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Water Year 2024 Groundwater Report

for the Santa Clara and Llagas Subbasins

Valley Water

SANTA CLARA VALLEY WATER DISTRICT

WATER YEAR 2024 GROUNDWATER REPORT

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EXECUTIVE SUMMARY

The Santa Clara Valley Water District (Valley Water) is the Groundwater Sustainability Agency (GSA) for the Santa Clara and Llagas subbasins[1] in Santa Clara County, which are sustainably managed through the comprehensive activities described in Valley Water's 2021 Groundwater Management Plan (GWMP).[2] This annual water year (WY) report is required under the Sustainable Groundwater Management Act (SGMA) and all data presented are for WY 2024 (October 1, 2023 to September 30, 2024), unless otherwise noted. Valley Water's water supply operations, water shortage analysis, and related planning are based on calendar year (CY), so relevant CY 2024 data is also presented.

This report has been expanded to address Department of Water Resources (DWR) comments[3] to incorporate more detailed information presented in CY groundwater reports, including performance against established metrics for applicable sustainability indicators. Since this report includes required SGMA content and more detailed information previously presented in CY reports, Valley Water is no longer producing a CY report. Valley Water will continue to submit annual reports to DWR by April 1.

This report describes groundwater use, levels, quality, storage, land subsidence, and the status of GWMP outcome measures and lower thresholds. These outcome measures are used to evaluate performance relative to Valley Water Board of Directors (Board) Water Supply Objectives 2.2.1 and 2.2.2: "*Manage groundwater to ensure sustainable supplies and avoid land subsidence" and "Aggressively protect groundwater from the threat of contamination*."

In the Santa Clara and Llagas subbasins, groundwater pumping by water retailers and other well users was 127,000 acre-feet (AF)[4], providing 44.5% of the total water used in the county. To sustain and protect groundwater supplies, in 2024 Valley Water:

- Recharged groundwater with 113,000 AF of local and imported surface water,
- Reduced groundwater demands by 158,400 AF through treated surface water deliveries and recycled water and water conservation programs, which collectively provide in-lieu recharge,
- Conducted monitoring and analysis of groundwater levels and quality, and land subsidence,
- Implemented the well ordinance program and activities to minimize groundwater quality threats, and
- Worked with basin stakeholders, land use agencies, and regulatory agencies to protect groundwater.

Table ES-1 shows data for key indicators of groundwater supply and subsidence conditions in 2024 as compared to 2023 and prior periods. The 2024 groundwater storage improved, up 6 to 9% compared to 2023. Average groundwater levels in 2024 were generally higher than 2023 and the five-year average

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[1] California Department of Water Resources (DWR) Basins 2-9.02 and 3-3.01, respectively. Valley Water identifies two groundwater management areas (Santa Clara Plain and Coyote Valley) within the Santa Clara Subbasin.

[2] This plan was submitted to DWR as an Alternative to a Groundwater Sustainability Plan in December 2016 and approved for SGMA compliance in July 2019. The first required periodic evaluation was adopted by the Board of Directors in November 2021 and approved by DWR in June 2024.

[3] From DWR's Reviews of Annual Report for the Santa Clara and Llagas subbasins, Water Year 2023, dated May 24, 2024.

[4] All values presented in this report are based on best available data (measured or estimated) and may be refined as additional data becomes available.

in most index wells and others around the county.

Due to healthy groundwater conditions heading into the recent (2020–2022) drought, a proactive drought response including the acquisition of emergency imported water supplies and mandatory water use reduction, and wet hydrologic conditions, groundwater storage was 383,900 AF in 2023. The increase in 2024 pumping reflects an increasing demand following the recent drought. However, above average hydrologic conditions and managed recharge continued in 2024, resulting in 409,000 AF end of year groundwater storage in the Santa Clara and Llagas subbasins (Table ES-1). This falls well within the normal stage (Stage 1) of Valley Water's Water Shortage Contingency Plan, indicating good groundwater supply conditions.

Groundwater levels in the Santa Clara Plain were well above the minimum thresholds established to protect against land subsidence, and 2024 subsidence monitoring data indicates uplift in most areas (Table ES-1). The areas with compaction were less than the subsidence threshold of 0.01 feet per year, indicating a low risk of permanent land subsidence in 2024.

