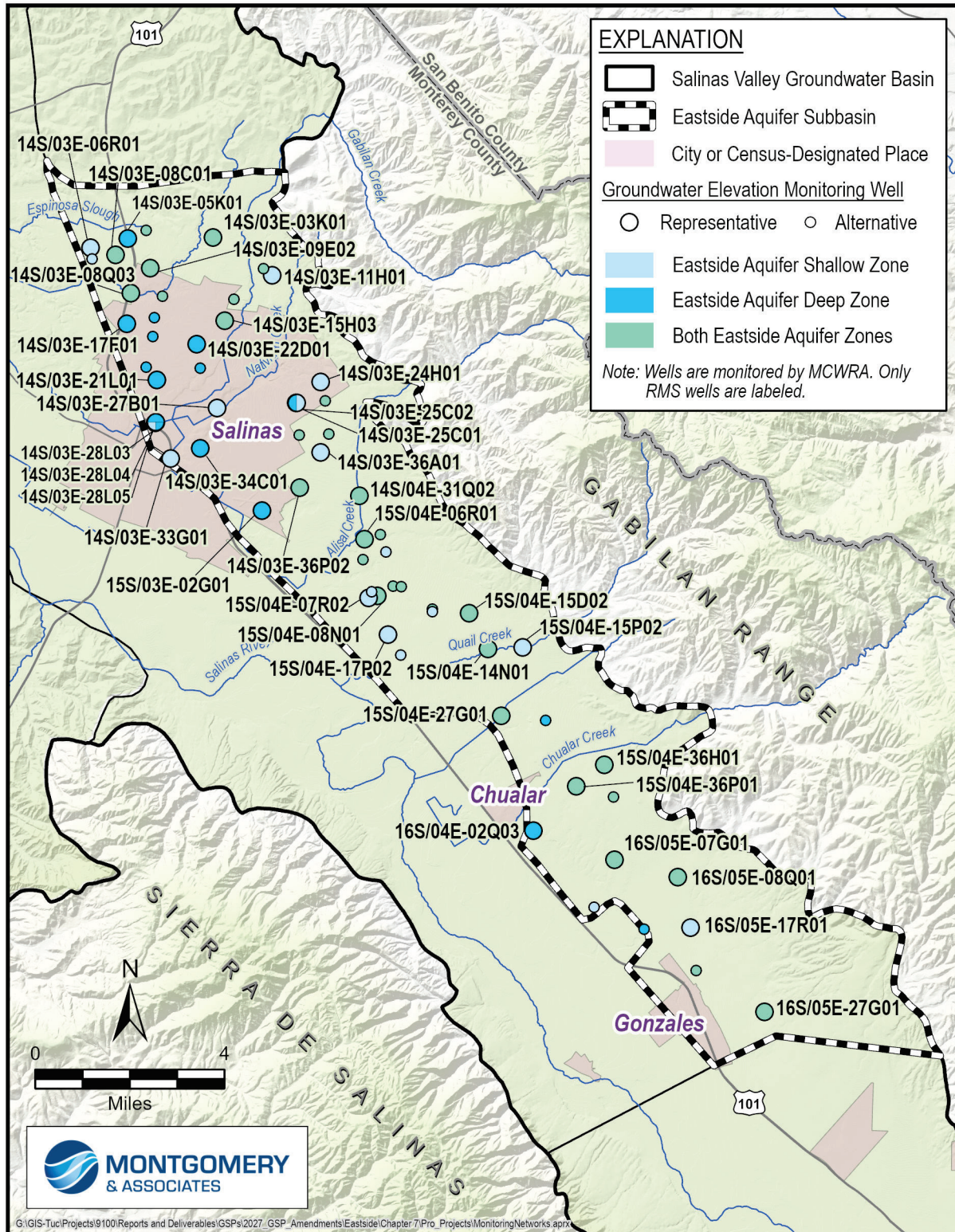


Figure 7-1. Groundwater Levels Monitoring Network

Table 7-1. Eastside Aquifer Groundwater Level Representative Monitoring Site Network

State Well Number	SGMA Site Code	Local Well Designation	Well Use	Total Well Depth (feet)	Reference Point (ft, NAVD88)	Latitude (NAD83)	Longitude (NAD83)
Shallow Zone							
14S/03E-06R01	367386N1216740W001	901	Irrigation	385	95.9	36.73863	-121.67404
14S/03E-11H01	367323N1215965W001	2330	Other	390	145.3	36.73235	-121.59659
14S/03E-24H01	366985N1216473W001	1974	Irrigation	375	166.6	36.69942	-121.58495
14S/03E-25C02	366927N1215940W001	FALA22619	Observation	370	139.9	36.69273	-121.59403
14S/03E-27B01	366906N1216242W001	15126	Irrigation	348	46.3	36.69061	-121.6242
14S/03E-33G01	366746N1216412W001	595	Municipal	331	45	36.67462	-121.64126
14S/03E-36A01	366668N1215919W001	1577	Irrigation	490	141.4	36.66688	-121.59191
15S/04E-07R02	366336N1215644W001	10343	Irrigation	304	86.6	36.63365	-121.56449
15S/04E-14N01	366197N1215055W001	709	Irrigation	400	247.9	36.61971	-121.50558
15S/04E-17P02	366225N1215568W001	2260	Irrigation	467	100	36.62258	-121.55684
16S/05E-17R01	366746N1216412W001	10410	Irrigation	299	186.4	36.53513	-121.43898
14S/03E-28L05	N/A	ES-1-C	Observation	255	47.2	36.68568	-121.64739
Deep Zone							
14S/03E-17F01	367099N1216326W001	1825	Municipal	620	92	36.71552	-121.6595
14S/03E-21L01	366985N1216473W001	671	Municipal	668	80	36.69859	-121.64738
14S/03E-22D01	366994N1215849W001	1969	Municipal	550	102	36.70994	-121.63268
14S/03E-25C01	366928N1215941W001	FALB22618	Observation	680	139.8	36.69275	-121.59406
14S/03E-34C01	366781N1216300W001	686	Municipal	580	67	36.67812	-121.63009
15S/03E-02G01	366594N1216060W001	685	Municipal	630	74	36.65946	-121.606
16S/04E-02Q03	365636N1214996W001	1303	Irrigation	1023	141.1	36.5636	-121.49969
14S/03E-28L04	N/A	ES-1-B	Observation	495	46.9	36.68555	-121.64749
14S/03E-28L03	N/A	ES-1-A	Observation	905	46.9	36.68542	-121.64759
14S/03E-05K01	N/A	ES-DA-2	Observation	1285	125.11	36.74168	121.6599
Both Zones							
14S/03E-03K01	367426N1216276W001	574	Irrigation	668	171.9	36.74267	-121.6276
14S/03E-08C01	367365N1216643W001	867	Irrigation	785	112.7	36.73652	-121.66438
14S/03E-08Q03	367250N1216581W001	57	Irrigation	806	75	36.72506	-121.65818
14S/03E-09E02	367327N1216510W001	1831	Municipal	650	121	36.73275	-121.65105
14S/03E-15H03	367174N1216222W001	752	Irrigation	784	129.6	36.71741	-121.62217
14S/03E-36P02	366835N1215813W001	1217	Irrigation	800	103.1	36.68356	-121.58136
14S/04E-31Q02	366661N1215694W001	806	Irrigation	710	120	36.66611	-121.56939
15S/04E-06R01	366517N1215669W001	1726	Irrigation	786	95.5	36.65172	-121.56693
15S/04E-08N01	366344N1215613W001	425	Irrigation	450	93.1	36.6344	-121.56135
15S/04E-15D02	366297N1215261W001	1599	Irrigation	510	190.6	36.62978	-121.52612
15S/04E-15P02	366190N1215187W001	56	Irrigation	Unknown	207.8	36.61904	-121.51873
15S/04E-27G01	365985N1215129W001	773	Irrigation	608	187.4	36.59853	-121.51298
15S/04E-36H01	365844N1214733W001	294	Irrigation	488	339.5	36.58446	-121.47331
15S/04E-36P01	365776N1214837W001	588	Irrigation	Unknown	255.1	36.57761	-121.48379
16S/05E-07G01	365553N1214685W001	1345	Irrigation	476	192.2	36.55535	-121.46851
16S/05E-08Q01	365505N1214442W001	10408	Irrigation	Unknown	226.4	36.55054	-121.44425
16S/05E-27G01	365122N1214080W001	2519	Irrigation	1122	275.3	36.51224	-121.40796

Note: New monitoring wells (ES-1-A, B, and C and ES-DA-2) do not have SGMA Site Codes because RMS wells must have established SMC to be entered into SGMA Portal.
N/A = Not available

7.2.1 Groundwater Level Monitoring Protocols

Chapter 4 of the MCWRA CASGEM monitoring plan includes a description of existing groundwater elevation monitoring procedures (MCWRA, 2015). The CASGEM groundwater elevation monitoring protocols established by MCWRA are adopted by this GSP and are included in Appendix 7A. Groundwater elevation measurements are collected at least 2 times per year to characterize seasonal low and seasonal high groundwater conditions. The monitoring protocols described in Appendix 7A cover multiple monitoring methods for collecting data by hand and by automated pressure transducers. These protocols are consistent with data and reporting standards described in GSP Regulations § 352.4.

7.2.2 Groundwater Level Monitoring Network Data Gaps

Based on GSP Regulations and BMPs published by DWR on monitoring networks (DWR, 2016b), a visual analysis of the existing monitoring network was performed using professional judgment to evaluate if the groundwater level monitoring network contains data gaps.

While there is no definitive requirement on monitoring well density, the BMP cites several studies (Heath, 1976; Sophocleous, 1983; Hopkins and Anderson, 2016) that recommend 0.2 to 10 wells per 100 square miles. The BMP notes that professional judgment should be used to design the monitoring network to account for high-pumping areas, proposed projects, and other subbasin-specific factors.

The Eastside Subbasin encompasses 90 square miles. If the BMP guidance recommendations are applied to the Subbasin, the well network should include between 1 and 9 wells. Since the RMS network includes 39 wells, the number of groundwater elevation monitoring wells in the Subbasin exceeds the range of the BMP guidance. Furthermore, Figure 7-1 shows that the geographic distribution of the RMS network is sufficient and has no significant spatial data gap.

Some of the wells in the monitoring network have unknown well construction information. SVBGSA will work with MCWRA to identify well construction information during GSP implementation through MCWRA's well registration effort.

7.3 Groundwater Storage Monitoring Network

As discussed in Chapter 8, the sustainability indicator for reduction of groundwater storage is measured using groundwater elevations as proxies. Therefore, the groundwater storage monitoring network is the same as the groundwater level monitoring network.

7.4 Seawater Intrusion Monitoring Network

The sustainability indicator for seawater intrusion is evaluated using the location of the 500 mg/L chloride isocontour. MCWRA develops annual maps of the 500 mg/L chloride isocontour (Figure 5-20 and Figure 5-21) using the chloride concentration measured in their existing network of monitoring wells. Seawater intrusion does not exist in this Subbasin but does exist in the adjacent 180/400 Subbasin. Should seawater intrusion enter the Subbasin, the MCWRA and SVBGSA will consider expanding the existing seawater intrusion monitoring network.

Table 7-2 and Figure 7-2 show the wells used by MCWRA to monitor seawater intrusion through changes in water quality in the Subbasin. SVBGSA adopts MCWRA's network, which consists of 3 monitoring wells in the Eastside Subbasin.

Table 7-2. Eastside Aquifer Seawater Intrusion Well Network

State Well Number	SGMA Site Code	Local Well Designation	Well Use	Total Well Depth (feet)	Latitude (NAD83)	Longitude (NAD83)
14S/03E-06F01	367457N1216804W001	25733	Irrigation	Unknown	36.69540	-121.64786
14S/03E-21M54	366954N1216478W001	1358	Municipal	550	36.74573	-121.68046
14S/03E-05K01	N/A	27165	Observation	1285	36.74169	-121.65978
14S/03E-28L03	N/A	27272	Observation	905	36.68542	-121.64759

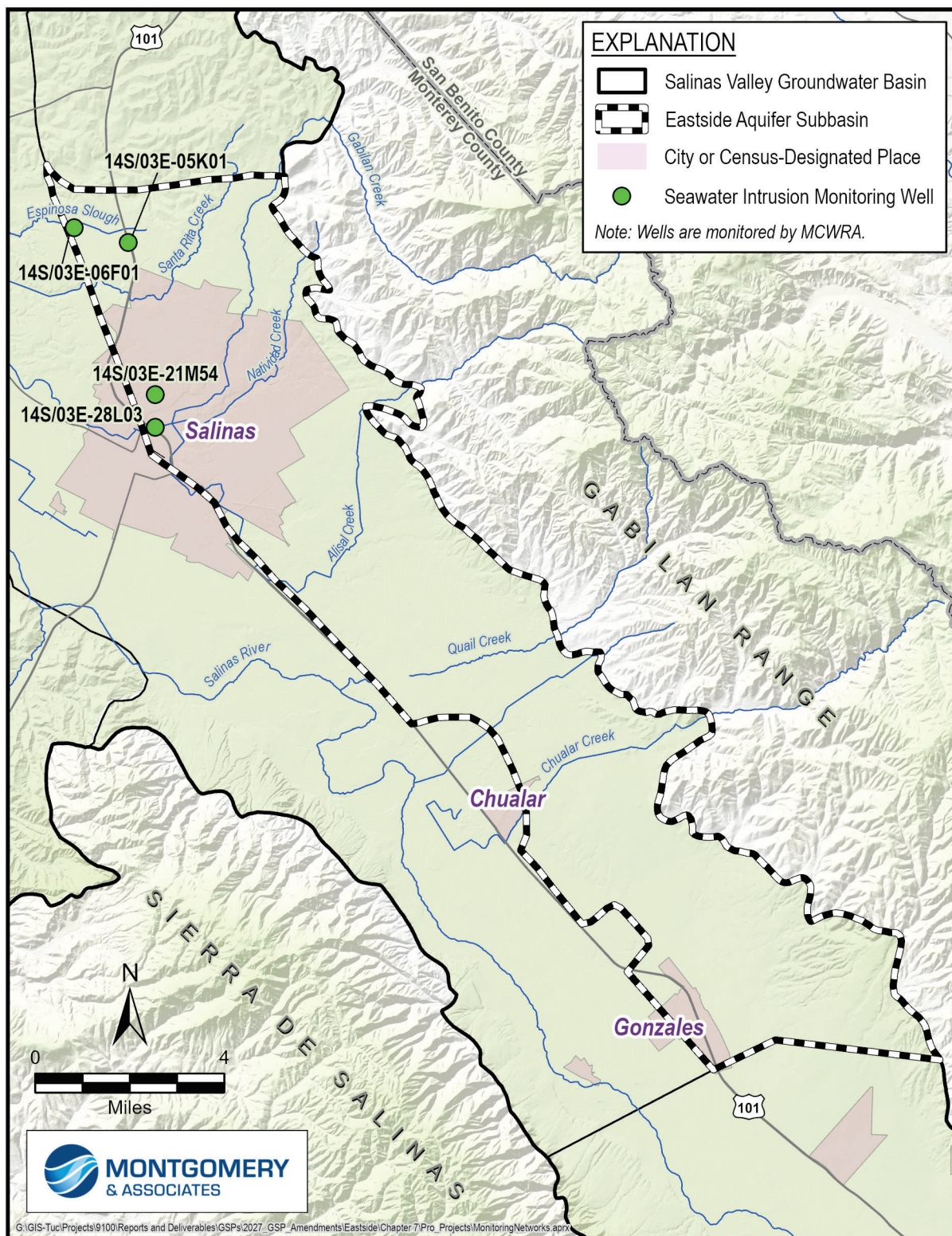


Figure 7-2. Seawater Intrusion Monitoring Network

7.4.1 Seawater Intrusion Monitoring Protocols

The protocols established by MCWRA for collecting groundwater quality data from monitoring wells and analyzing those data for seawater intrusion are adopted by this GSP. The groundwater quality data and seawater intrusion monitoring protocols are available in the Monterey County Quality Assurance Project Plan (QAPP), and included in Appendix 7B. MCWRA also established chloride data contouring protocols to establish the isocontour map, provided in Appendix 7C. These protocols are consistent with data and reporting standards described in GSP Regulations § 352.4.

7.4.2 Seawater Intrusion Monitoring Data Gaps

There are no data gaps in the seawater intrusion monitoring program.

7.5 Groundwater Quality Monitoring Network

The sustainability indicator for degraded water quality is evaluated at wells monitored for established water quality regulatory programs. The SVBGSA adopts the active public water system supply wells monitored under the SWRCB DDW, and all irrigation supply and on-farm domestic wells monitored under the CCRWQCB ILP for Ag Order 4.0 compliance. The Subbasin's groundwater quality network is shown on Figure 7-3 and the wells in the network are listed in Appendix 7D.

The public water system supply wells included in the monitoring network were identified by reviewing data from the SWRCB DDW. The SWRCB collects data for municipal systems; community water systems; non-transient, non-community water systems; and non-community water systems that provide drinking water to at least 15 service connections or serve an average of at least 25 people for at least 60 days a year. Only active DDW wells are included in the SVBGSA's groundwater quality network.