Table ES-1. Groundwater Supply and Subsidence Conditions Compared to Other Years

Subbasin	Condition Indicator	2024	Compared to 2023	Compared to 5-Year Average (2020–2024)
Groundwater Supply (AF)				
Santa Clara and Llagas	Managed Recharge	113,000	Same	Up 20%
	Groundwater Pumping	127,000	Up 18%	Up 2%
	End of Year Groundwater Storage	409,000	Up 6%	Up 16%
Santa Clara	Managed Recharge	87,300	Down 7%	Up 20%
	Groundwater Pumping	82,900	Up 22%	Down 1%
	End of Year Groundwater Storage	383,900	Up 6%	Up 15%
Llagas	Managed Recharge	25,700	Up 30%	Up 25%
	Groundwater Pumping	44,100	Up 11%	Up 5%
	End of Year Groundwater Storage	25,100	Up 9%	Up 20%
Groundwater Elevations (feet, NAVD 88)[1]				
Santa Clara	Santa Clara Plain index well	99.2	Up 4.6 feet	Up 17.3 feet
	Coyote Valley index well	273.1	Down 2.7 feet	Up 1.8 feet
Llagas	Llagas Subbasin index well	255.8	Up 11.6 feet	Up 15.7 feet
Subsidence (feet/year)				
Santa Clara	Land Subsidence[2]	-0.010 (Aquifer uplift)	Aquifer uplift in 2023	Aquifer compaction over 5-year average

Notes:

[1] Groundwater elevations represent the average of all readings at three regional groundwater level index wells for the period noted based on the North American Vertical Datum of 1988 (NAVD 88).

[2] Valley Water has established a tolerable compaction rate of 0.01 feet/year based on average measured subsidence at two extensometers over the most recent 11-years (Appendix A), which was -0.010 feet/year in 2024 indicating uplift and meeting the tolerable rate. Subsidence calculations are based on the calendar year.

Groundwater quality in 2024 remained generally good in principal aquifer zones, with median total dissolved solids (TDS) below the secondary drinking water standard of 500 milligrams per liter (mg/L) and median nitrate below the primary drinking water standard of 10 mg/L. Nitrate and TDS concentrations are generally stable or decreasing over time. Nitrate and PFAS (per- and polyfluoroalkyl substances) are the primary groundwater quality challenges as described in the outcome measures summary below.

Outcome Measure Summary

The 2021 GWMP identifies outcome measures to assess performance relative to Board policy and groundwater sustainability goals. All outcome measures related to groundwater storage, levels, and land subsidence were met in 2024 (Table ES-2). Continued sustainable groundwater supply conditions demonstrate the effectiveness of Valley Water's significant investments in basin management facilities, diverse water supplies, and conjunctive water management, as well as close coordination with water retailers.

Table ES-2. Summary of 2024 Groundwater Supply Outcome Measure Performance

Sustainability Indicator	GWMP Outcome Measure	Outcome Measure – Lower Threshold
Groundwater Storage (Countywide)	Projected end of year groundwater storage is greater than 278,000 AF in the Santa Clara Plain, 5,000 AF in the Coyote Valley, and 17,000 AF in the Llagas Subbasin.	Projected end of year countywide groundwater storage is greater than Stage 5 (150,000 AF) of the Water Shortage Contingency Plan.
2024 Result	**Outcome measure met**: End of CY 2024 groundwater storage is 380,800 AF, 7,000 AF, and 25,900 AF in the Santa Clara Plain, Coyote Valley, and Llagas Subbasin, respectively.[1] The outcome measure is met for all groundwater management areas.	**Lower threshold not exceeded**: Countywide groundwater storage at the end of CY 2024 was 413,700 AF, well above the lower threshold.[2]
Subsidence (Santa Clara Subbasin only)	Groundwater levels are above subsidence thresholds at the Santa Clara Subbasin subsidence index wells.	Groundwater levels are above the historical low water levels at the majority of the Santa Clara Subbasin subsidence index wells.
2024 Result	**Outcome measure met**: Groundwater levels were far above subsidence thresholds at all ten subsidence index wells.	**Lower threshold not exceeded**: Groundwater levels were far above their historic lows at all ten subsidence index wells.

Notes:
[1] The groundwater storage outcome measure is based on the CY to align with Valley Water operations and planning. End of WY 2024 groundwater storage is 375,800 AF, 8,100 AF, and 25,100 AF in the Santa Clara Plain, Coyote Valley, and Llagas Subbasin, respectively.
[2] Countywide groundwater storage at the end of WY 2024 was 409,000 AF.

Groundwater quality outcome measures were only partially met in 2024 (Table ES-3). The outcome measure for seawater intrusion in the Santa Clara Subbasin was met, as were TDS trend outcome measures in both the Santa Clara and Llagas subbasins. These results indicate that seawater intrusion and groundwater quality trends are generally stable or improving countywide. However, the outcome measures for primary drinking water standards were not met in 2024 for the Santa Clara and Llagas subbasins primarily due to nitrate and PFAS as described below.

For Santa Clara Subbasin water supply wells tested, 90% of all samples were below Maximum Contaminant Levels (MCLs)[5]. Most detections above MCLs were for PFOS (15 Santa Clara Plain wells) and nitrate (eight Coyote Valley wells, most of which are domestic wells). The PFOS detections were localized in two areas and the impacted water retailer is actively pursuing well head treatment.

For Llagas Subbasin water supply wells tested, 68% of all samples met primary drinking water standards. Nitrate was detected above the MCL in 71 wells (primarily domestic wells). Six wells (including public and domestic water supply wells) had PFOA and/or PFOS above MCLs.

Elevated nitrate continues to be a primary groundwater protection challenge, especially in South County. While long-term trends indicate stable or improving conditions, 30% of South County wells tested have nitrate above the drinking water standard (primarily domestic wells). Valley Water does not control land use or have regulatory authority over activities with the most nitrate loading to groundwater, such as agriculture or septic systems. However, Valley Water continues to coordinate with land use and regulatory agencies to influence policies, regulations, and decisions related to nitrate management. More directly, Valley Water's managed recharge helps dilute nitrate in groundwater, and water quality testing helps to reduce well owner exposure.

With the April 2024 adoption of drinking water standards for six PFAS compounds (including PFOA and PFOS), public water systems will need to monitor their water supply for these chemicals within three years and include the results in their Annual Water Quality Reports to customers. Public water systems that detect PFAS above the drinking water limits will have up to five years to implement solutions, such as treatment or other actions, to ensure water delivered to customers does not exceed these limits. Water systems must also notify the public if levels of regulated PFAS exceed these new standards.

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[5] For ease of reporting, any single result reported above an MCL is considered as an exceedance. However, based on drinking water regulations and follow-up sampling, a single detection above an MCL may not constitute a violation of drinking water standards. Public water systems are required to meet all drinking water standards for water delivered to customers.

Table ES-3. Summary of 2024 Groundwater Quality Outcome Measure Performance

Sustainability Indicator	GWMP Outcome Measure	Outcome Measure – Lower Threshold
Groundwater Quality (Santa Clara Subbasin)	For Santa Clara Subbasin water supply wells, at least 95% meet primary drinking water standards, and at least 90% have stable or decreasing trends for TDS.	At least 70% of water supply wells have stable or decreasing trends for nitrate and TDS.
2024 Result	**Outcome measure partially met:** 90% of wells tested met all primary drinking water standards (below 95% target). 93% of wells had stable or decreasing trends for TDS (above 90% target). **Action plan:** Continue to monitor, assess potential causes, implement the Salt and Nutrient Management Plan, and engage with regulatory, land use, and retail water agencies as needed.	**Lower threshold not exceeded**: Stable or decreasing nitrate and TDS trends were observed in 90% and 93% of water supply wells, respectively.
Groundwater Quality (Llagas Subbasin)	For Llagas Subbasin water supply wells, at least 95% meet primary drinking water standards, and at least 90% have stable or decreasing trends for TDS.	At least 70% of water supply wells have stable or decreasing trends for nitrate and TDS.
2024 Result	**Outcome measure partially met:** 68% of water supply wells tested met all primary drinking water standards (below 95% target). 91% had stable or decreasing trends for TDS (met 90% target). **Action plan:** Continue to monitor, assess potential causes, implement the Salt and Nutrient Management Plan, and engage with regulatory, land use, and retail water agencies as needed.	**Lower threshold not exceeded**: Stable or decreasing nitrate and TDS trends were observed in 91% and 91% of water supply wells, respectively.
Seawater Intrusion (Santa Clara Subbasin only)	In the Santa Clara Subbasin shallow aquifer, the 100 mg/L chloride isocontour area is less than the historical maximum extent area (57 square miles).	In the Santa Clara Subbasin shallow aquifer, the 100 mg/L chloride isocontour area is less than 81 square miles, which represents a one-mile radial buffer of the historical maximum extent area.
2024 Result	**Outcome measure met**: The 100 mg/L chloride isocontour area was 44 square miles in 2024.	**Lower threshold not exceeded**: The 100 mg/L chloride isocontour area was 44 square miles in 2024.

Notes: For ease of reporting, any single result reported above an MCL is considered as an exceedance. However, based on drinking water regulations and follow-up sampling, a single detection above an MCL may not constitute a violation of drinking water standards. Public water systems are required to meet all drinking water standards for water delivered to customers.