Water quality for agricultural supply wells are monitored through the CCRWQCB ILP regulates discharge from irrigated agricultural lands through the Ag Orders. Ag Order 4.0 established 2 main monitoring requirements: 1) the creation of a monitoring plan to assess groundwater quality trends, and 2) monitoring of all on-farm domestic wells for the presence of 1,2,3-trichloropropane (1,2,3-TCP) and nitrate. The Central Coast Water Quality Preservation Inc., the third-party that conducts most CCRWQCB ILP compliance sampling in the Salinas Valley, is developing the Groundwater Quality Trend Monitoring (GQTM) Workplan to address the trend monitoring requirement of the Ag Order 4.0 requirements. The GQTM Workplan will evaluate nitrate and major cations and anions trends in select wells. All ILP wells sampled by Preservation Inc. as of GSP Amendment 1 are provisionally included in the Subbasin's monitoring network until the GQTM Workplan is approved by the CCRWQCB. Once it is approved, the SVBGSA's monitoring network will comprise the wells in the GQTM Workplan and additional on-farm domestic wells sampled for 1,2,3-TCP and nitrate.

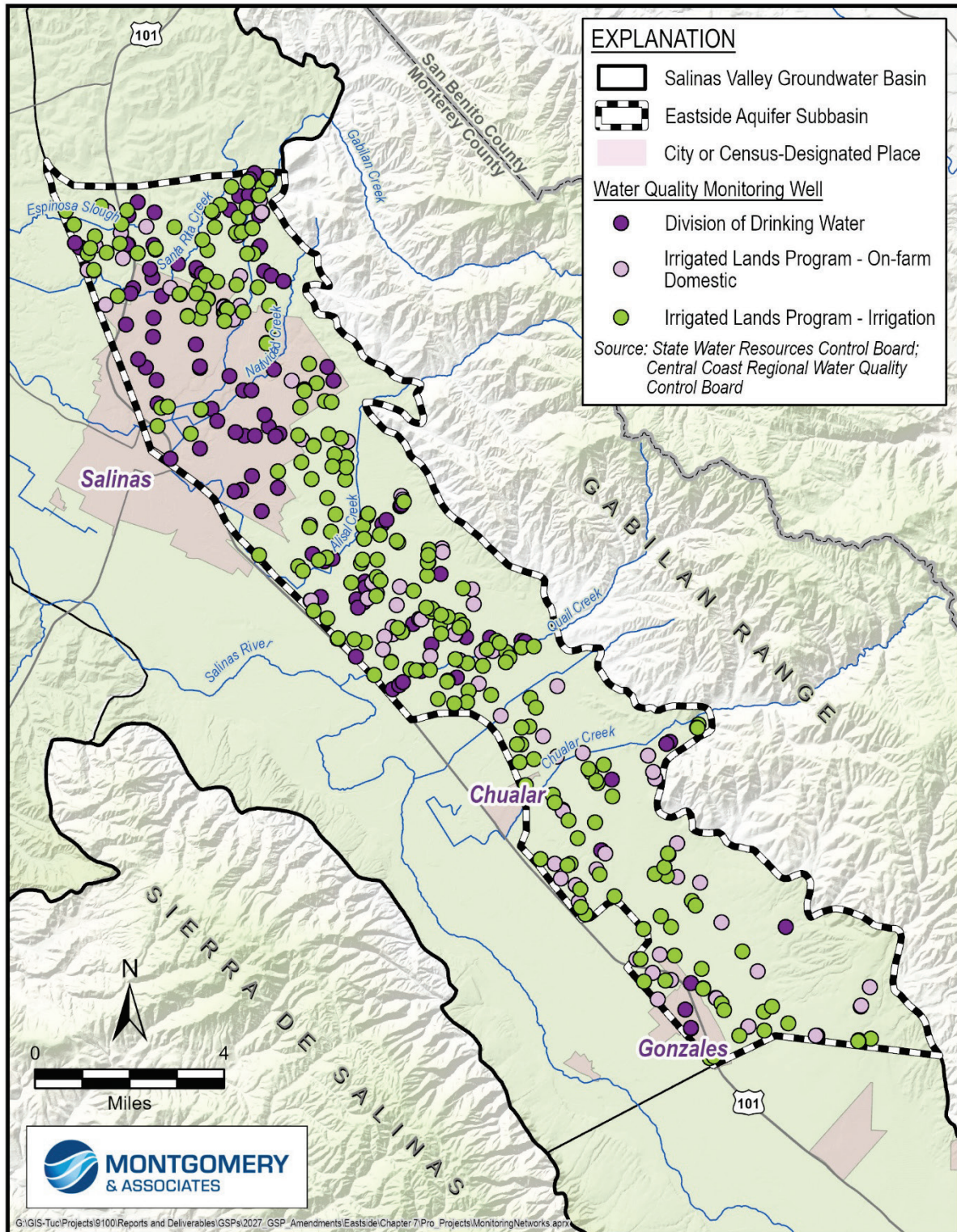


Figure 7-3. Groundwater Quality Monitoring Network

7.5.1 Groundwater Quality Monitoring Protocols

The SVBGSA does not independently sample wells. Instead, the GSA analyzes water quality data that are collected through the DDW and ILP. Therefore, the GSA is dependent on the monitoring density and frequency of DDW and ILP.

Water quality data from public water systems are collected, analyzed, and reported in accordance with protocols that are reviewed and approved by the SWRCB DDW, in accordance with the state and federal Safe Drinking Water Acts. Monitoring protocols may vary by agency.

The ILP data are collected annually under CCRWQCB Ag Order 4.0. Not all wells are sampled every year; the sampling frequency is further outlined in Ag Order 4.0. A copy of Ag Orders 4.0 monitoring and reporting programs are included in Appendix 7E and are incorporated into this GSP. These protocols are consistent with data and reporting standards described in GSP Regulations § 352.4.

7.5.2 Groundwater Quality Monitoring Data Gaps

The DDW and ILP monitoring network provide sufficient spatial and temporal data to determine groundwater quality trends for water quality indicators to address known water quality issues. Additionally, there is adequate spatial coverage in the water quality monitoring network to assess impacts to beneficial uses and users.

7.6 Land Subsidence Monitoring Network

As described in Section 5.5, DWR collects land subsidence data using InSAR satellite data and makes these data available to GSAs. This subsidence dataset represents the best available science for the Eastside Subbasin and is therefore used as the subsidence monitoring network.

7.6.1 Land Subsidence Monitoring Protocols

Land Subsidence monitoring protocols are the ones used by DWR for InSAR measurements and interpretation. DWR adapted their methods to measure subsidence on hard surfaces only and interpolate between them to minimize the change in land surface elevation captures in soft surfaces that are likely not true subsidence. The cell size of this interpolated surface is 302 feet by 302 feet. If the annual monitoring indicates subsidence is occurring at a rate greater than the minimum thresholds, then additional investigation and monitoring may be warranted. In particular, the GSAs will implement a study to assess if the observed subsidence can be correlated to groundwater elevations, and whether a reasonable causality can be established. These protocols are consistent with data and reporting standards described in GSP Regulation § 352.4.

7.6.2 Land Subsidence Data Gaps

There are no data gaps associated with the subsidence monitoring network.

7.7 Interconnected Surface Water Monitoring Network

The sustainability indicator for the depletion of ISW due to groundwater pumping is evaluated by monitoring shallow groundwater levels near locations of potential ISW in monitoring wells adjacent to streams. No locations of ISW were identified in the Subbasin, as shown on Figure 4-9.

7.7.1 Interconnected Surface Water Monitoring Protocols

If there were to be ISW in the future, monitoring protocols for shallow wells monitoring ISW will be identical to MCWRA's groundwater elevation monitoring protocols, included in Appendix 7A. These protocols are consistent with data and reporting standards described in GSP Regulations § 352.4.

7.7.2 Interconnected Surface Water Data Gaps

There are no data gaps in the ISW monitoring network in the Eastside Subbasin.

7.8 Other Monitoring Networks

The following monitoring networks are needed in addition to the monitoring networks outlined above for sustainability indicators. These include monitoring of GDEs at identified locations throughout the Subbasin, as well as monitoring and reporting of annual groundwater extractions and surface water diversions, which are required under SGMA to document total water use within the Subbasin.

7.8.1 Groundwater Dependent Ecosystems

Central Coast Wetlands Group will monitor and assess GDEs to detect if their conditions are declining. When such declines in condition are detected, the GDE must be flagged for further investigation into the root cause of the decline to determine if it is related to groundwater management activities. For the purposes of GDE monitoring in the Salinas Valley, ecosystem condition is primarily defined through vegetation health and vigor since this metric can be most readily tied to groundwater conditions. If groundwater levels are lowered below a depth that vegetation roots can access, a decline in vegetation vigor due to the loss of the water source would be an expected result and defined as an adverse impact.

7.8.1.1 Groundwater Dependent Ecosystems Monitoring Protocols

The GDE monitoring methodology uses a 2-pronged approach including an annual desktop-based component and a 5-year interval field-based component. A change in GDE vegetation vigor could be related to many factors, so a subsequent hydrogeological analysis is required to investigate groundwater level trends around potential GDEs to understand if GDE health is related to groundwater management.

7.8.1.2 Groundwater Dependent Ecosystems Monitoring Data Gaps

There are no GDE monitoring data gaps in the Eastside Subbasin because there are no potential GDEs identified. However, SVBGSA will continue desk-top monitoring and should they be identified in the Subbasin in the future, SVBGSA should consider adding a field-based component.

7.8.2 Groundwater Extraction Monitoring Network

MCWRA's GEMS is the part of the GMP used to monitor extraction in the Salinas Valley. Monthly extractions for agricultural and urban water use are reported annually to MCWRA pursuant to MCWRA Ordinance 5426. Urban water use includes larger public water systems and industrial water use. Historically, most pumping in the Salinas Valley was only reported for Zones 2, 2A, and 2B, which mainly overlaps with the Subbasin as depicted on Figure 3-3. Starting in WY 2025, groundwater pumping was reported for the entirety of the Subbasin. Additionally, small public water systems will be required to report extraction starting in WY 2026. Extraction is self-reported by well owners or operators on a WY basis (October 1 to September 30).

SVBGSA will work with MCWRA to obtain the GMP 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 MCWRA Ordinance 5426.

SVBGSA prepared an estimate of rural domestic pumping across the Valley. Rural domestic pumping is estimated using the number of drinking water connections based on data compiled for water systems and 2024 Monterey County parcel data. After estimating the number of connections, the connections were multiplied by a constant value 0.35 AF/yr per connection across all subbasins to estimate water use. This constant was verified using reported urban pumping to assess the accuracy of the connections and water use estimates. Once all non-*de minimis* extractors are reporting through GEMS, those estimates will be replaced with reported data.

7.8.2.1 Groundwater Extraction Monitoring Protocols

Groundwater extraction monitoring is accomplished using the GMP data provided by MCWRA.

7.8.2.2 Groundwater Extraction Monitoring Data Gaps

Accurate assessment of the amount of pumping requires a complete count of the number of municipal, agricultural, and domestic wells in the GSP area. As discussed in Chapter 3, MCWRA has an ongoing well registration program to catalogue existing and active groundwater wells, including their locations, depths, and whether the well is active, abandoned, or destroyed.

The accuracy and reliability of groundwater pumping reported through the GMP is constantly being updated. SVBGSA will continue to work with MCWRA to assure data quality control.

7.8.3 Salinas River Watershed Diversions

Salinas River watershed monthly diversion data are collected annually by the SWRCB. Prior to WY 2025, the SWRCB used eWRIMS which has been replaced with CalWATRS. CalWATRS is used to track information of water rights in the state on a WY basis and is publicly accessible at <https://calwatrs.waterboards.ca.gov/portal/s/search-information>. These data include diversions from the Salinas River and its tributaries.

These data are used in the Annual Reports to account for surface water use in the Salinas Valley. However, many stakeholders have noted that a portion of the agricultural water use in the Valley has been reported to MCWRA as groundwater extraction and to the SWRCB as surface water diversions. To help reduce any potential double-counting in the Annual Reports, the GMP requires every well owner or well operator reporting groundwater extraction to the SWRCB to report that same information to MCWRA and indicate whether those data are reported to both agencies.

7.8.3.1 Salinas River Watershed Diversions Monitoring Protocols

Salinas River watershed diversion monitoring protocols are established by the SWRCB for the collection of water right information. These protocols are consistent with data and reporting standards described in GSP Regulations § 352.4.

7.8.3.2 Salinas River Watershed Diversions Monitoring Data Gaps

There are no data gaps in the Salinas River watershed diversion monitoring network in the Eastside Subbasin.

7.9 Data Management System and Data Reporting

SVBGSA has developed a data management system (DMS) in adherence to GSP Regulations § 352.6 and § 354.40 that is used to store, review, and upload data collected as part of the GSP development and implementation.

The SVBGSA DMS consists of 2 SQL databases. The HydroSQL database stores information about each well and timeseries data for water level and extraction. Fields in the HydroSQL database include:

- Subbasin
- Cadastral coordinates
- Planar coordinates
- Well owner
- Well name
- Well status
- Well depth
- Screened interval top and bottom
- Well type
- Water level elevation
- Annual pumping volume

Well owner and annual pumping information will be stored in HydroSQL; however, neither will be publicly accessible due to confidentiality requirements. Real-time streamflow data for USGS gages is automatically uploaded to the HydroSQL database via a live link to the USGS website.

Water quality data are stored in the EnviroSQL database, which is linked to the HydroSQL database for data management purposes. Fields in the EnviroSQL database include:

- Station
- Parameter
- Sample Date
- Detection (detect or non-detect)
- Value
- Unit

The data used to populate the SVBGSA DMS are listed in Table 7-3. Categories marked with an X indicate datasets that are used in populating the DMS, including data that are publicly accessible or that are available to SVBGSA from MCWRA. Some data, such as groundwater extraction is confidential, and cannot be made publicly accessible by SVBGSA unless aggregated.

Table 7-3. Datasets Available for Use in Populating the DMS

Data Sets	Data Category					
	Well and Site Information	Well Construction	Water Level	Groundwater Extraction ¹	Streamflow	Water Quality
MCWRA	X	X	X	X		
GAMA Groundwater Information System (DDW)	X					X
CCRWQCB (ILP)						X
USGS Gage					X	

¹ Pumping data not publicly accessible

Data are compiled and reviewed to comply with quality objectives. The review included the following checks:

- Removing or flagging questionable data being uploaded in the DMS. This includes identifying outliers that may have been introduced during the original data entry process and plotting each well hydrograph to identify and remove anomalous data points.
- Loading into the database and checking for errors and missing data.

Well log information is entered for selected wells, and other information will be added as it is acquired to satisfy the requirements of the SGMA regulations.

The DMS includes a publicly accessible web map that is available on the SVBGSA website; accessible at <https://svbgsa.org/gsp-web-map-and-data/>. This web map allows users to visualize and interact with the data stored in the DMS. The web map provides interested parties with access to non-confidential technical information used in the development of the GSP and annual reports, and includes public well data and analysis such as water level contour maps and seawater intrusion maps, as well as various local administrative boundaries. In addition, the web map has functionalities to be able to graph timeseries of water levels and search for specific wells in the database. This web-map is regularly updated as new information is made available to the SVBGSA.

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 how the Subbasin's sustainability is measured, informing the PMAs that may be needed to achieve these criteria. This chapter includes adequate data to explain how SMC were developed and how they influence all beneficial uses and users.

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

8.1 Definitions

Key terms relevant to the SMC are repeated from the SGMA legislation and GSP Regulations below. Where there is no definition in the Regulations, additional explanatory text is added.

- **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 California Water Code § 10721(x).

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

- **Significant and unreasonable** is not defined in the Regulations. However, the definition of undesirable results states, “Undesirable results occur when significant and unreasonable effects ... are caused by groundwater conditions....” This GSP adopts the phrase significant and unreasonable to be the qualitative description of undesirable conditions due to inadequate groundwater management. Minimum thresholds are the quantitative measurement of the significant and unreasonable conditions.
- **Minimum threshold** refers to numeric value(s) for each sustainability indicator used to define undesirable results. Minimum thresholds are indicators of an unreasonable condition.
- **Measurable objective** refers to specific, quantifiable goal(s) 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 for each sustainability indicator.

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

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

- **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 is to manage groundwater resources for long-term community, financial, and environmental benefits to the Subbasin's residents and businesses. The goal of this GSP is to ensure long-term viable water supplies while maintaining the unique cultural, community, and business aspects of the Subbasin; its primary objective is to balance the needs of all water users in the Subbasin.

Several PMAs 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. Chapter 10 describes the prioritized PMAs as of GSP Amendment 2. This portfolio of PMAs provide sufficient options to achieve sustainability in the Eastside Subbasin throughout GSP implementation.