SGMA Compliance and GWMP Implementation

On November 23, 2021, the Valley Water Board of Directors adopted the 2021 GWMP as the first required periodic evaluation to the approved Alternative to a Groundwater Sustainability Plan (GSP). DWR approved the 2021 GWMP in June 2024, determining it satisfies SGMA objectives and was responsive to comments on the 2016 GWMP. Valley Water has submitted seven annual reports for these subbasins as required by SGMA.

To maintain sustainable groundwater conditions, Valley Water continues to implement the proactive groundwater management activities described in the GWMP. Chapter 5 of this report summarizes the status of the six major GWMP recommendations. Continued groundwater sustainability is central to the Valley Water mission to provide Silicon Valley safe, clean water for a healthy life, environment, and economy. As such, Valley Water will continue to "manage groundwater to ensure sustainable supplies and avoid land subsidence," and "aggressively protect groundwater from the threat of contamination" in accordance with Board policy.

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CHAPTER 1 – INTRODUCTION

For over 95 years, the Santa Clara Valley Water District (Valley Water) has had the responsibility and authority to manage groundwater Santa Clara County per the California legislature.[6] Valley Water's groundwater management objectives and authority under the Santa Clara Valley Water District Act (District Act) are to recharge groundwater basins, conserve, manage and store water for beneficial and useful purposes, increase water supply, protect surface water and groundwater from contamination, prevent waste or diminution of the water supply, and do any and every lawful act necessary to ensure sufficient water is available for present and future beneficial uses.

Valley Water Board of Directors (Board) Water Supply Objectives 2.2.1 and 2.2.2 reflect the mission to protect groundwater resources: *"Manage groundwater to ensure sustainable supplies and avoid land subsidence" and "Aggressively protect groundwater from the threat of contamination."* Pursuant to the District Act and Board policy, the 2021 GWMP identifies the following groundwater sustainability goals:

- Groundwater supplies are managed to optimize water supply reliability and minimize land subsidence.
- Groundwater is protected from contamination, including saltwater intrusion.

After the statewide implementation of the Sustainable Groundwater Management Act (SGMA) in 2015, Valley Water became the Groundwater Sustainability Agency (GSA) for the Santa Clara and Llagas subbasins in 2016[7]. In December 2016, Valley Water submitted its Board-adopted 2016 Groundwater Management Plan (GWMP) to the Department of Water Resources (DWR) as an Alternative to a Groundwater Sustainability Plan, and DWR approved the plan in July 2019.

SGMA requires GSAs to submit periodic evaluations of approved Alternatives at least once every five years. To meet this requirement, Valley Water prepared the 2021 GWMP[8], which was adopted by Valley Water's Board on November 23, 2021 after a public hearing and submitted to DWR in December 2021. In June 2024, DWR approved the 2021 GWMP confirming it satisfies the objectives of SGMA and complies with related regulations. Valley Water's comprehensive groundwater management programs and investments described in the GWMP have resulted in sustainable groundwater conditions for many decades and will ensure groundwater resources are sustainable into the future.

Purpose

Under the California Code of Regulations Title 23, Division 2, Chapter 1.5, Subchapter 2, Article 7, §356.2, each agency shall submit an annual report to DWR by April 1 of each year following adoption of the Plan. This water year (WY) 2024 groundwater report is the eighth annual report submitted to DWR. It covers the Santa Clara Subbasin (DWR Basin 2-9.02) and the Llagas Subbasin (Basin 3-3.01) (Figure 1), which are managed in their entirety by Valley Water. This report describes groundwater conditions in the Santa Clara and Llagas subbasins including groundwater use, recharge, water levels, water balance, storage, quality, and land subsidence. This report also assesses the outcome measures using 2024 data to evaluate performance in meeting GWMP sustainability goals.

[6] Santa Clara Valley Water District Act, Water Code Appendix, Chapter 60.

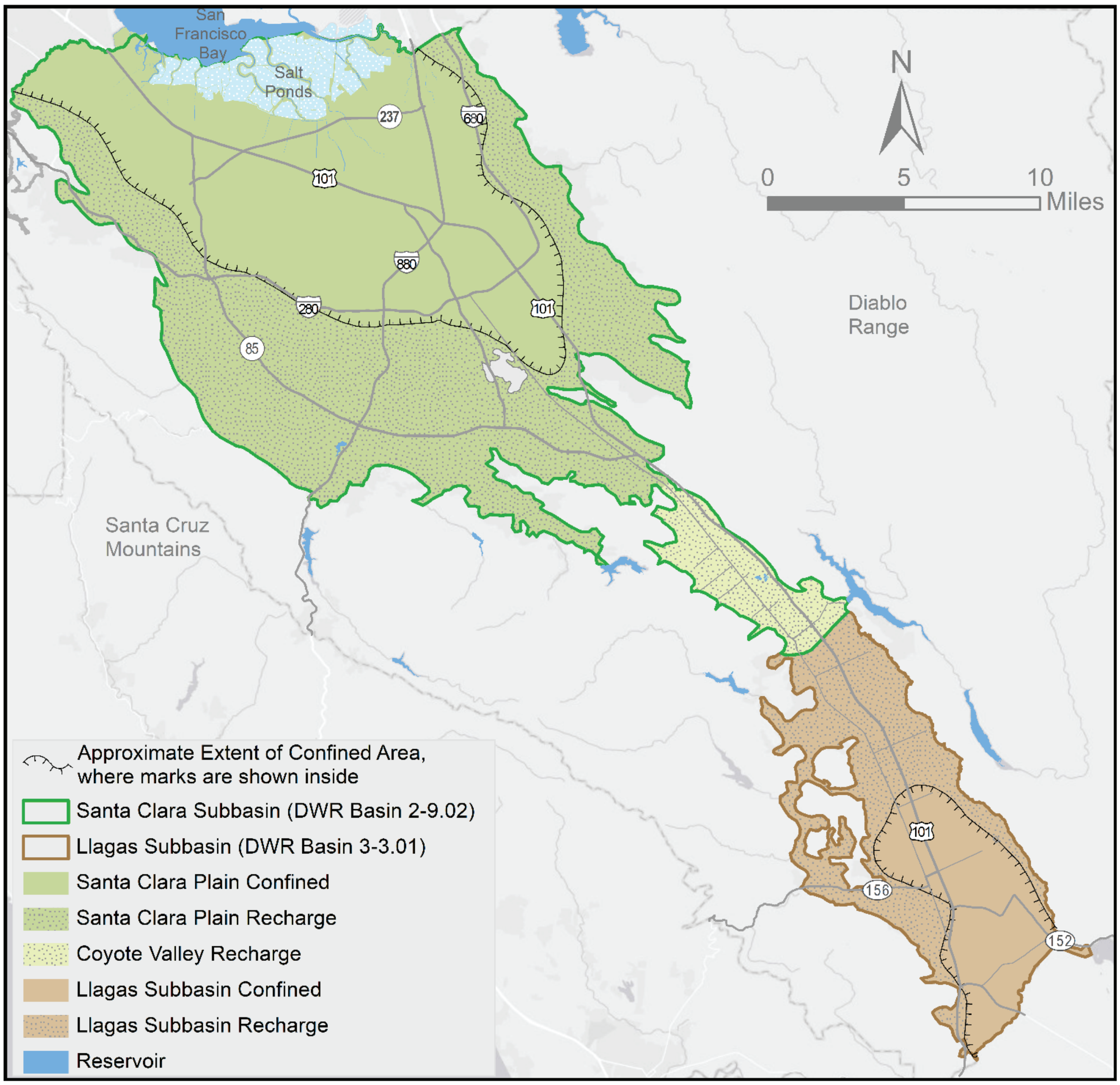
[7] Valley Water is also the GSA for the small portions of the North San Benito Subbasin (DWR Basin 3-3.05) in Santa Clara County. The annual report for that basin is prepared and submitted by the San Benito County Water District, the GSA for the majority of the basin.

[8] https://www.valleywater.org/your-water/where-your-water-comes/groundwater/sustainable

Study Area

This report covers the Santa Clara and Llagas subbasins (Figure 1). Valley Water divides the Santa Clara Subbasin into two groundwater management areas, the Santa Clara Plain and the Coyote Valley, due to different land use and management characteristics. The Santa Clara and Llagas subbasins are separated by a groundwater divide near Cochrane Road in Morgan Hill. Groundwater in the Santa Clara Subbasin generally flows toward San Francisco Bay, while flow in the Llagas Subbasin is generally to the southeast toward the Pajaro River. The Santa Clara Plain and Llagas subbasins have both confined and recharge areas. Within the confined areas, low permeability clays and silts separate shallow and principal aquifers, with the latter defined as aquifer materials greater than 150 feet below ground surface. The recharge areas are unconfined as there are no laterally extensive aquitards forming distinct shallow and principal aquifer zones.

Figure 1. Santa Clara and Llagas Subbasins



The information in this report is primarily summarized by groundwater management area or by groundwater benefit zone (Figure 2). Groundwater benefit zones are areas where Valley Water collects fees from groundwater users based on the benefits received from Valley Water groundwater management activities. Zone W-2 generally coincides with the Santa Clara Plain, Zone W-7 with the Coyote Valley, and Zones W-5 and W-8 with the Llagas Subbasin. The Santa Clara Subbasin north of Metcalf Road is also referred to as North County. The Coyote Valley and Llagas Subbasin are collectively referred to as South County.