The management actions and projects are designed to achieve sustainability within 20 years by 1 or more of the following means:

- Educating stakeholders and prompting changes in behavior to improve chances of achieving sustainability
- Increasing awareness of groundwater pumping impacts to promote voluntary reductions in groundwater use through improved water use practices or fallowing crop land
- Increasing basin recharge, including through injections into the confined aquifers
- Creating barriers to the expansion of seawater intrusion

- Developing new alternative water supplies for use in the Subbasin to offset groundwater pumping

8.3 Achieving Long-Term Sustainability

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

The GSA tracks hydrologic conditions as an ongoing GSP implementation activity. These observed hydrologic conditions are used to develop values for average hydrologic conditions, which are compared to predicted future hydrologic conditions. This information will be used to interpret the Subbasin's performance against SMC. Year-by-year micro-management is not the intent of this GSP; it is developed to avoid undesirable results with long-term, deliberate groundwater management. For example, groundwater extractions may experience variations caused by reasonably anticipated hydrologic fluctuations. However, under average hydrologic conditions, GSP PMAs consider these factors.

Because the GSP addresses long-term groundwater sustainability, exceedance of some SMC during an individual year does not constitute an undesirable result by itself. Pursuant to SGMA regulations (California Water Code § 10721(w)(1)), "Overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and groundwater recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods." Therefore, groundwater levels may temporarily fall below minimum thresholds during prolonged droughts, which could be more extreme than those that have been anticipated based on historical data and anticipated climate change conditions. Such temporary exceedances do not constitute an undesirable result.

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

8.4 General Process for Establishing Sustainable Management Criteria

The SMC presented in this chapter were developed using publicly available information during development of the original GSP and subsequent amendments. The process has included feedback gathered during public meetings, hydrogeologic analysis, and coordination with other agencies. 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 GSA staff and GSA Board Members
- Modifying minimum thresholds and measurable objectives based on input from the public, GSA staff, and GSA Board Members, if needed.

During GSP Amendment 1, the process included:

- Presenting to the Subbasin Committee on the general SMC requirements and implications. These presentations outlined the original approach to developing SMC.
- Presenting to the Subbasin Committee on lessons learned on SMC since 2022, including DWR's review and assessment of the Salinas Valley GSPs. Amendment 1 incorporates DWR's suggested corrective actions into the SMC where appropriate.
- Discussions on updates to the approach to SMC in the GSP Amendments and receiving feedback from the Subbasin Committees and public.
- Modifying SMC approach for the storage and ISW SMC based on input from the Subbasin Committee and Board approval of the amendments.
- Receiving public comments on the GSP Amendment SMC updates, and discussing public comments with the Subbasin Committee and Board.

The SMC presented in this chapter are intended to address GSP Regulations, not other laws and regulations; however, they are developed so as to be compatible with existing laws.

Considering the preferred portfolio of PMAs to be able to achieve SMC within SGMA timeframes.¹

8.5 Sustainable Management Criteria Summary

Table 8-1 provides a summary of the SMC for each of the 6 sustainability indicators. Measurable objectives are the goals that reflect SVBGSA's desired groundwater conditions in the Subbasin for each sustainability indicator. The measurable objectives provide operational flexibility above the minimum thresholds. The minimum thresholds are quantitative indicators of the Subbasin's locally defined significant and unreasonable conditions. An undesirable result is a combination of minimum threshold exceedances that show a significant and unreasonable condition across the Subbasin as a whole. This GSP is designed not only to avoid undesirable results, but to achieve the sustainability goals within 20 years, along with interim milestones every 5 years to demonstrate progress. The preferred portfolio of management actions and projects is selected to maintain conditions above minimum thresholds or reach the measurable objectives within 20 years and maintain those conditions for 30 years for all 6 sustainability indicators. Chapter 9 also includes contingency projects to provide sufficient options for reaching and maintaining sustainability as defined by the SMC. The rationale and background for developing these criteria are described in detail in the following sections.

Minimum thresholds are selected to avoid undesirable results for other sustainability indicators, with the exception of groundwater level minimum thresholds avoiding seawater intrusion. Seawater intrusion requires projects and/or management actions to address within the SGMA timeframe, and depending on those selected and their design, seawater intrusion may not be addressed by protective groundwater elevations. 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.

¹ As PMAs are refined and further developed, modifications to the SMC may be necessary based on changes to the preferred portfolio of PMAs, and further analysis feasibility, effectiveness, and potential impacts to beneficial uses and users with changes.

Table 8-1. Sustainable Management Criteria Summary

Sustainability Indicator	Measurement	Minimum Threshold	Measurable Objective	Undesirable Result
Chronic lowering of groundwater levels	Measured through groundwater level representative monitoring well network.	Minimum thresholds are set to 2015 groundwater elevations. See Table 8-2.	Measurable objectives are set to 1999 groundwater elevations. See Table 8-2.	More than 15% of groundwater elevation minimum thresholds are exceeded.
Reduction in groundwater storage	Measured by proxy through groundwater level representative monitoring well network.	Minimum thresholds are established by proxy using groundwater elevations. The reduction in groundwater storage minimum thresholds are the same as the chronic lowering of groundwater levels minimum thresholds.	Measurable objectives are established by proxy using groundwater elevations. The reduction in groundwater storage measurable objectives are the same as the chronic lowering of groundwater levels measurable objectives.	More than 15% of groundwater elevation minimum thresholds are exceeded. The undesirable result for reduction in groundwater storage is established by proxy using groundwater elevations.
Seawater intrusion	Seawater intrusion maps developed by MCWRA.	Minimum threshold is the 500 mg/L chloride isocontour at the Subbasin boundary.	Measurable objective is identical to the minimum threshold, resulting in no seawater intrusion in the Eastside Subbasin.	Any exceedance of the minimum threshold, resulting in mapped seawater intrusion within the Subbasin boundary.
Degraded groundwater quality	Groundwater quality data downloaded annually from GAMA groundwater information system for DDW wells and requested annually from CCRWQCB for ILP wells.	Minimum threshold is zero additional exceedances of either the regulatory drinking water standards or the Basin Plan objectives for groundwater quality COC. Exceedances are only measured in public water system supply wells and ILP on-farm domestic and irrigation supply wells. See Table 8-4.	Measurable objective is identical to the minimum threshold.	Future or new minimum thresholds exceedances are caused by a direct result of extraction or GSA groundwater management action(s), including projects or management actions and regulation of groundwater extraction, unless minimum threshold exceedances are managed to provide a water supply (i.e., treated, blended, or replaced) or beneficial users are not potentially harmed.

Sustainability Indicator	Measurement	Minimum Threshold	Measurable Objective	Undesirable Result
Land subsidence	Measured using DWR provided InSAR data.	Minimum threshold is zero net long-term subsidence, with no more than 0.1 foot per year of estimated land movement to account for InSAR errors.	Measurable objective is identical to the minimum threshold, resulting in zero net long-term subsidence.	There is an exceedance of the minimum threshold for subsidence due to lowered groundwater elevations.
Depletion of ISW	Groundwater elevations in shallow wells adjacent to locations of ISW identified using the SVIHM.	Minimum thresholds are established by proxy using shallow groundwater elevations observed in 2015 near locations of ISW.	Measurable objectives are established by proxy using shallow groundwater elevations observed in 1999 near locations of ISW.	There is an exceedance of the minimum threshold in a shallow groundwater monitoring well used to monitor ISW. There are no identified locations of ISW in the Subbasin.

8.6 Chronic Lowering of Groundwater Levels SMC

8.6.1 Locally Defined Significant and Unreasonable Conditions

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

- Are at or below the observed groundwater elevations in 2015. Public and stakeholder input identified these historical groundwater elevations as significant and unreasonable.
- Cause 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, with the exception of seawater intrusion, which will be addressed through PMAs rather than protective groundwater elevations

These significant and unreasonable conditions were determined during development of the original GSP.

8.6.2 Minimum Thresholds

The minimum thresholds for chronic lowering of groundwater levels are set to 2015 groundwater elevations in this Subbasin.

The minimum threshold values for each well within the groundwater level representative monitoring network are provided in Table 8-2. The minimum threshold contour maps, along with the RMS well locations for the Eastside Subbasin are shown on Figure 8-1 and Figure 8-2 for the Shallow and Deep Zones, respectively. The tables and maps shown below do not include the 4 new monitoring wells SVBGSA added to the monitoring network between 2022 and 2026, after the original GSP was drafted. Once these wells have approximately 5 years of groundwater elevation measurements, SMC will be established for each and will be documented through annual reports.

As indicated in Table 8-2, 17 out of 35 RMS are screened in both the Shallow and Deep Zones of the Eastside Aquifer. 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 Levels Minimum Thresholds and Measurable Objectives

Monitoring Site	Minimum Threshold (feet)	Measurable Objective (feet)
Shallow Zone		
14S/03E-06R01	-25	-20.2
14S/03E-11H01	18.5	81.6
14S/03E-24H01	-78.9	-49.3
14S/03E-25C02	-65.4	-42.2
14S/03E-27B01	-8.5	-0.7
14S/03E-33G01	-15.9	-4.8
14S/03E-36A01	-52.9	-27.4
15S/04E-07R02	0.4	22.8
15S/04E-14N01	-32.9	15.7
15S/04E-17P02	-18	17.5
16S/05E-17R01	63.2	78.4
Deep Zone		
14S/03E-17F01	-48	-31.5
14S/03E-21L01	-36	-22.6
14S/03E-22D01	-60.5	-48.5
14S/03E-25C01	-66.1	-42.9
14S/03E-34C01	-31	-22
15S/03E-02G01	-33.5	-6.3
16S/04E-02Q03	34.1	59.4
Both Zones		
14S/03E-03K01	-59.2	-36.8
14S/03E-08C01	-48	-31.5
14S/03E-08Q03	-34.1	-24.1
14S/03E-09E02	-54	-38.2
14S/03E-15H03	-52.7	-34.1
14S/03E-36P02	-39.5	-18.7
14S/04E-31Q02	-44	-23
15S/04E-06R01	-27.5	-1.1
15S/04E-08N01	-8.5	4.5
15S/04E-15D02	-23	3.3
15S/04E-15P02	-25.6	0.2
15S/04E-27G01	0.1	29.8
15S/04E-36H01	15.6	58.9
15S/04E-36P01	31.1	55.4
16S/05E-07G01	40.5	71.1
16S/05E-08Q01	46.9	67.8
16S/05E-27G01	81.5	92.2

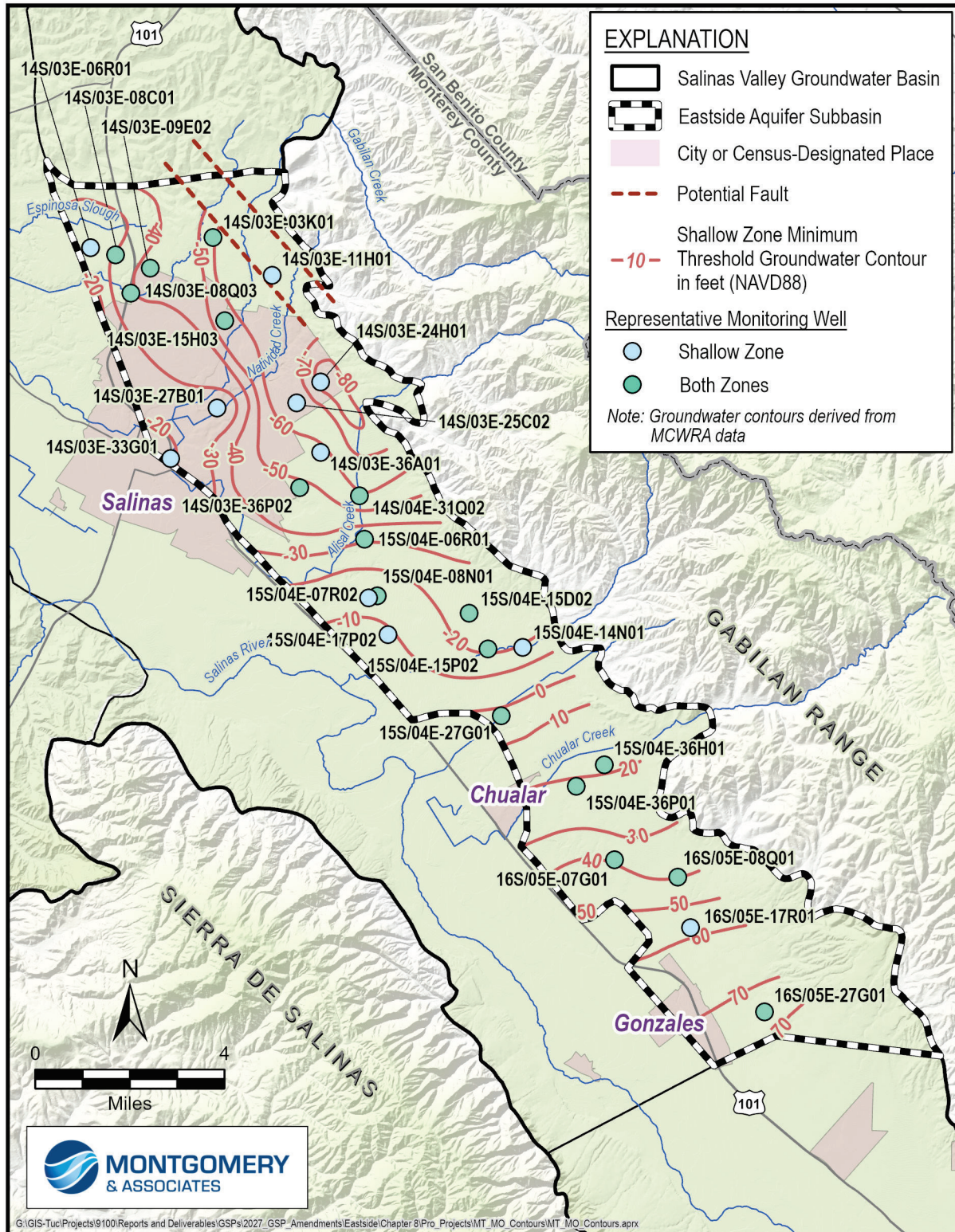


Figure 8-1. Groundwater Level Minimum Threshold Contour Map for the Shallow Zone of the Eastside Aquifer

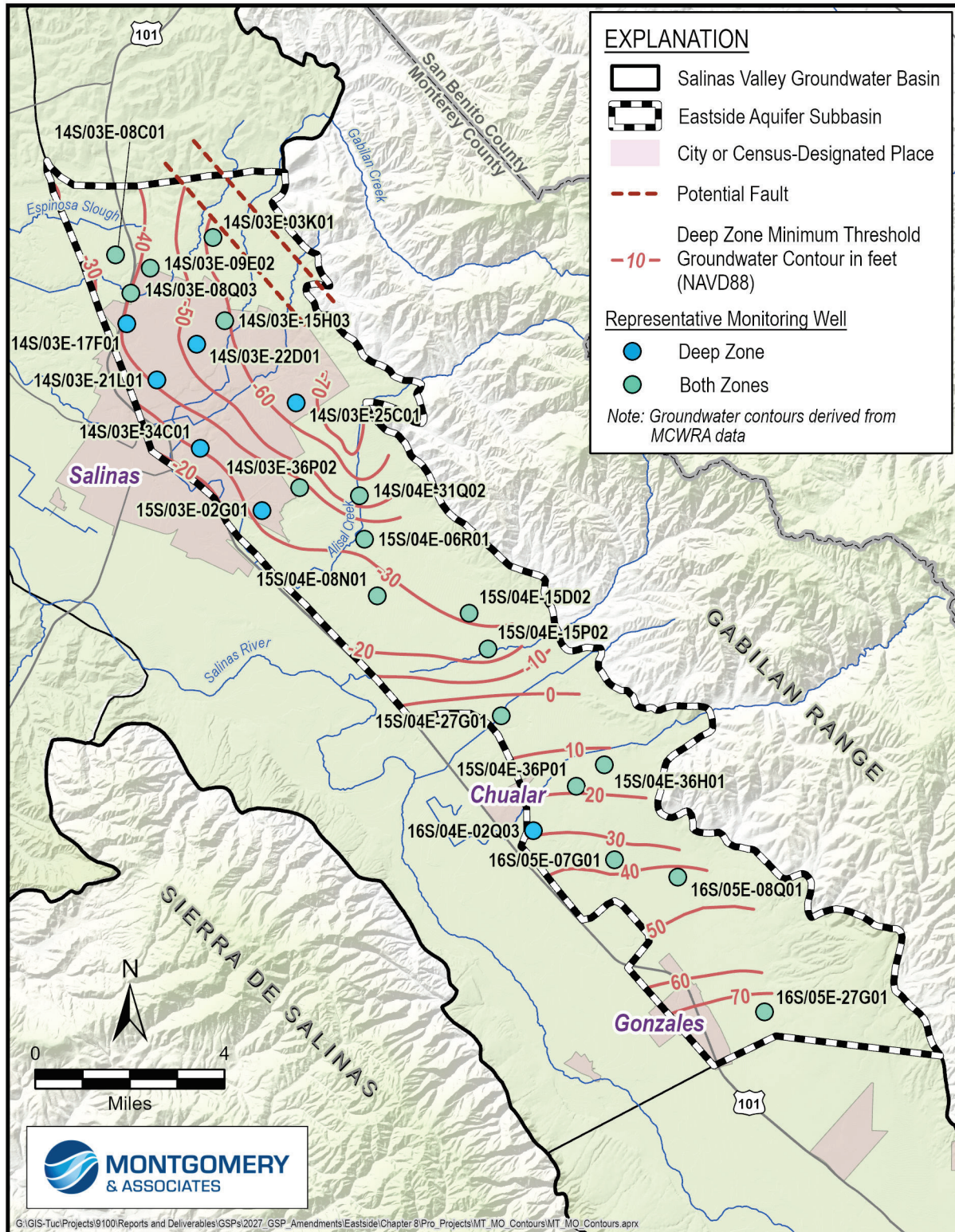


Figure 8-2. Groundwater Level Minimum Threshold Contour Map for the Deep Zone of the Eastside Aquifer

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

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

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

The following were general steps for developing minimum thresholds and measurable objectives during development of the original GSP included the following:

1. SVBGSA presented options to the Subbasin Committee and recommended an approach and criteria to set the groundwater level minimum thresholds and measurable objectives, which was approved by the Board through GSP adoption.
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; WY 1967 marks the beginning of operations at San Antonio Reservoir. The CSIP began operating in 1998.