Report Content

In addition to this Introduction, this report includes the following chapters:

- Chapter 2: Water Supply and Use
- Chapter 3: Groundwater Levels and Subsidence
- Chapter 4: Groundwater Quality
- Chapter 5: Groundwater Management Plan Implementation

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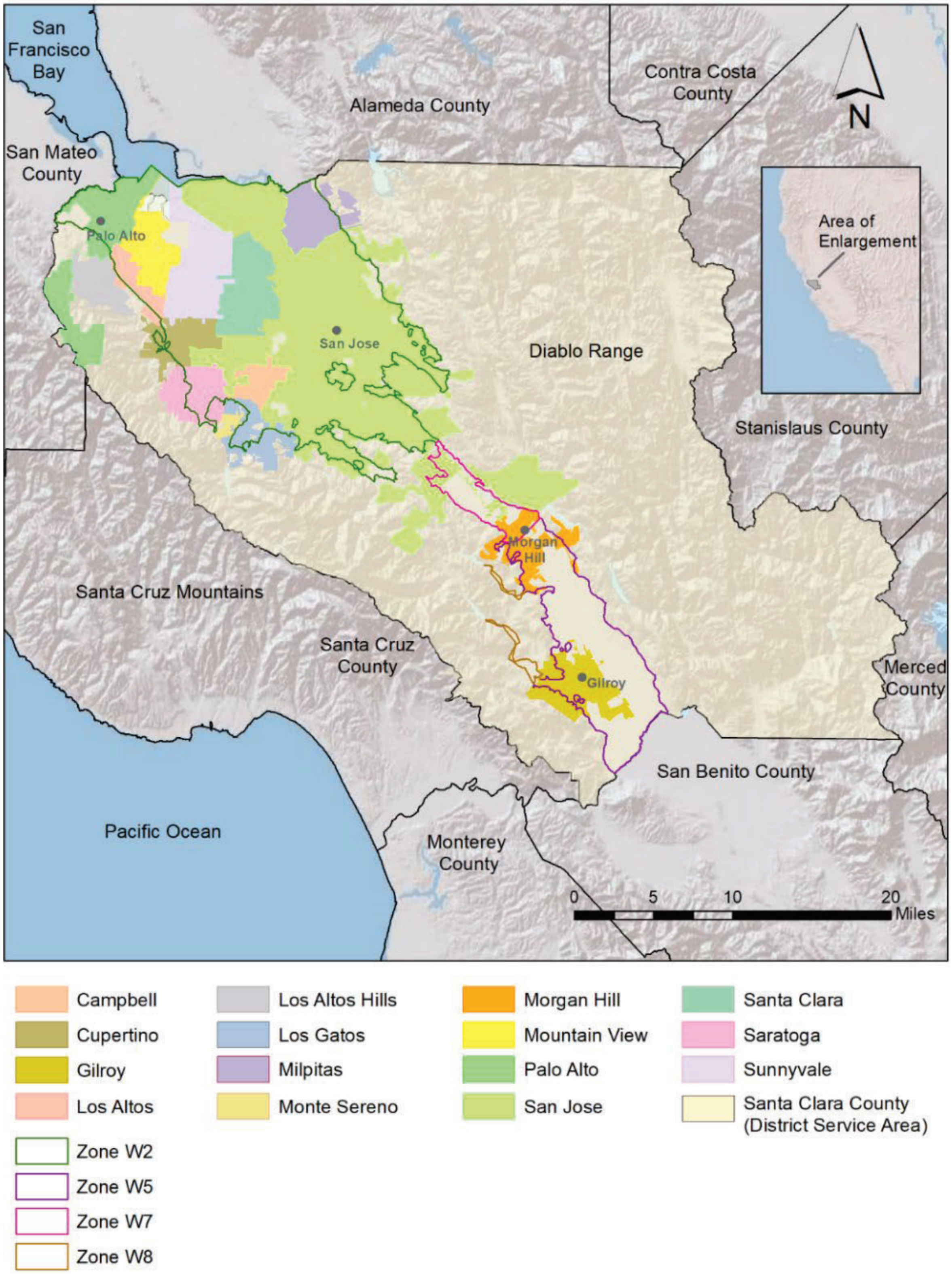
Figure 2. Groundwater Benefit Zones and Local Cities



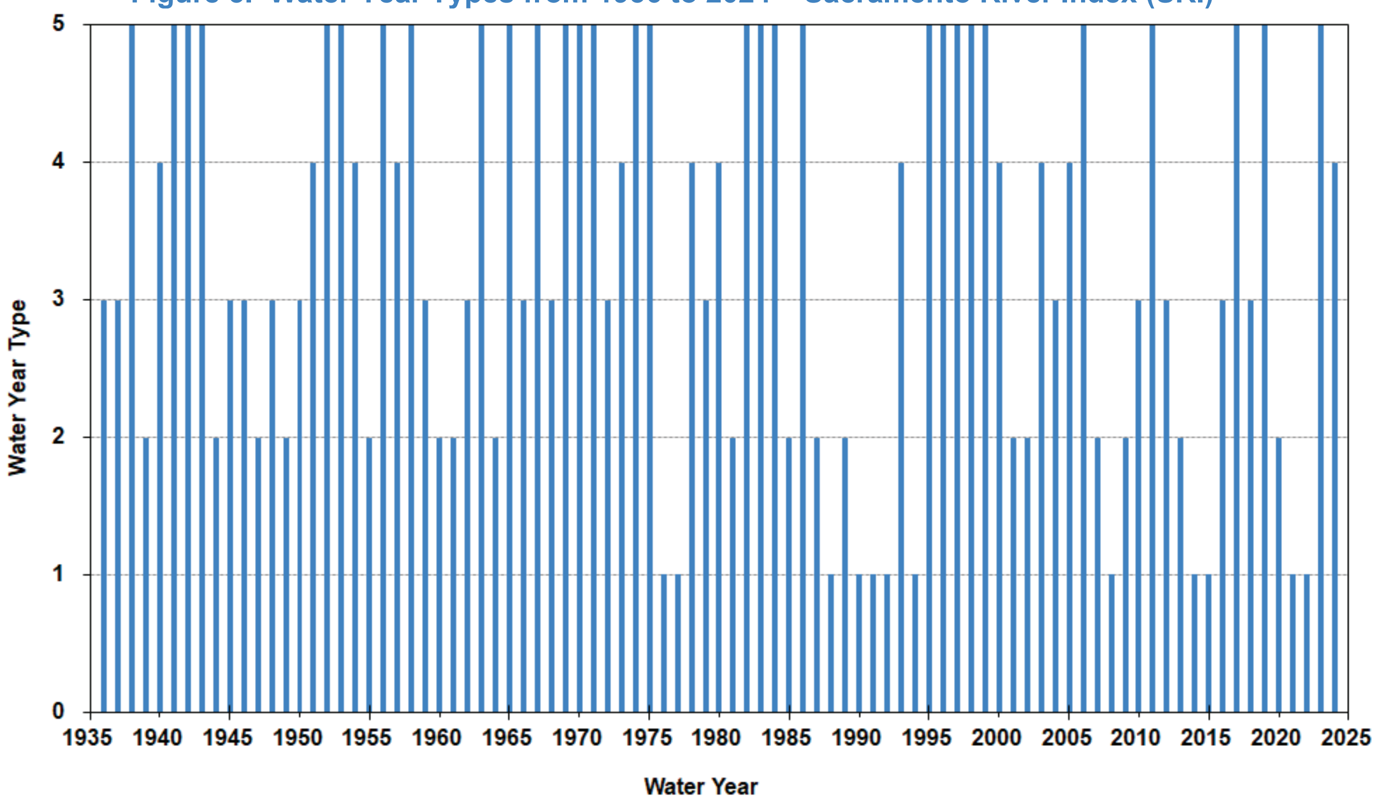
CHAPTER 2 – WATER SUPPLY AND USE

Chapter 2 summarizes 2024 water supply and use, including water year type, groundwater pumping, surface water supply for managed and natural recharge, in-lieu recharge, annual groundwater balance, and change in groundwater storage. Trends are presented for groundwater pumping, managed recharge, and other water supplies. All data in this chapter are for water year 2024 (October 1, 2023 to September 30, 2024), unless otherwise noted.

2.1 Water Year Type

According to DWR, 2024 was an above-normal year, as compared to the weather whiplash from the dry conditions in 2022 to the wet conditions in 2023[9] (Figure 3). Valley Water uses the DWR Sacramento River Index (SRI) to help model hydrologic conditions in Santa Clara County because this index reflects conditions in the Sierra and the Sacramento-San Joaquin Delta that influence Valley Water's imported water deliveries. Rainfall stations within Santa Clara County confirm that the rainfall in 2024 was above the historical average. For example, rainfall at the San Jose International Airport (Station ID SJC) was approximately 15.4 inches or 123% of average.