The average groundwater elevation change hydrograph with minimum threshold and measurable objectives lines for the Eastside Subbasin are shown on Figure 8-3. The average 2015 groundwater elevations in the Eastside 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.

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 minimum threshold seemed unreasonable for an RMS, it was adjusted to be more reflective of recently low groundwater elevations and changes in groundwater elevations experienced due to climatic cycles. Additionally, measurable objectives were revised in order to set a more realistically achievable goal based on historic water levels. 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 5A.

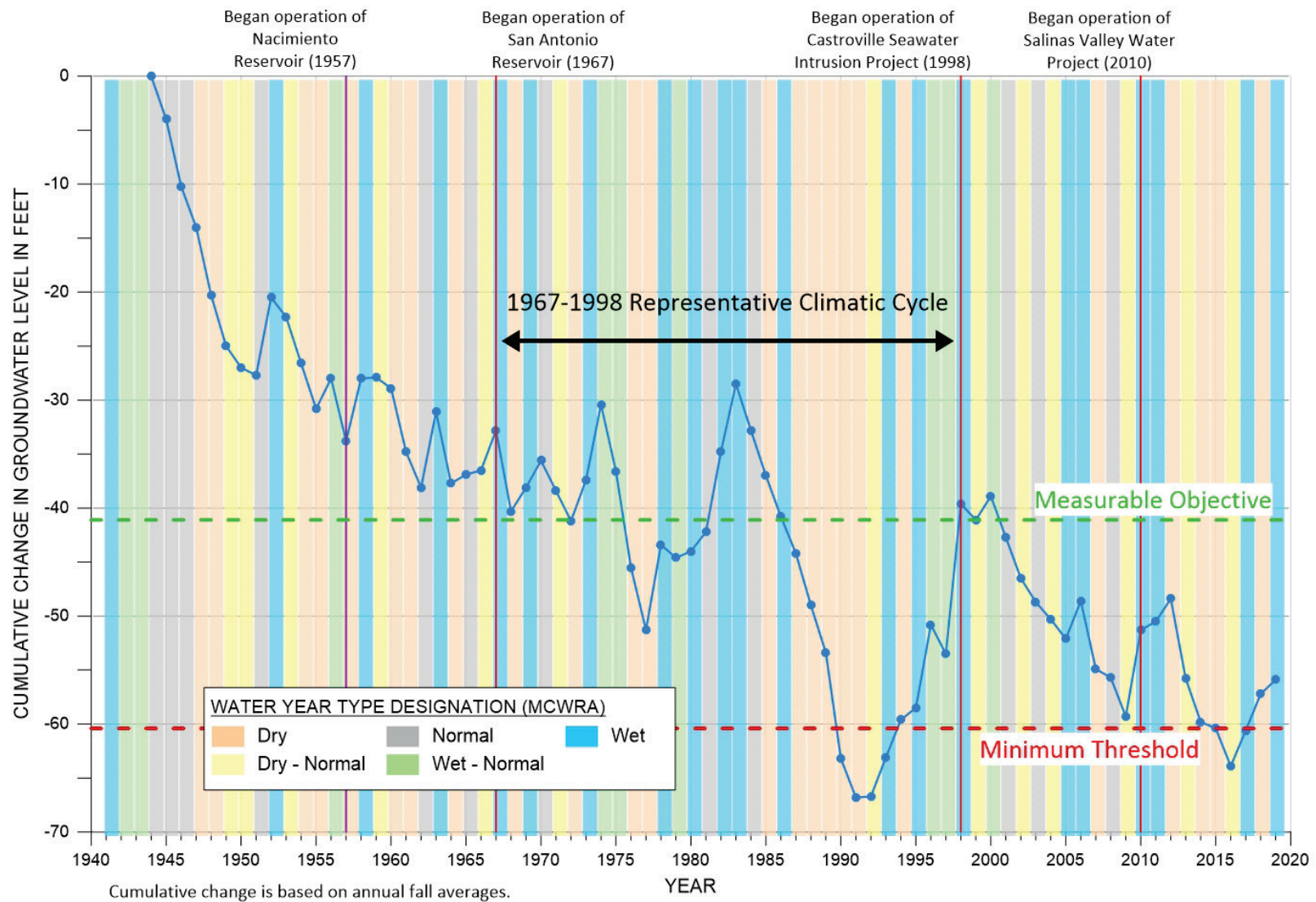


Figure 8-3. Cumulative Groundwater Elevation Change Hydrograph with Selected Measurable Objective and Minimum Threshold for the Eastside Aquifer

8.6.2.2 Minimum Thresholds Impact on Domestic Wells

To address the human right to water, minimum thresholds for groundwater levels are compared to the range of domestic well depths in the Subbasin using DWR's OSWCR database. This check was done to assure that the minimum thresholds maintain operability in a reasonable percentage of domestic wells. The minimum thresholds for groundwater levels 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. However, domestic wells are an important beneficial user. Well completion reports that were reported as domestic were included; however, some may support multiple households.

The OSWCR database is used to check that most domestic wells are covered by the groundwater level monitoring network. The average computed depth of domestic wells in the Subbasin is 361 feet using the Public Land Survey System sections data in the OSWCR database.

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

- The OSWCR database does not eliminate wells that have been abandoned, destroyed, or replaced, such as if the user switched to a water system, and abandoned or destroyed wells would have no detrimental impacts from lowered groundwater levels. For example, 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.
- Well registration under the GMP further informs the analysis.
- Only wells likely to be in the principal aquifer were considered; any domestic wells drawing water from shallow, perched groundwater are not included.
- Only wells that had accurate locations were included, since some wells in the OSWCR database are not accurately located, it could lead to inaccurate estimations of depth to water in the wells.

Given the limitations listed above, the analysis of minimum threshold impacts on domestic wells included 20 wells out of the total 206 domestic wells in the OSWCR database. The analysis of domestic wells showed that in the Eastside Subbasin all domestic wells 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. These percentages were considered reasonable despite the limitations of this analysis. Since data for the analysis is limited, further assessment may be done when more data becomes available.

An additional analysis was completed using MCWRA well database, which includes 27 active domestic wells. Of these, only 23 wells had construction information and were used to compare to the minimum thresholds. All 23 domestic wells will have at least 25 feet of water in them as long as groundwater elevations remain above minimum thresholds; and will also have at least 25 feet of water in them when measurable objectives are achieved. If more wells with construction information are registered, the assessment may be redone.

For both sets of domestic wells used for the analysis, the depth to water is derived from a smoothly interpolated groundwater elevation contour map and a digital elevation model of land surface elevation. Such regional interpolation maps are the best estimate of the groundwater elevations between measured points in the subbasin; however, site-specific groundwater elevations may not match it precisely. Uncertainty in the regional map may result in discrepancies in groundwater elevations at the selected domestic wells.

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

SVBGSA compared minimum thresholds between RMSs to understand the relationship between RMS wells (i.e., describe why or how a groundwater level minimum threshold set at a particular RMS is similar to or different from groundwater level thresholds in nearby RMS). The groundwater level 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 RMS wells do not conflict with each other.

Groundwater level minimum thresholds are set to avoid undesirable results for other sustainability indicators, with the exception of seawater intrusion. Seawater intrusion requires projects and/or management actions to address within the SGMA timeframe, and depending on those selected and their design, seawater intrusion may not be addressed by protective groundwater elevations. Relationships between groundwater level minimum thresholds and the other sustainability indicators are:

- **Reduction in groundwater storage.** The chronic lowering of groundwater levels minimum thresholds are identical to the groundwater storage minimum thresholds. Thus, the groundwater level minimum thresholds will not result in an undesirable loss of groundwater storage.
- **Seawater intrusion.** The chronic lowering of groundwater level minimum thresholds are set above historical lows. Therefore, the groundwater elevation minimum thresholds are not set to prevent seawater intrusion. Seawater intrusion may be mitigated by either lowering groundwater elevations near the coast to capture seawater intrusion or raising groundwater elevations inland of the intrusion to drive seawater intrusion towards the

coast. PMAs may result in lower or higher groundwater elevations to manage seawater intrusion depending on the type of project. The groundwater elevation minimum threshold was not set to solve seawater intrusion in this GSP, but rather to not exacerbate seawater intrusion, without intervention. This relationship may need to be re-evaluated during the next phase of project and management action development.

- **Degraded water quality.** The chronic lowering of groundwater levels minimum threshold could affect groundwater quality through 2 processes:
 1. Changes in groundwater elevation could change groundwater gradients, which could cause poor quality groundwater to flow toward production and domestic wells that would not have otherwise been impacted. These groundwater gradients, however, are only dependent on differences between groundwater elevations, not on the groundwater elevations themselves. Therefore, the minimum threshold groundwater levels do not directly lead to a significant and unreasonable degradation of groundwater quality in production and domestic wells.
 2. Decreasing groundwater elevations may mobilize COC that are concentrated at depth, such as arsenic. The groundwater level minimum thresholds are near or above historical lows at the start of SGMA. Therefore, any depth dependent constituents have previously been mobilized by historical groundwater levels. Maintaining groundwater elevations above the minimum thresholds is intended to assure that no new depth dependent COC are mobilized and are therefore protective of beneficial uses and users.
- **Land subsidence.** The chronic lowering of groundwater levels minimum thresholds are set at or above recent low groundwater elevations. Thus, avoiding the dewatering and compaction of clay-rich sediments that causes subsidence in response to lowering groundwater elevations. Where groundwater levels are consistently below minimum thresholds, such as in the Deep Aquifers, land subsidence is a risk.
- **Depletion of ISW.** The chronic lowering of groundwater levels minimum thresholds are identical to the ISW minimum thresholds. Therefore, the groundwater level minimum thresholds will not result in a significant or unreasonable depletion of ISW.

8.6.2.4 Effect of Minimum Thresholds on Neighboring Basins and Subbasins

The Eastside Subbasin has 3 neighboring subbasins within the Salinas Valley:

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

The SVBGSA is either the exclusive GSA or is 1 of the coordinating GSAs for all adjacent Subbasins. Because SVBGSA's jurisdiction includes all these subbasins, the SVBGSA coordinates the development of the minimum thresholds and measurable objectives for all these subbasins. The 180/400 Subbasin GSP was submitted in 2020, was approved in 2022, and GSP Amendment 1 was submitted in 2025. GSPs for the other Salinas Valley subbasins were submitted in 2022 and approved in 2023. Amendments for all Salinas Valley subbasins have been developed together for submittal in 2027. Minimum thresholds for this Minimum thresholds for the Eastside Subbasin are reviewed relative to information developed for the neighboring subbasins' GSPs to ensure that these minimum thresholds will not prevent the neighboring subbasins from achieving sustainability. SVBGSA GSPs have been developed with consistent methods and SMC.

8.6.2.5 Effects on Beneficial Users and Land Uses

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

Agricultural land uses and users. The groundwater level minimum thresholds prevent continued lowering of groundwater elevations in the Subbasin. Unless sufficient recharge projects are undertaken, this may have the effect of limiting the amount of groundwater pumping in the Subbasin and the amount and type of crops that can be grown in the Subbasin. The groundwater level 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 under irrigation may become more valuable as bringing new lands into irrigation becomes more difficult and expensive.
- Agricultural land not under irrigation may become less valuable or converted to another land use because it may be too difficult and expensive to irrigate.
- Keeping groundwater elevations above historical lows will help prevent greater electricity demand associated with pumping at lower elevations.

Urban land uses and users. The groundwater level minimum thresholds may reduce the amount of groundwater pumping in the Subbasin. This may limit urban growth or result in urban areas obtaining alternative sources of water. This may result in higher water costs for public drinking water system users. Keeping groundwater elevations above historical lows will help prevent greater electricity demand associated with pumping at lower elevations.

Domestic land uses and users. The groundwater level minimum thresholds are intended to protect most domestic wells, including 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, domestic wells may become dry if

they are shallow, groundwater elevations in their vicinity are very low, or pump capacity is low, which may require deeper wells, higher capacity pumps, or joining a water system, if capacity is available. Maintaining groundwater levels above historical lows also helps prevent problems associated with elevations below well screens, such as mechanical damage to wells such as cavitation, reduced pump efficiency, and microbial growth. Additionally, the groundwater level minimum thresholds may limit the number of new domestic wells or small state and small local system wells that can be drilled to limit future declines in groundwater elevations.

Ecological land uses and users. The groundwater level minimum thresholds may limit the amount of groundwater pumping in the Subbasin and may limit both urban and agricultural growth. This outcome may benefit ecological land uses and users by curtailing the conversion of native vegetation to agricultural or domestic uses, and by reducing pressure on existing ecological land caused by declining groundwater elevations. Maintaining groundwater levels above historical lows helps protect GDEs whose rooting depths may be exceeded at deeper levels.

8.6.2.6 Relevant Federal, State, or Local Standards

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

8.6.2.7 Method for Quantitative Measurement of Minimum Thresholds

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

As noted in Chapter 7, the groundwater level representative monitoring network in the Subbasin as of GSP Amendment 1 includes 39 wells. This includes 4 new monitoring wells that are not discussed in Chapter 8 because they do not have established SMC yet.

8.6.3 Measurable Objectives

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

The measurable objectives for the chronic lowering of groundwater levels are set to 2011 groundwater elevations.

The measurable objectives are summarized in Table 8-2 and are also shown on the hydrographs for each RMS in Appendix 5A.

8.6.3.1 Methodology for Setting Measurable Objectives

The methodology for establishing measurable objectives is described in detail in Section 8.6.2.1. 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 Subbasin. The measurable objective contour maps for the Eastside 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.

8.6.3.2 Interim Milestones

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

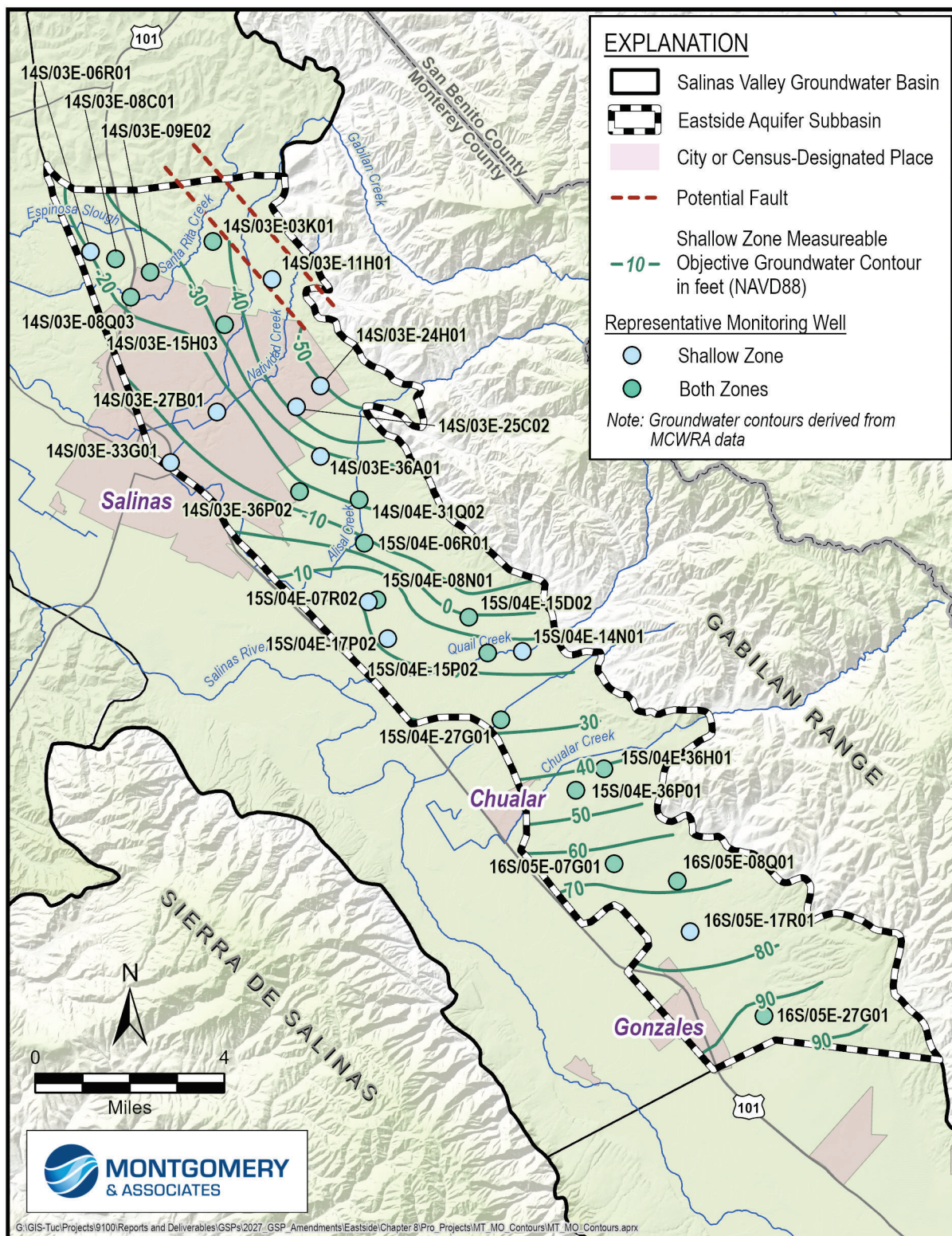


Figure 8-4. Groundwater Level Measurable Objective Contour Map for the Shallow Zone of the Eastside Aquifer

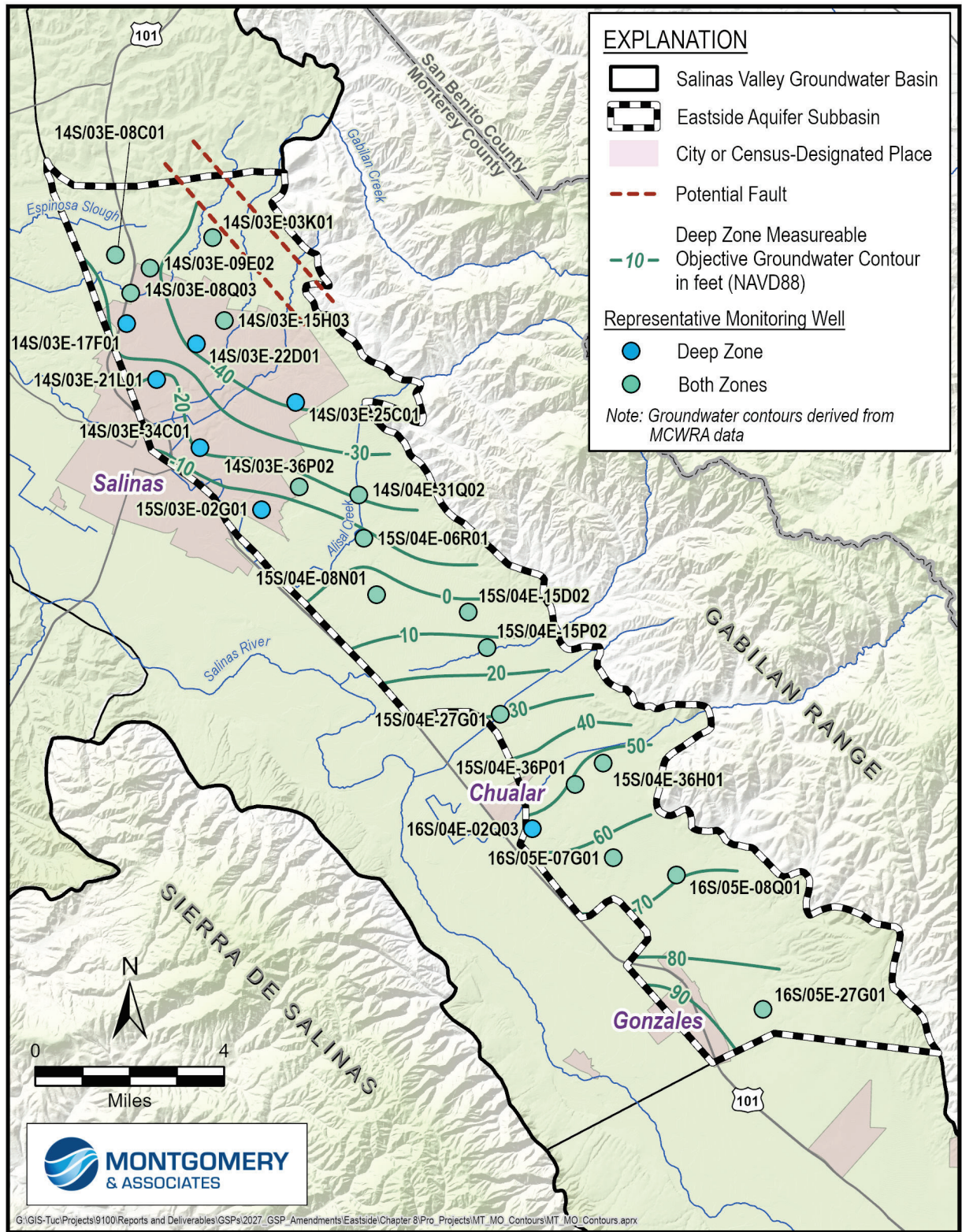


Figure 8-5. Groundwater Level Measurable Objective Contour Map for the Deep Zone of the Eastside Aquifer

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

Monitoring Site	GSP Baseline (2019) Groundwater Elevation (feet)	Interim Milestone at Year 2027(feet)	Interim Milestone at Year 2032 (feet)	Interim Milestone at Year 2037 (feet)	Measurable Objective (feet) (goal to reach at 2042)
Shallow Zone					
14S/03E-06R01	-22.5	-28.2	-28.2	-25.1	-20.2
14S/03E-11H01	69.2	62.0	70.5	79.0	81.6
14S/03E-24H01	-67.0	-73.7	-73.7	-61.4	-49.3
14S/03E-25C02	-60.5	-71.5	-71.5	-59.5	-42.2
14S/03E-27B01	-3.9	-8.8	-8.8	-5.4	-0.7
14S/03E-33G01	-13.0	-15.8	-15.8	-12.1	-4.8
14S/03E-36A01	-47.9	-55.3	-55.3	-44	-27.4
15S/04E-07R02	13.0	0.8	0.8	10.6	22.8
15S/04E-14N01	-29.5	-34.1	-34.1	-11.1	15.7
15S/04E-17P02	4.2	-14.2	-14.2	-1.0	17.5
16S/05E-17R01	75.8	67.5	67.5	73.7	78.4
Deep Zone					
14S/03E-17F01	-36.0	-45.0	-45.0	-37.8	-31.5
14S/03E-21L01	-32.0	-42.8	-42.8	-34.5	-22.6
14S/03E-22D01	-48.0	-50.0	-50.0	-50.0	-48.5
14S/03E-25C01	-62.4	-77.5	-77.5	-63.2	-42.9
14S/03E-34C01	-27.0	-31.5	-31.5	-24.0	-22
15S/03E-02G01	-23.0	-31.4	-31.4	-22.0	-6.3
16S/04E-02Q03	45.6	31.1	31.1	44.1	59.4
Both Zones					
14S/03E-03K01	-55.7	-64.0	-64.0	-53.2	-36.8
14S/03E-08C01	-44.9	-38.1	-36.1	-34.2	-31.5
14S/03E-08Q03	-46.0	-48.3	-43.4	-38.1	-24.1
14S/03E-09E02	-48.0	-65.3	-65.3	-54.2	-38.2
14S/03E-15H03	-44.5	-56.1	-56.1	-46.7	-34.1
14S/03E-36P02	-25.4	-34.9	-34.9	-22.9	-18.7
14S/04E-31Q02	-35.2	-49.3	-49.3	-33	-23
15S/04E-06R01	-23.5	-37.3	-37.3	-22.7	-1.1
15S/04E-08N01	1.2	-6.9	-6.9	0.1	4.5
15S/04E-15D02	-16.2	-28.4	-28.4	-14.6	3.3
15S/04E-15P02	-8.8	-23.2	-23.2	-8.7	0.2
15S/04E-27G01	13.8	-0.9	-0.9	12.9	29.8
15S/04E-36H01	27.6	13.9	13.9	33.8	58.9
15S/04E-36P01	30.0	20.1	20.1	32.1	55.4
16S/05E-07G01	50.9	36.7	36.7	50	71.1
16S/05E-08Q01	57.0	41.0	41.0	54.5	67.8
16S/05E-27G01	88.2	79.3	79.3	84.3	92.2

8.6.4 Undesirable Results

8.6.4.1 Criteria for Defining Chronic Lowering of Groundwater Levels Undesirable Results

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

More than 15% of the groundwater elevation minimum thresholds are exceeded.

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

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.

Based on the RMS wells that have SMC as of GSP Amendment 1, the 15% limit on minimum threshold exceedances in the undesirable result allows for 4 exceedances in the 35 existing representative monitoring wells; the percentage of minimum threshold exceedances will be adjusted in any given year based on the RMS wells monitored that have SMC set. This was considered a reasonable number of exceedances given the hydrogeologic uncertainty of aquifer characteristics of the Subbasin. As the monitoring system grows, additional exceedances will be allowed.

8.6.4.2 Potential Causes of Undesirable Results

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 or heavily utilized wells may cause excessive localized drawdowns that lead to 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.
- **Reservoir operations.** Operation of Nacimiento and San Antonio Reservoirs affect the timing and quantity of surface water flows. This affects groundwater levels in the subbasin both directly from recharge of surface water in the Subbasin and indirectly from subsurface flows after recharge in adjacent subbasins. In addition, surface water rediversion at the SRDF, along with recycled water availability, affect CSIP groundwater demand.
- **Subsurface flows with adjacent subbasins.** The Eastside Subbasin is hydraulically connected with the Forebay, 180/400, and Langley Subbasins. Groundwater levels in those subbasins may affect the potential for undesirable results in the Eastside Subbasin.

8.6.4.3 Effects on Beneficial Users and Land Uses

Undesirable results for groundwater levels could have negative effects on beneficial users and land uses. Domestic wells are the most vulnerable due to their shallower depths. Low groundwater levels may result in higher pumping costs, the need to lower well pumps, mechanical problems, microbial contamination, or the need to drill deeper replacement wells. While municipal and agricultural production wells tend to be deeper, their electricity demand and the cost of pumping still increases at lower groundwater levels. Lowering the pump or drilling a deeper well in the same location is not a solution as the levels will only continue to drop unless the well is replaced in a deeper portion of the aquifer. Rural residential domestic users are the most vulnerable, as they tend to have the shallowest wells that are the first to be affected.

The lower the groundwater levels are, the more it increases the risk that seawater intrusion advances inland, as well as vertically migrates to aquifers with lower groundwater levels. The Groundwater Level SMC was not set to prevent seawater intrusion; however, lower groundwater levels could cause greater advancement of seawater intrusion, either laterally or vertically.

8.7 Reduction in Groundwater Storage SMC

8.7.1 Locally Defined Significant and Unreasonable Conditions

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

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

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

8.7.2 Minimum Thresholds

The minimum thresholds for reduction in groundwater storage are established by proxy using groundwater elevations. The reduction in groundwater storage minimum thresholds are identical to the chronic lowering of groundwater levels minimum thresholds.

Although not the metric for establishing change in groundwater storage, the GSAs are committed to pumping at or less than the Subbasin's long-term sustainable yield. The projected long-term sustainable yield within Chapter 6 is based on the anticipated climate; however, if the climate or other conditions that occur differ, the long-term amount that can be pumped while maintaining stable groundwater level trends may also differ. Further, it does not reflect the pumping at which seawater intrusion is stopped. This will be further analyzed during GSP implementation as PMAs are refined and modeling is updated to assess groundwater storage effects and benefits. SGMA allows 20 years to reach sustainability.

8.7.2.1 Information and Methodology Used to Establish Minimum Thresholds

Since groundwater storage and groundwater elevation minimum thresholds are identical, the methodology used to establish minimum thresholds for reduction in groundwater storage are detailed in Section 8.6.2.1.

The general relationship between groundwater storage and groundwater elevations is described in greater detail in Chapter 4, Section 4.4.2. The Subbasin-specific data analysis to establish the proxy relationship between groundwater storage and groundwater is discussed below.

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

Figure 8-6 compares the Subbasin's cumulative change in storage, plotted on the black line, with the average annual change in groundwater elevation, plotted on the blue line. Groundwater elevation change data are derived from the groundwater elevation network; the cumulative change in groundwater storage is derived from the SVIHM. Although the data come from 2 sources, the data show similar patterns between 1998 and 2022.

Figure 8-7 shows a scatter plot of simulated cumulative change in storage and average change in observed groundwater elevations. The comparison between 1980 and 2022 yields a strong positive correlation ($R^2=0.705$). The correlation for the 1980 to 2022 period is sufficient to show

that groundwater elevations are an adequate proxy for groundwater storage. Additionally, the relationships shown on Figure 8-4 and Figure 8-5 also demonstrate that when paired with SVIHM storage parameters, long term trends in measured change in groundwater elevations can be used to approximate trends in storage change.

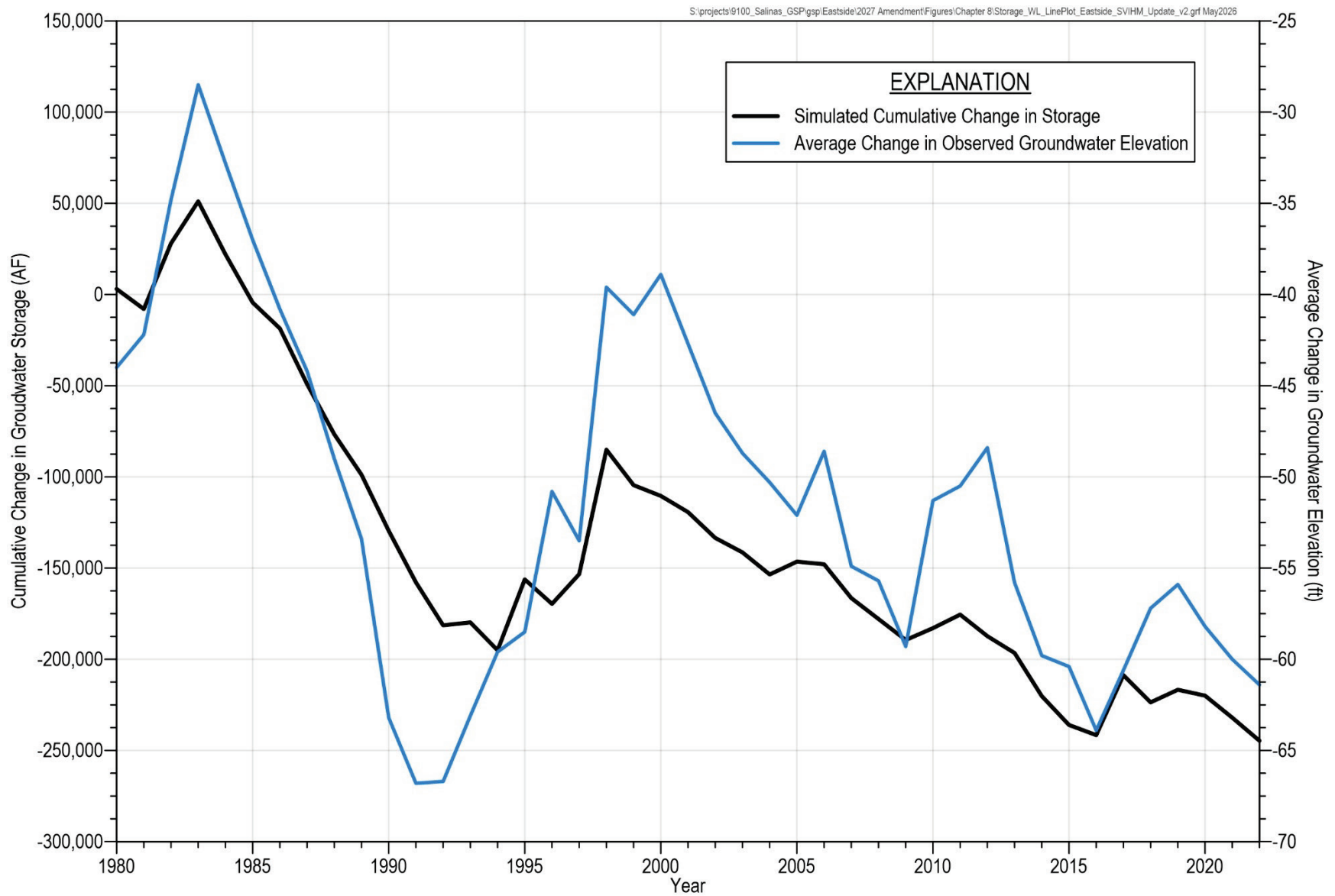


Figure 8-6. Cumulative Change in Storage and Average Change in Groundwater Elevation in the Eastside Aquifer

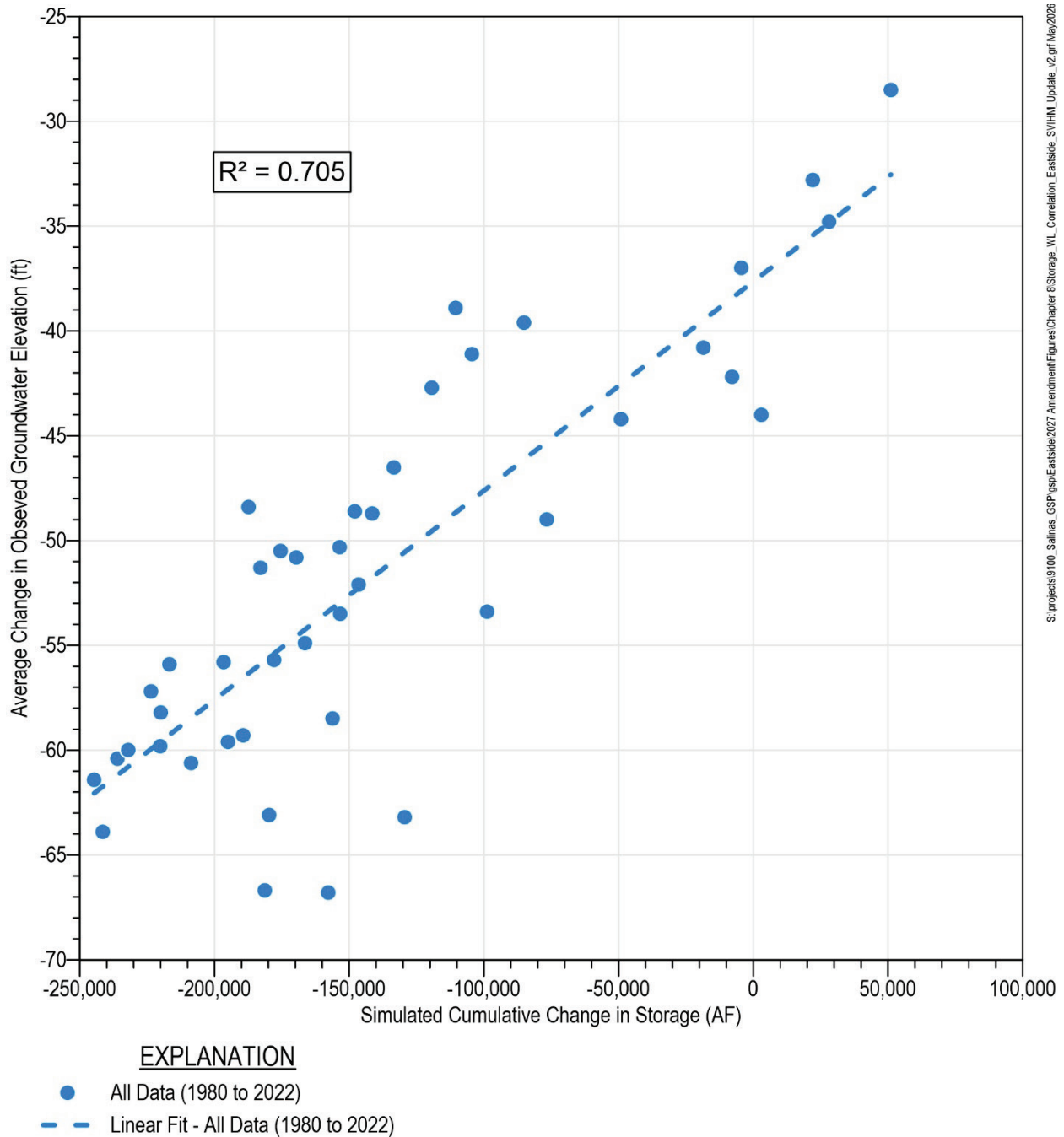


Figure 8-7. Correlation Between Cumulative Change in Storage and Average Change in Groundwater Elevation

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

The groundwater storage minimum thresholds are identical to groundwater level minimum thresholds, which are consistent with other sustainability indicators, as described in Section 8.6.2.3.

8.7.2.3 Effect of Minimum Thresholds on Neighboring Basins and Subbasins

The Eastside Subbasin has 3 neighboring subbasins within the Salinas Valley:

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

The SVBGSA is either the exclusive GSA or is 1 of the coordinating GSAs for the adjacent Subbasins. Because the SVBGSA's jurisdiction includes all these subbasins, the SVBGSA coordinates the development of the minimum thresholds and measurable objectives for all these subbasins. The 180/400 Subbasin GSP was submitted in 2020, was approved in 2022, and GSP Amendment 1 was submitted in 2025. GSPs for the other Salinas Valley subbasins were submitted in 2022 and approved in 2023. Amendments for all Salinas Valley subbasins have been developed together for submittal in 2027. Minimum thresholds for this Subbasin have been reviewed relative to information developed for the neighboring subbasins' GSPs to ensure that these minimum thresholds will not prevent the neighboring subbasins from achieving sustainability. SVBGSA GSPs have been developed with consistent methods and SMC.

8.7.2.4 Effect on Beneficial Uses and Users

Because the groundwater storage minimum thresholds are defined based on groundwater level minimum thresholds, the effects of groundwater storage minimum threshold on beneficial uses and users are identical to those described in Section 8.6.2.5.

8.7.2.5 Relation to State, Federal, or Local Standards

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

8.7.2.6 Method for Quantitative Measurement of Minimum Threshold

The groundwater level minimum thresholds will be used as proxies for reduction of groundwater storage, therefore, the measurement of change in groundwater storage will be measured as outlined in Section 8.6.2.7 using the groundwater level monitoring network described in Chapter 7.

8.7.3 Measurable Objectives

The measurable objectives for reduction in groundwater storage are established by proxy using groundwater elevations. The reduction in groundwater storage measurable objectives are identical to the chronic lowering of groundwater levels measurable objectives.

8.7.3.1 Methodology for Setting Measurable Objectives

As stated in Section 8.6.3, the groundwater level measurable objectives for chronic lowering of groundwater levels provide an adequate margin of operational flexibility for managing the Subbasin. Therefore, the change in storage measurable objectives were set to be identical to the groundwater level measurable objectives: providing the same margin of operation flexibility.

8.7.3.2 Interim Milestones

The groundwater level interim milestones described in Table 8-3 and Section 8.6.3.2 will serve as proxies for the reduction of groundwater storage interim milestones.

8.7.4 Undesirable Results

8.7.4.1 Criteria for Defining Reduction in Groundwater Storage Undesirable Results

The criteria used to define undesirable results for reduction of groundwater storage are based on minimum thresholds established for chronic lowering of groundwater levels. The reduction of storage undesirable result is:

More than 15% of groundwater elevation minimum thresholds are exceeded. The undesirable result for reduction in groundwater storage is established by proxy using groundwater elevations.

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

8.7.4.2 Potential Causes of Undesirable Results

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

- **Expansion of agricultural or municipal pumping.** Additional agricultural or municipal pumping may result in lowered groundwater elevations, lower recharge of the principal aquifers from precipitation or streamflow, or seawater intrusion that reduce groundwater in storage to 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.
- **Reservoir operations.** Operation of Nacimiento and San Antonio Reservoirs affect the timing and quantity of surface water flows. This affects groundwater levels and storage in the subbasin both directly from recharge of surface water in the Subbasin and indirectly from subsurface flows after recharge in adjacent subbasins. In addition, surface water rediversion at the SRDF, along with recycled water availability, affect CSIP groundwater demand.
- **Subsurface flows with adjacent subbasins.** The Eastside Subbasin is hydraulically connected with the 180/400, Forebay, and Langley Subbasins. Groundwater levels in those subbasins may affect the potential for undesirable results in the Eastside Subbasin.

8.7.4.3 Effects on Beneficial Users and Land Use

The practical effect of the reduction in groundwater storage undesirable result is a chronic, long-term net loss of groundwater in storage. Therefore, beneficial uses and users would not have access to a similar amount of water in storage, and the undesirable result would have an additional negative effect on the beneficial users and uses of groundwater.

8.8 Seawater Intrusion SMC

8.8.1 Locally Defined Significant and Unreasonable Conditions

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

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

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

8.8.2 Minimum Thresholds

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

Figure 8-8 presents the minimum threshold, shown in red, for seawater intrusion in the Eastside Subbasin as represented by the 500 mg/L chloride concentration isocontour. The purple line shows the GSP baseline 2019 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.

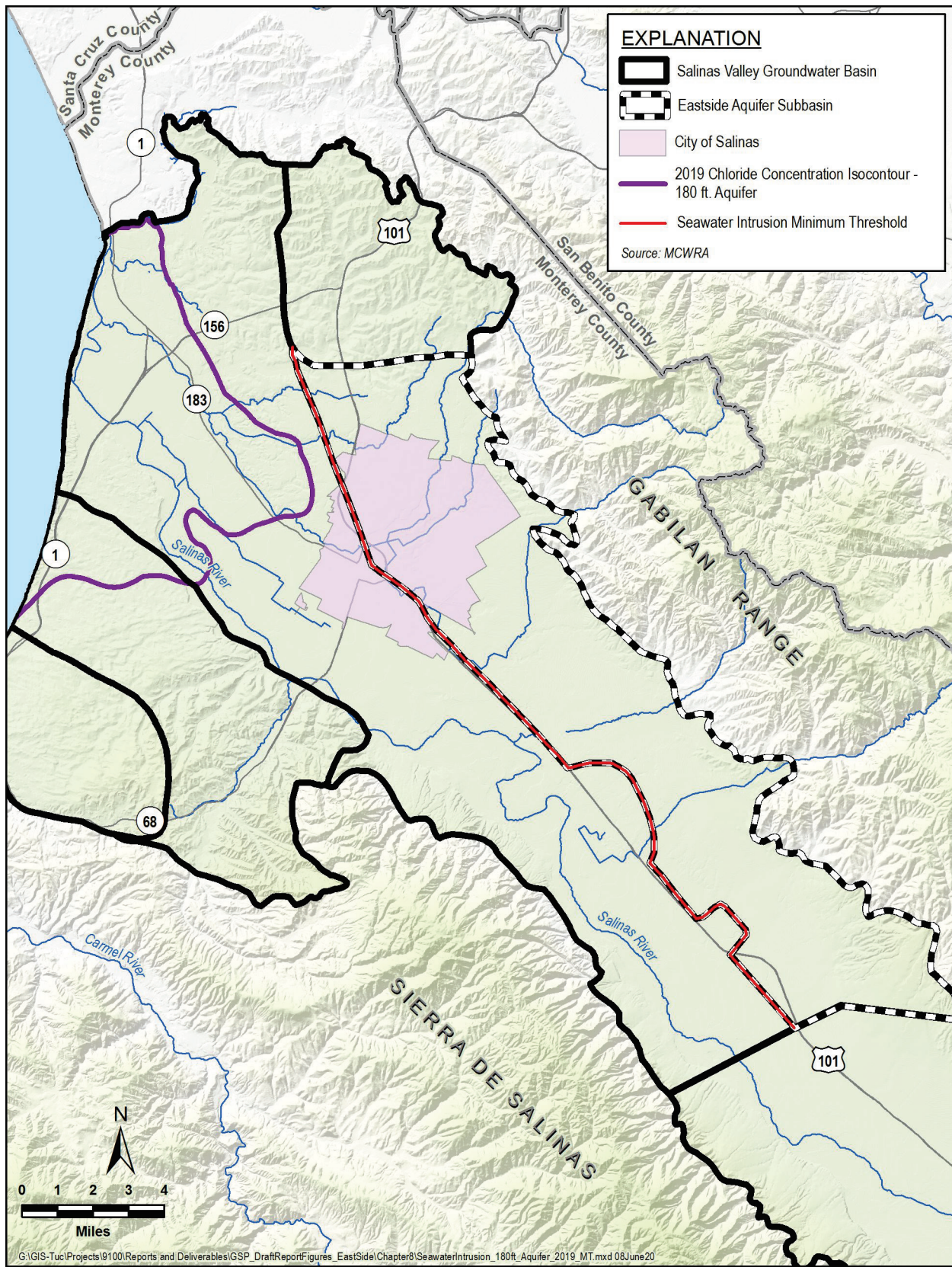


Figure 8-8. Minimum Threshold for Seawater Intrusion in the Eastside Aquifer

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

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

The groundwater models used to assess the effectiveness of PMAs on seawater intrusion specifically incorporate assumptions for future sea level rise. Therefore, actions to avoid undesirable results will include sea level rise assumptions in their design and development. Future development of PMAs in the next phase of GSP implementation may warrant further review and modification of the seawater intrusion minimum threshold based on their ultimate timing, scale, configuration and anticipated benefits and effects.

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

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

- **Chronic lowering of groundwater levels.** The seawater intrusion minimum threshold does not promote additional pumping that could cause groundwater elevations to decrease in the Subbasin. Therefore, the seawater intrusion minimum threshold will not result in significant or undesirable groundwater elevations.
- **Reduction in groundwater storage.** The seawater intrusion minimum threshold does not promote additional pumping in excess of the sustainable yield. Therefore, the seawater intrusion minimum threshold will not result in an exceedance of the groundwater storage minimum threshold. Groundwater storage, as measured by pumping, will not be affected by the seawater intrusion minimum thresholds.
- **Degraded water quality.** The seawater intrusion minimum threshold does not promote decreasing groundwater elevations that could lead to exceedances of groundwater quality minimum thresholds. In fact, the seawater intrusion minimum threshold may have a beneficial impact on groundwater quality by preventing increases in chloride concentrations in supply wells.
- **Land Subsidence.** The seawater intrusion minimum threshold does not promote additional pumping that could cause subsidence. Therefore, the seawater intrusion minimum threshold will not result in an exceedance of the subsidence minimum threshold.

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

8.8.2.3 Effect of Minimum Threshold on Neighboring Basins and Subbasin

The Eastside Subbasin has 3 neighboring subbasins within the Salinas Valley:

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

The SVBGSA is either the exclusive GSA or is 1 of the coordinating GSAs for the adjacent Subbasins. Because the SVBGSA's jurisdiction covers all these subbasins, the SVBGSA is coordinating the development of the minimum thresholds and measurable objectives for all these subbasins. The 180/400 Subbasin GSP was submitted in 2020, was approved in 2022, and GSP Amendment 1 was submitted in 2025. GSPs for the other Salinas Valley subbasins were submitted in 2022 and approved in 2023. Amendments for all Salinas Valley subbasins have been developed together for submittal in 2027. Minimum thresholds for this Subbasin have been reviewed relative to information developed for the neighboring subbasins' GSPs to ensure that these minimum thresholds will not prevent the neighboring subbasins from achieving sustainability. SVBGSA GSPs have been developed with consistent methods and SMC.

8.8.2.4 Effects on Beneficial Users and Land Uses

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

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

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

Ecological land uses and users. Although the seawater intrusion minimum threshold does not directly benefit ecological uses, it can be inferred that the seawater intrusion minimum thresholds provide generally positive benefits to the Subbasin's ecological water uses. Preventing seawater

intrusion into the Subbasin will help prevent unwanted high salinity levels from impacting ecological groundwater uses.

8.8.2.5 Relevant Federal, State, or Local Standards

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

8.8.2.6 Method for Quantitative Measurement of Minimum Threshold

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

8.8.3 Measurable Objectives

The measurable objective for seawater intrusion is identical to the minimum threshold that is shown on Figure 8-8.

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

8.8.3.1 Methodology for Setting Measurable Objectives

In the Eastside 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. The methodology used to set measurable objectives is discussed in Section 8.8.2.1.

8.8.3.2 Interim Milestones

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.

8.8.4 Undesirable Result

8.8.4.1 Criteria for Defining Seawater Intrusion Undesirable Result

The seawater intrusion undesirable result is a quantitative combination of chloride concentrations minimum threshold exceedances. Because any 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:

Any exceedance of the minimum threshold, resulting in mapped seawater intrusion within the Subbasin boundary.

8.8.4.2 Potential Causes of Undesirable Results

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

- Groundwater levels below sea level and an inland flow gradient
- Increased pumping, such as during droughts, which lowers groundwater levels inland of the seawater intrusion front and causes additional intrusion
- Unanticipated high sea level rise

8.8.4.3 Effects on Beneficial Users and Land Use

The primary detrimental effect on beneficial users and land uses from allowing seawater intrusion to occur in the Subbasin is that the pumped groundwater may become saltier, which can impact crop production and may cause potential exceedances of secondary MCLs. This may necessitate treatment or blending of water, or drilling wells deeper, or limit the amount or type of crops that can be grown. Agricultural land may become less valuable because it may be too difficult and expensive to irrigate. Reduced yields may have a ripple effect on the local economy and may negatively affect land values. Thus, preventing seawater intrusion into the Subbasin prevents impacts to domestic, municipal, and agricultural wells and associated land uses.

8.9 Degraded Water Quality SMC

8.9.1 Locally Defined Significant and Unreasonable Conditions

Locally defined significant and unreasonable changes in groundwater quality resulting from a direct result of extraction or GSA groundwater management action that either:

- Increase the number of potable water supply wells in which above an established MCL or SMCL, or
- Increase in the number of agricultural supply wells in which COC concentrations may lead to significantly reduced crop production based on the water quality objectives from the Water Quality Basin Plan for the Central Coastal Basin (CCRWQCB, 2019).

These are not considered significant and unreasonable if they are managed to provide drinking water supply (i.e., treated, blended, or replaced) or if beneficial users are not potentially impacted. These significant and unreasonable conditions were determined with input from the Subbasin Committees, other coordinating GSAs, and discussions with GSA staff, and for GSP Amendment 1, the CCRWQCB. These conditions were determined to be significant and unreasonable because groundwater quality in exceedance of these could cause a financial burden on groundwater users or otherwise harm them. Public water systems with COC concentrations above the MCL or SMCL are required to add treatment to the drinking water supplies or drill

new wells. Agricultural wells with COCs that significantly reduce crop production will reduce grower's yields and profits.

8.9.2 Minimum Thresholds

The minimum thresholds for degraded water quality are zero additional exceedances of the regulatory drinking water standards or Basin Plan objectives beyond those observed in 2019 for groundwater quality constituents of concern.

The minimum thresholds for all wells in the monitoring network reflect California's Title 22 drinking water standards and the water quality objectives listed in the Basin Plan (CCRWQCB, 2019). The minimum threshold values are based on data up to September 30, 2019. While SGMA states that undesirable results that occur after January 1, 2015, should be addressed for groundwater quality, 2019 was selected because it was the last year of data available when the original GSP was drafted and there was no substantial difference from 2015 water quality data. Full discussion of these GSP baseline conditions is included in Chapter 5 and comparison between 2015 and 2019 quality is included in the 2027 GSP Periodic Evaluation. Because the minimum thresholds reflect no additional exceedances, the minimum thresholds are set to the percentage of exceedances in 2019. Surpassing the percentage of existing exceedances for any of the listed constituents will lead to an undesirable result. Not all wells in the monitoring network are sampled for every COC.

The constituents listed in Table 8-4 comprise the constituent watchlist for the Eastside Subbasin. Table 8-4 expands upon the water quality assessment presented in Table 5-3. A subset of these constituents defines the COC for which SMC are established. Several constituents were not sampled prior to WY 2019; however, these constituents exceed the Title 22 regulatory standard or Basin Plan water quality objective during the WY 2021 to WY 2025 period. Therefore, this amendment updates what needs to be included in the constituent watchlist. The fourth through sixth columns of Table 8-4 show the criteria used to select COC that are described in Section 8.9.2.1. To be a COC, a constituent had to be found above the level of concern in 3 out of 5 years from WY 2021 to WY 2025 and exist in at least 10% of wells and occur in at least 5 wells averaged over this period. The constituents that meet the COC criteria for the purpose of this GSP are highlighted in orange in Table 8-4.

Since WY 2019, there has been 1 new additional COC in the Subbasin (1,2,3-trichloropropane), which is flagged with an asterisk in Table 8-4. Because there were no exceedances of the level of concern for these COC in WY 2019, the minimum threshold is set to 0%. Only constituents that meet the criteria in Section 8.9.2.1 are included as COC; however, all monitored constituents included in the watchlist are reviewed as part of annual reports. As part of 5-year periodic evaluations, the list of COCs are reassessed and SMC are added for additional constituents if they meet the COC criteria. This enables identification of persistent constituents, rather than year-to-year fluctuations. If any new COC are identified during the periodic evaluation, the

minimum threshold is either: 1) set to 0% if it was sampled for and there were no exceedances of the level of concern for the COC in WY 2017, or 2) set after initial years of monitoring if it was not historically sampled for.

Table 8-4. Water Quality Constituent Watchlist and Minimum Thresholds

Constituent	Concentration Level of Concern	Standard Units	Data from WY 2021 to WY 2025 for COC Criteria			Data up to WY 2019		
			Number of Years with Level of Concern Exceedances (COC >3)	Average Percentage of Wells with Exceedances (COC >10%)	Average Number of Wells with Exceedances (COC >5)	Number of Wells Sampled	Number of Wells Exceeding Level of Concern in the Last Sample	Minimum Threshold/ Measurable Objective – Percent of Wells Exceeding Level of Concern
			DDW Wells					
1,2,3-Trichloropropane* (1,2,3-TCP)	0.005	µg/L	5	20%	7	73	6	8%
Aluminum	1,000	µg/L	1	1%	1	72	1	1%
Arsenic	10	µg/L	4	3%	1	72	2	3%
Chloride	106	mg/L	5	30%	5	67	26	39%
Fluoride	2	mg/L	0	0%	0	74	1	1%
Gross Alpha Radioactivity	15	pci/L	0	0%	0	71	1	1%
Iron	300	µg/L	4	9%	2	65	3	5%
Manganese	50	µg/L	4	5%	1	66	0	0%
MTBE (Methyl-tert-butyl ether)	13	µg/L	5	5%	1	72	0	0%
Nitrate (as nitrogen)	10	mg/L	5	26%	18	78	20	26%
Sodium	69	mg/L	2	29%	5	0	0	-
Specific Conductance	1600	µmhos/cm	2	3%	1	74	2	3%
Total Dissolved Solids	1000	mg/L	2	3%	1	67	4	6%
			ILP On-Farm Domestic Wells					
1,2,3-Trichloropropane* (1,2,3-TCP)	0.005	µg/l	4	33%	14	0	0	-
Nitrate + Nitrite (sum as nitrogen)	10	mg/L	5	53%	33	49	30	61%
Specific Conductance	1600	µmhos/cm	4	17%	12	37	10	27%

Constituent	Concentration Level of Concern	Standard Units	Data from WY 2021 to WY 2025 for COC Criteria			Data up to WY 2019		
			Number of Years with Level of Concern Exceedances (COC >3)	Average Percentage of Wells with Exceedances (COC >10%)	Average Number of Wells with Exceedances (COC >5)	Number of Wells Sampled	Number of Wells Exceeding Level of Concern in the Last Sample	Minimum Threshold/ Measurable Objective – Percent of Wells Exceeding Level of Concern
			ILP Irrigation Supply Wells					
Chloride	106	mg/L	2	92%	4	81	31	38%
Nitrate + Nitrite* (sum as nitrogen)	10	mg/L	4	45%	66	22	14	64%
Sodium	69	mg/L	2	75%	3	80	38	48%
Specific Conductance	1600	µmhos/cm	4	7%	10	68	3	4%
Total Dissolved Solids	1000	mg/L	4	8%	11	72	4	6%

*Constituent was not of concern prior to WY 2019.

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

As noted in the GSP Regulations, minimum thresholds are based on a degradation of groundwater quality, not an improvement of groundwater quality (23 CCR § 354.28 (c)(4)). Therefore, this GSP is designed to avoid taking any action that may inadvertently move groundwater constituents already in the Subbasin in such a way that the constituents have a significant and unreasonable impact that would not otherwise occur. The constituents that have historically occurred in the Subbasin up to 2025 were reviewed and were included as COCs if they met the following 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 in at least 3 years from WY 2021 to WY 2025.
3. They must have been found in the Subbasin at levels above the level of concern in 10% or more of the wells sampled on average between WY 2021 and WY 2025.
4. They must occur at levels above the level of concern in at least 5 wells in the monitoring network averaged from WY 2021 to WY 2025.

Based on the review of groundwater quality in Chapter 5, the COC that may affect drinking water supply wells or are known to cause reductions in crop production are listed in Table 8-4. The other constituents discussed in Chapter 5 that do not meet the COC criteria will be monitored under the constituent watchlist but are not used to define the SMC.

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

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

- **Chronic lowering of groundwater levels.** The degradation of groundwater quality minimum thresholds could influence groundwater level minimum thresholds by limiting the types of water that can be used for recharge to maintain or raise groundwater elevations.
- **Reduction in groundwater storage.** The degradation of groundwater quality minimum thresholds could influence groundwater storage minimum thresholds by limiting the types of water that can be used for recharge to maintain or raise groundwater elevations.

- **Seawater intrusion.** The degradation of groundwater quality minimum thresholds do not promote additional pumping that could exacerbate seawater intrusion. Therefore, the groundwater quality minimum thresholds will not result in an exceedance of the seawater intrusion minimum threshold.
- **Land subsidence.** The degradation of groundwater quality minimum thresholds do not promote additional pumping that could cause subsidence. Therefore, the groundwater quality minimum thresholds will not result in an exceedance of the subsidence minimum threshold.
- **Depletion of ISW.** The degradation of groundwater quality minimum thresholds do not promote additional pumping or lower groundwater elevations adjacent to ISW. Therefore, the groundwater quality minimum thresholds will not result in a significant or unreasonable depletion of ISW.

8.9.2.3 Effect of Minimum Thresholds on Neighboring Basins and Subbasins

The Eastside Subbasin has 3 neighboring subbasins within the Salinas Valley:

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

The SVBGSA is either the exclusive GSA or is 1 of the coordinating GSAs for the adjacent Subbasins. Because SVBGSA's jurisdiction includes all these subbasins, the SVBGSA coordinates the development of the minimum thresholds and measurable objectives for all these subbasins. The 180/400 Subbasin GSP was submitted in 2020, was approved in 2022, and GSP Amendment 1 was submitted in 2025. GSPs for the other Salinas Valley subbasins were submitted in 2022 and approved in 2023. Amendments for all Salinas Valley subbasins have been developed together for submittal in 2027. Minimum thresholds for this Subbasin were reviewed relative to information developed for the neighboring subbasins' GSPs to ensure that these minimum thresholds will not prevent the neighboring subbasins from achieving sustainability. SVBGSA GSPs have been developed with consistent methods and SMC.

8.9.2.4 Effect on Beneficial Uses and Users

Agricultural land uses and users. The groundwater quality minimum thresholds generally provide positive benefits to the Subbasin's agricultural water users. The minimum thresholds help ensure extraction or GSA actions do not degrade groundwater quality such that it would reduce crop production. This helps protect groundwater supplies for agricultural production.

Urban land uses and users. The groundwater quality minimum thresholds generally provide positive benefits to the Subbasin's urban water users. The minimum thresholds help ensure extraction or GSA actions do not degrade groundwater quality such that it would cause more drinking water wells to violate drinking water standards. This helps provide 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 by helping ensure extraction and GSA actions do not degrade groundwater quality such that it would cause more drinking water wells to violate drinking water standards. This helps provide 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. GDEs could potentially become impacted if contaminated groundwater is taken up by GDEs. Some effects may be indirect, such as elevated nitrates stimulating additional aquatic growth, resulting in depressed dissolved oxygen levels. Species-specific tolerance levels for each COC is unknown, so minimum thresholds help protect ecological uses by preventing further degradation due to extraction or GSA action. .

8.9.2.5 Relation to State, Federal, or Local Standards

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

8.9.2.6 Method for Quantitative Measurement of Minimum Thresholds

Degradation of groundwater quality minimum thresholds will be directly measured from active wells in the Subbasin. Groundwater quality will be evaluated based on SWRCB GAMA groundwater information system data submitted through DDW and data received from CCRWQCB ILP and GQTM Workplan once approved, as discussed in Chapter 7.

Exceedances of MCLs and SMCLs and water quality objectives for crop production will be reviewed annually.

This review will be centered around the COC identified above. Every 5 years, in line with Periodic Evaluations, water quality data will be reassessed to determine whether any additional constituents meet the COC criteria listed above. If so, these additional constituents will be added to the list of COC for the Subbasin.

8.9.3 Measurable Objectives

The measurable objectives for degradation of groundwater quality represent target groundwater quality distributions in the Subbasin. SGMA does not mandate the improvement of groundwater quality. Therefore, the measurable objectives are based on no groundwater quality degradation and are identical to the minimum thresholds, as defined in Table 8-4.

The measurable objectives for degraded water quality are zero additional exceedances of the regulatory drinking water standards or Basin Plan objectives beyond those observed in 2019 for groundwater quality constituents of concern.

8.9.3.1 Methodology for Setting Measurable Objectives

As described above, measurable objectives are set to be identical to the minimum thresholds and therefore follow the same method as detailed in Section 8.8.2.1.

8.9.3.2 Interim Milestones

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

8.9.4 Undesirable Result

8.9.4.1 Criteria for Defining Undesirable Result

Water quality degradation that results in a minimum threshold exceedance becomes an undesirable result when it is a direct result of extraction or GSA groundwater management. Some groundwater quality changes are expected to occur independent of SGMA activities; because these changes are not related to SGMA activities or GSA management, they do not constitute an undesirable result. Additionally, SGMA states that GSAs are not responsible for addressing water quality degradation that was present before January 1, 2015 (California Water Code § 10727.2(b)(4)). Therefore, the degradation of groundwater quality reaches an undesirable result when:

Future or new minimum thresholds exceedances are caused by a direct result of extraction or GSA groundwater management, including projects or management actions and regulation of groundwater extraction, unless minimum threshold exceedances are managed to provide a water supply (i.e., treated, blended, or replaced) or beneficial users are not potentially harmed.

The groundwater level SMC is designed and intended to help protect groundwater quality. Setting the groundwater level minimum thresholds at or above historical lows assures that no

new depth dependent constituents of water quality concern are mobilized. The GSA may pursue projects or management actions to ensure that groundwater levels do not fall below groundwater level minimum thresholds.

This undesirable result recognizes there is an existing regulatory framework in the form of the California Porter Cologne Act and the federal Clean Water Act that addresses water quality management; and considers existing federal, state, and local groundwater quality standards, which were used in the development of minimum thresholds in the GSP. SVBGSA is not responsible for enforcing drinking water requirements or for remediating violations of those requirements that were caused by others (Moran and Belin, 2019). The existing regulatory regime does not require nor obligate SVBGSA to take any affirmative actions to manage or control existing groundwater quality. However, SVBGSA is committed to monitoring and disclosing changes in groundwater quality and ensuring its groundwater management actions do not cause drinking water or irrigation water to be unusable.

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

If minimum thresholds are exceeded, SVBGSA will review the potential causes, groundwater quality, and groundwater gradients to assess if the exceedance resulted from extraction or GSA action, or was independent of GSA activities. Both the implementation of actions and assessment of exceedances will occur throughout the GSP timeframe of 50 years as required by SGMA. The evaluation of whether a minimum threshold exceedance constitutes an undesirable result includes:

- **Step 1: Desktop Assessment**
Conduct initial screening of whether the exceedance is likely caused by extraction or GSA groundwater management action, is not managed, and is not associated with seawater intrusion.
- **Step 2: Coordination and Verification**
Consult with the Water Quality Coordination Group.
- **Step 3: Evaluate Potential Impacts on Beneficial Uses and Users**
If the exceedance is likely attributable to extraction or GSA actions, assess whether there are beneficial users that could potentially be harmed.
- **Step 4: Assess Data Needs**
Evaluate whether additional sampling is needed to confirm conditions or better

understand causes, considering existing monitoring programs (e.g., Preservation, Inc., MCWRA, SWRCB reporting).

- **Step 5: Identify Potential Actions to Address Water Quality Degradation**

If degradation is linked to extraction or GSA actions, consider appropriate responses, such as:

- Additional data collection and/or analysis
- Modifications to projects or management actions
- Extraction management
- Well mitigation measures

Figure 8-9 outlines these steps and some of the specific considerations within them. Steps 1-3 will be conducted as part of the GSP annual report process. Steps 4 and 5 require more time and will be conducted afterwards. GSP 5-year periodic evaluations will summarize results of all steps, as well as if any management was added after annual reports to address undesirable results.

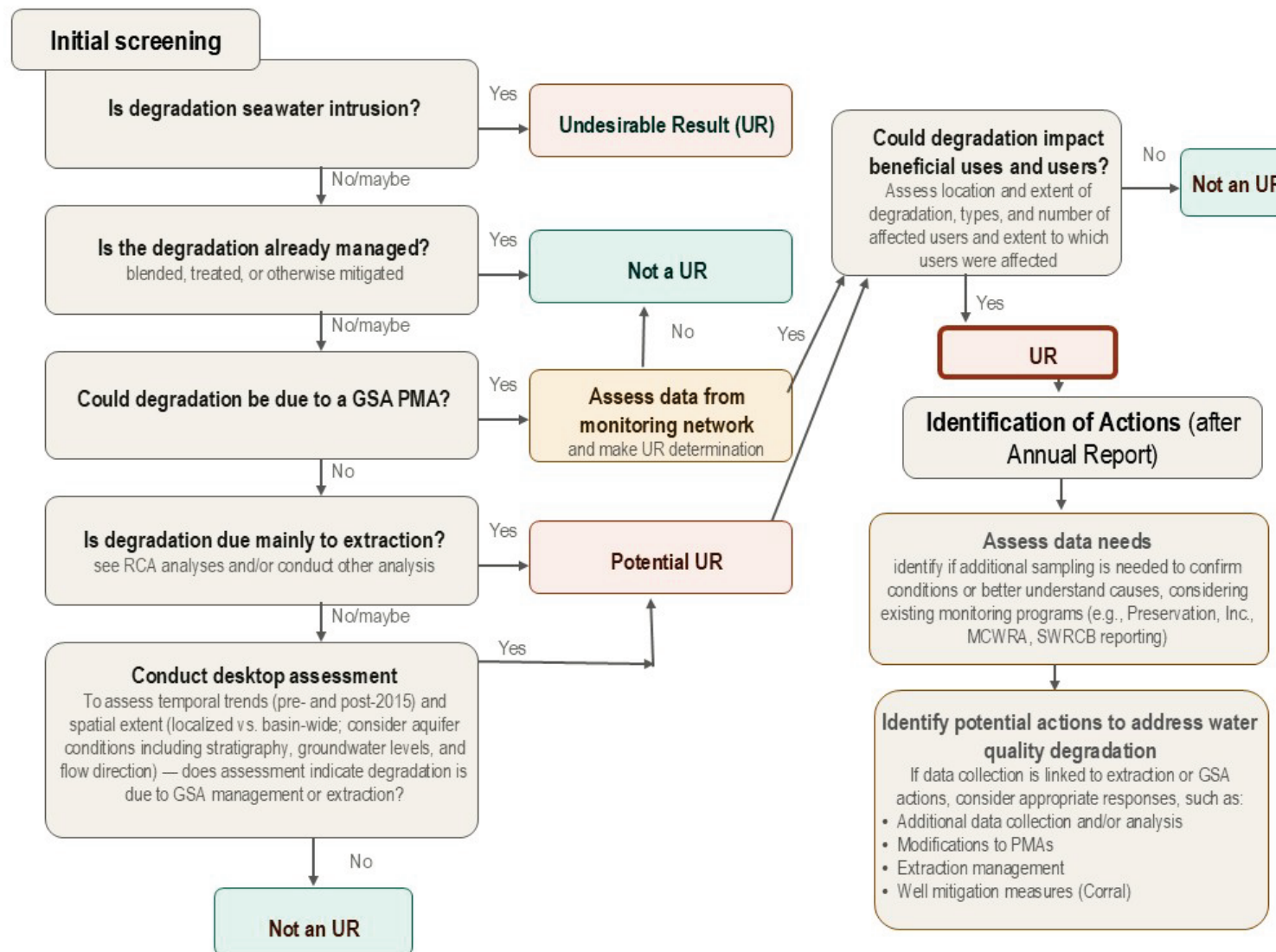


Figure 8-9. Process to Determine if Minimum Threshold Exceedances Constitute an Undesirable Result

For SGMA compliance, undesirable results for groundwater quality are not caused by (1) lack of action, unless due to pumping; (2) GSA required reductions in pumping; (3) exceedances in groundwater quality minimum thresholds that occur if there are fewer exceedances than if there had been a lack of management; (4) exceedances in groundwater quality minimum thresholds that would have occurred independent of pumping or GSA action; or (5) past harm.

8.9.4.2 Potential Causes of Undesirable Results

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

- **Required Changes to Subbasin Pumping.** If the location and rates of groundwater pumping change as a result of projects implemented under the GSP, these changes could alter hydraulic gradients and associated flow directions, and cause movement of 1 of the COC toward 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 1 of the COC towards a supply well in concentrations that exceed relevant limits.
- **Recharge of Poor-Quality Water.** Recharging the Subbasin with water that exceeds an MCL, SMCL, or level that reduces crop production could lead to an undesirable result.

8.9.4.3 Effects on Beneficial Users and Land Use

Groundwater quality degradation caused by pumping or GSA action could negatively affect beneficial users. Degradation could necessitate treatment for drinking water, reduce crop yields, or limit the types or amount of crops that can be grown. These could increase the cost of water or production. This undesirable result does not apply to groundwater quality changes that occur due to other causes.

8.10 Land Subsidence SMC

8.10.1 Locally Defined Significant and Unreasonable Conditions

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

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

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

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

8.10.2 Minimum Threshold

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

The 2019 subsidence data from the original GSP, described in Chapter 5, did not exceed the minimum threshold.

8.10.2.1 Information Used and Methodology for Establishing Subsidence Minimum Thresholds

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

1. The error between InSAR data and continuous Global Positioning System (GPS) data is 16 mm (0.052 foot) 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 foot 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 1 year to June of the following year.

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

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

- **Chronic lowering of groundwater levels.** The land subsidence minimum threshold will not decrease groundwater elevations and therefore will not result in significant or unreasonable groundwater elevations.
- **Reduction in groundwater storage.** The land subsidence minimum threshold will not change the amount of pumping and therefore will not result in a significant or unreasonable change in groundwater storage.
- **Seawater intrusion.** The land subsidence minimum threshold does not promote additional pumping that could exacerbate seawater intrusion. Therefore, the subsidence minimum threshold will not induce additional advancement of seawater intrusion along the coast.
- **Degraded water quality.** The land subsidence minimum threshold does not promote decreasing groundwater elevations that lead to exceedance of groundwater quality minimum thresholds and therefore will not result in significant or unreasonable degradation of water quality.
- **Depletion of ISW.** The land subsidence minimum threshold does not promote additional pumping or lower groundwater elevations adjacent to ISW. Therefore, the subsidence minimum threshold will not result in a significant or unreasonable depletion of ISW.

8.10.2.3 Effect of Minimum Thresholds on Neighboring Basins and Subbasins

The Eastside Subbasin has 3 neighboring subbasins within the Salinas Valley:

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

The SVBGSA is either the exclusive GSA or is 1 of the coordinating GSAs for the adjacent Subbasins. Because SVBGSA's jurisdiction includes all of these subbasins, it coordinates development of the minimum thresholds and measurable objectives across them. The 180/400 Subbasin GSP was submitted in 2020, was approved in 2022, and GSP Amendment 1 was submitted in 2025. GSPs for the other Salinas Valley subbasins were submitted in 2022 and approved in 2023. Amendments for all Salinas Valley subbasins have been developed together for submittal in 2027. Minimum thresholds for this Subbasin have been reviewed relative to information developed for the neighboring subbasins' GSPs to ensure that these minimum thresholds will not prevent the neighboring subbasins from achieving sustainability. SVBGSA GSPs have been developed with consistent methods and SMC.

8.10.2.4 Effects on Beneficial Uses and Users

The subsidence minimum threshold is set to prevent any inelastic land subsidence. Available data indicate that as of GSP Amendment 1, there has been no inelastic subsidence occurring in the Subbasin. The subsidence minimum threshold helps prevent damage to critical infrastructure, such as roads, drinking water systems, and supply wells.

8.10.2.5 Relation to State, Federal, or Local Standards

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

8.10.2.6 Method for Quantitative Measurement of Minimum Threshold

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

8.10.3 Measurable Objective

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

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

8.10.3.1 Methodology for Setting Measurable Objectives

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

8.10.3.2 Interim Milestones

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

8.10.4 Undesirable Results

8.10.4.1 Criteria for Defining Undesirable Results

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

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

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

8.10.4.2 Potential Causes of Undesirable Results

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

8.10.4.3 Effects on Beneficial Users and Land Use

An undesirable result for subsidence would occur if any subsidence were to occur in the Subbasin. Land subsidence can harm critical infrastructure that affects land use and water use, such as roads, drinking water supply systems, and wells.

8.11 Depletion of Interconnected Surface Water SMC

Areas with ISW occur where shallow groundwater may be connected to the surface water system. This SMC applies only to locations of ISW, and as shown on Figure 4-9, there are no locations of ISW in the Eastside Subbasin. This section describes the locally defined significant and unreasonable conditions, how minimum thresholds and measurable objectives will be set, and undesirable results if locations of ISW are identified in the future.

The SVIHM is used to identify the locations of ISW and to develop an estimate of the quantity and timing of stream depletions due to pumping during GSP baseline 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 process for evaluating the magnitude of stream depletions in relation to shallow groundwater elevations in interconnected reaches is described in Chapter 5.

As described in Chapter 7, depletion of ISW due to pumping is monitored and assessed based on shallow groundwater levels near locations of ISW.

8.11.1 Locally Defined Significant and Unreasonable Conditions

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

- Depletions from groundwater extraction that would result in a significant and unreasonable impact on other beneficial uses and users such as riparian water rights holders, appropriative surface water rights holders, ecological surface water users, and recreational surface water uses.
- Shallow groundwater levels near locations of ISW below those observed in 2015. While a documented determination of whether past depletions was significant is not available, staying above 2015 groundwater levels was determined to be a reasonable balance for all the beneficial uses and users.

These significant and unreasonable conditions were determined based on input collected Subbasin Committee meetings and discussions with GSA staff. There is currently no data that determines what level of depletion from groundwater extraction or what groundwater levels have a significant adverse effect on a beneficial use or user of ISW. Should there be a determination regarding what level of depletion from groundwater extraction is significant, SVBGSA will take that into consideration as it reviews how it locally defines significant and unreasonable conditions for the SMC in the 5-Year periodic evaluation.

8.11.2 Minimum Thresholds

The minimum thresholds are established to maintain consistency with the chronic lowering of groundwater elevation and reduction in groundwater storage minimum thresholds, which are also established based on groundwater elevations.

The minimum thresholds for depletion of ISW are shallow groundwater elevations observed in 2015 near locations of ISW.

As discussed in Chapter 7, the monitoring network for ISW is composed of shallow groundwater monitoring well(s). The monitoring network is dependent on the location of ISW established in Chapter 4. If monitoring indicates that groundwater and surface water are connected, SMC will be determined using the well(s)'s groundwater elevations during the minimum threshold and measurable objective years, or interpolated values from the groundwater elevation contour maps for wells that do not have shallow groundwater elevation measurements for those years.

8.11.2.1 Information Used and Methodology for Establishing Depletion of Interconnected Surface Water Minimum Thresholds and Measurable Objectives

8.11.2.1.1 Establishing Groundwater Elevations as Proxies

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

The evaluation of ISW in the Salinas Valley is based on an approach recommended by the Environmental Defense Fund (EDF, 2018) that uses groundwater elevations as surrogates for streamflow depletion rates caused by groundwater use. Basic hydraulic principles state that groundwater flow is proportional to the difference between groundwater elevations at different locations along a flow path. Using this basic principle, groundwater flow to a stream, or conversely seepage from a stream to the underlying aquifer, is proportional to the difference between water elevation in the stream and groundwater elevations at locations away from the stream. Assuming the elevation in the stream is relatively stable, changes in interconnectivity between the stream and the underlying aquifer is determined by changes in groundwater levels in the aquifer. Thus, the change in hydraulic gradient between stream elevation and surrounding groundwater elevations is representative of change in interconnection between surface water and groundwater. Monitoring the hydraulic gradient in the aquifer adjacent to the stream monitors the interconnectivity between stream and aquifer. Therefore, the gradient can be monitored by measuring and evaluating groundwater elevations at selected shallow monitoring wells near streams.

8.11.2.1.2 Review of Beneficial Uses and Users of Surface Water

The various beneficial uses and users of surface waters were addressed when setting the ISW depletion minimum thresholds. The classes of beneficial uses and users that were reviewed include riparian rights holders, appropriative rights holders, ecological surface water users, and recreational surface water users. This is not a formal analysis of public trust doctrine, but it is a reasonable review 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 ISW are developed using the definition of significant and unreasonable conditions described above, public information about critical habitat, locations of ISW derived from the SVIHM, and public information about water rights described below.

Riparian water rights holders. Table 8-5 provides a summary of water diversions reported to the SWRCB by water rights holders on tributaries within the Eastside Subbasin. The diversion data were obtained from queries of the SWRCB eWRIMS water rights management system. The

diversion data are self-reported by water rights holders with points of diversion located within the Subbasin. Any riparian rights holders are reported in Table 8-5.

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 8-5. Reported Annual Surface Water Diversions in the Eastside Aquifer

	Diversions (Acre-Feet)								
	2011	2012	2013	2014	2015	2016	2017	2018	2019
Statement of Diversion and Reported Riparian Diversion	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 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 GSP baseline level of depletion has not injured any appropriative water rights holders in the Subbasin.

Ecological surface water users. Because there are no known flow prescriptions on any surface water bodies in the Subbasin, the GSP baseline 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 GSP baseline 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 GSP baseline rate of surface water depletion is not having a known 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.

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

The minimum thresholds for depletion of ISW will be set to 2015 groundwater elevations in the shallow monitoring well(s) within the Subbasin. The minimum thresholds all reference the same historical year and have existed simultaneously in the past. Therefore, no conflict exists between minimum thresholds measured at various locations within the Subbasin.

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

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

8.11.2.3 Effect of Minimum Thresholds on Neighboring Basins and Subbasins

The Eastside Subbasin has 3 neighboring subbasins within the Salinas Valley:

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

The SVBGSA is either the exclusive GSA or is 1 of the coordinating GSAs for the adjacent Subbasins. Because SVBGSA's jurisdiction includes all these subbasins, the SVBGSA

coordinates the development of the minimum thresholds and measurable objectives for all these subbasins. The 180/400 Subbasin GSP was submitted in 2020, was approved in 2022, and GSP Amendment 1 was submitted in 2025. GSPs for the other Salinas Valley subbasins were submitted in 2022 and approved in 2023. Amendments for all Salinas Valley subbasins have been developed together for submittal in 2027. Minimum thresholds for the Eastside Subbasin have been reviewed relative to information developed for the neighboring subbasins' GSPs to ensure that these minimum thresholds will not prevent the neighboring subbasins from achieving sustainability. SVBGSA GSPs have been developed with consistent methods and SMC.

8.11.2.4 Effect on Beneficial Uses and Users

The depletion of ISW minimum thresholds may have varied effects on beneficial users and land uses in the Subbasin. While there are no established locations where surface water and groundwater are interconnected, should there be locations identified, the ISW minimum thresholds would likely have the following effects on beneficial uses and users.

Agricultural land uses and users. The depletion of ISW minimum thresholds prevent lowering of groundwater elevations adjacent to certain parts of streams beyond historical lows. The measurable objectives are higher than the minimum thresholds, providing flexibility for groundwater extraction needed during droughts. The minimum thresholds are considered less restrictive for agricultural land users than higher thresholds and help protect downstream users. However, pumping limitations may be needed to maintain levels above minimum thresholds if there are insufficient PMAs available.

Urban land uses and users. The depletion of ISW minimum thresholds prevents lowering of groundwater elevations adjacent to certain parts of streams below historical lows. The measurable objective is higher than the minimum threshold, providing flexibility for groundwater extraction needed during droughts. Minimum thresholds higher than historical levels help protect downstream users, but they may limit the amount of urban pumping near streams. However, pumping limitations may be needed to maintain groundwater levels above minimum thresholds if there are insufficient PMAs implemented. If pumping is limited beyond historical levels, municipalities may have to obtain alternative sources of water to achieve urban growth goals. If this occurs, this may result in higher water costs for municipal water users.

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

Ecological land uses and users. The depletion of ISW minimum thresholds help address ecological uses and users by preventing low groundwater levels near locations of ISW beyond what was historically experienced. Additionally, by setting future groundwater levels at or above

recent lows, there should be less impact to ecological users than experienced at the start of SGMA.

8.11.2.5 Relation to State, Federal, or Local Standards

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

8.11.2.6 Method for Quantitative Measurement of Minimum Threshold

The SVIHM is used to identify areas of ISW. Groundwater elevations measured in shallow wells adjacent to these areas of potential ISW will serve as the primary approach for monitoring depletion of ISW.

New shallow monitoring wells installed pursuant to the GSP do not have data from 2015. Minimum thresholds for those wells will be estimated based on the first few years of groundwater elevation measurements.

8.11.3 Measurable Objectives

The measurable objectives for depletion of ISW target groundwater elevations are higher than the minimum thresholds. The measurable objectives are established to maintain consistency with the chronic lowering of groundwater elevation and reduction in groundwater storage minimum thresholds, which are also established based on groundwater elevations.

The measurable objectives for depletion of ISW are shallow groundwater elevations observed in 1999 near locations of ISW.

8.11.3.1 Method for Setting Measurable Objectives

The depletion of ISW measurable objectives are set to be identical to the groundwater level measurable objectives. The methodology for establishing measurable objectives is outlined in Section 8.6.2.1. Groundwater elevations from 1999 were selected as representative of the measurable objectives for the Eastside Subbasin.

8.11.3.2 Interim Milestones

The interim milestones leading to the depletion of ISW measurable objectives will be added when the measurable objective is set if the monitoring well indicates that groundwater and surface water are connected.

8.11.4 Undesirable Results

8.11.4.1 Criteria for Defining Undesirable Results

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

There is an exceedance of the minimum threshold in a shallow groundwater monitoring well used to monitor ISW depletion.

Streamflow depletion in the Subbasin is complicated by many factors, such as recharge of the aquifer from streamflow, losses to vegetation, and evapotranspiration. The ISW SMC applies to depletion of ISW from groundwater use and is monitored by proxy through groundwater elevations. For SGMA compliance purposes, the default assumption is that groundwater elevations below 2015 levels near locations of ISW represent depletions that are significant and unreasonable. Any additional groundwater level declines would likely be an undesirable result that must be addressed under SGMA.

8.11.4.2 Potential Causes of Undesirable Results

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

- **Localized pumping increases.** Even if the Subbasin is adequately managed at the Subbasin scale, increases in localized pumping near ISW bodies could reduce shallow groundwater elevations.
- **Expansion of riparian water right water use.** Riparian water rights holders often pump from wells adjacent to streams. Pumping by riparian water rights holder users is not regulated under this GSP. Additional riparian pumping 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.

8.11.4.3 Effects on Beneficial Users and Land Use

Undesirable results for depletion of ISW due to pumping could have negative effects on beneficial users and land uses. Groundwater levels below historical lows near locations of ISW could reduce surface water available for riparian water rights holders, appropriative water rights holders, ecological water uses, and recreational water uses.

SVBGSA will work with MCWRA and state and federal agencies, including National Marine Fisheries Service (NMFS), to further evaluate the effects of shallow groundwater levels near locations of ISW on surface water users and land uses.