Figure 3. Water Year Types from 1936 to 2024 – Sacramento River Index (SRI)



Notes: Water year types per DWR SRI: 1 (critical); 2 (dry); 3 (below normal); 4 (above normal); 5 (wet)

[9] Department of Water (DWR), Water Year 2023: Weather whiplash, from drought to deluge. California Department of Water Resources, Sacramento, CA, 12 pages, October 2023, available at: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Water-Basics/Drought/Files/Publications-And-Reports/Water-Year-2023-wrap-up-brochure_01.pdf

2.2 Groundwater Pumping

Total groundwater pumping was 127,000 AF, providing 44.5% of the water used by county residents and businesses. Table 1 summarizes pumping by subbasin and water use category, and Table 2 summarizes the number of wells reporting groundwater use. Figures 4 and 5 show the location and volume of groundwater pumping. About 82,900 AF of groundwater was pumped in the Santa Clara Subbasin, with about 95% of that supporting municipal and industrial (M&I) uses (Table 1). Agricultural and domestic use totaling 4,300 AF was mostly in the more rural Coyote Valley in the southern Santa Clara Subbasin. A total of 1,192 wells reported groundwater use in the Santa Clara Subbasin (Table 2).

Total pumping in the Llagas Subbasin was 44,100 AF (Table 1). In this subbasin, agricultural use was more significant (25,200 AF), accounting for 57% of pumping. M&I groundwater use was 17,200 AF or 39% of subbasin pumping. While the quantity of groundwater used for domestic purposes was relatively small in the Llagas Subbasin (1,700 AF or 4%), 72% of the 2,976 individual wells reporting groundwater use in Llagas Subbasin were domestic wells (Table 2).

Groundwater pumped from the subbasins is recorded in accordance with the District Act. This act requires well owners and operators to register all wells within the county and to file monthly, semi-annual, or annual production statements for water-producing wells within Valley Water's groundwater benefit zones, with reporting frequency dependent on the amount of water produced.

By Board Resolution, meters are only installed at those sites determined to be economically feasible per approved criteria or as required to facilitate the complete and accurate collection of groundwater production revenue. In Zone W-2, which essentially overlaps the Santa Clara Plain groundwater management area, meters are required for facilities producing more than 20 AF of agricultural water or more than 1 AF of non-agricultural water annually. Within Zones W-5 and W-8 (Llagas Subbasin) and W-7 (Coyote Valley groundwater management area), meters are required for facilities producing more than 20 AF of agricultural water or more than 2 AF of non-agricultural water[10]. As shown in Table 1, most groundwater pumping (88%) is metered. Smaller pumpers are required to report production semi-annually or annually on a fiscal year (July 1 – June 30) basis.

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[10] https://www.valleywater.org/contractors/doing-businesses-with-the-district/wells-well-owners/reporting-methods-and-requirements

Table 1. 2024 Groundwater Pumping (AF) by Water Use

Water Use Sector	Measurement Method	Santa Clara Subbasin (Zones W-2 and W-7)	Llagas Subbasin (Zones W-5 and W-8)	Total Pumping
M&I	Metered[1]	72,200	16,400	88,600
	Estimated[2]	6,400	800	7,200
Domestic	Metered	0	100	100
	Estimated	300	1,600	1,900
Agricultural	Metered	3,300	19,400	22,700
	Estimated	700	5,800	6,500
Total		**82,900**	**44,100**	**127,000**

Notes: All values are rounded to the nearest hundred.

[1] Metered groundwater pumping generally has an accuracy within 2%. For metered wells used for multiple purposes (especially agricultural and domestic), while the total volume pumped is within this accuracy, the allocation between various uses may be estimated.

[2] Non-metered pumpers report groundwater pumping based on crop factors (agricultural use) or table of average uses (domestic use). Estimated pumping shown for the water year is based on fiscal year reporting and typical pumping patterns. Reporting accuracy is not applicable for the estimated groundwater pumping.

Table 2. Number of Wells Reporting Groundwater Use in 2024

Water Use Sector	Santa Clara Subbasin		Llagas Subbasin (Zones W-5 and W-8)	Total
	Santa Clara Plain (Zone W-2)	Coyote Valley (Zone W-7)		
M&I	520	63	281	864
Domestic	168	318	2,154	2,640
Agricultural	30	93	541	664
Total	**718**	**474**	**2,976**	**4,168**

Notes: Some wells may report pumping for more than one use category (e.g., domestic and agricultural). For wells reporting semi-annually or annually (primarily agricultural and domestic), the number of wells in each sector was estimated based on the prior year since validated 2024 data was not available by the date of publication of this report.

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Figure 4. 2024 Santa Clara Subbasin Groundwater Pumping

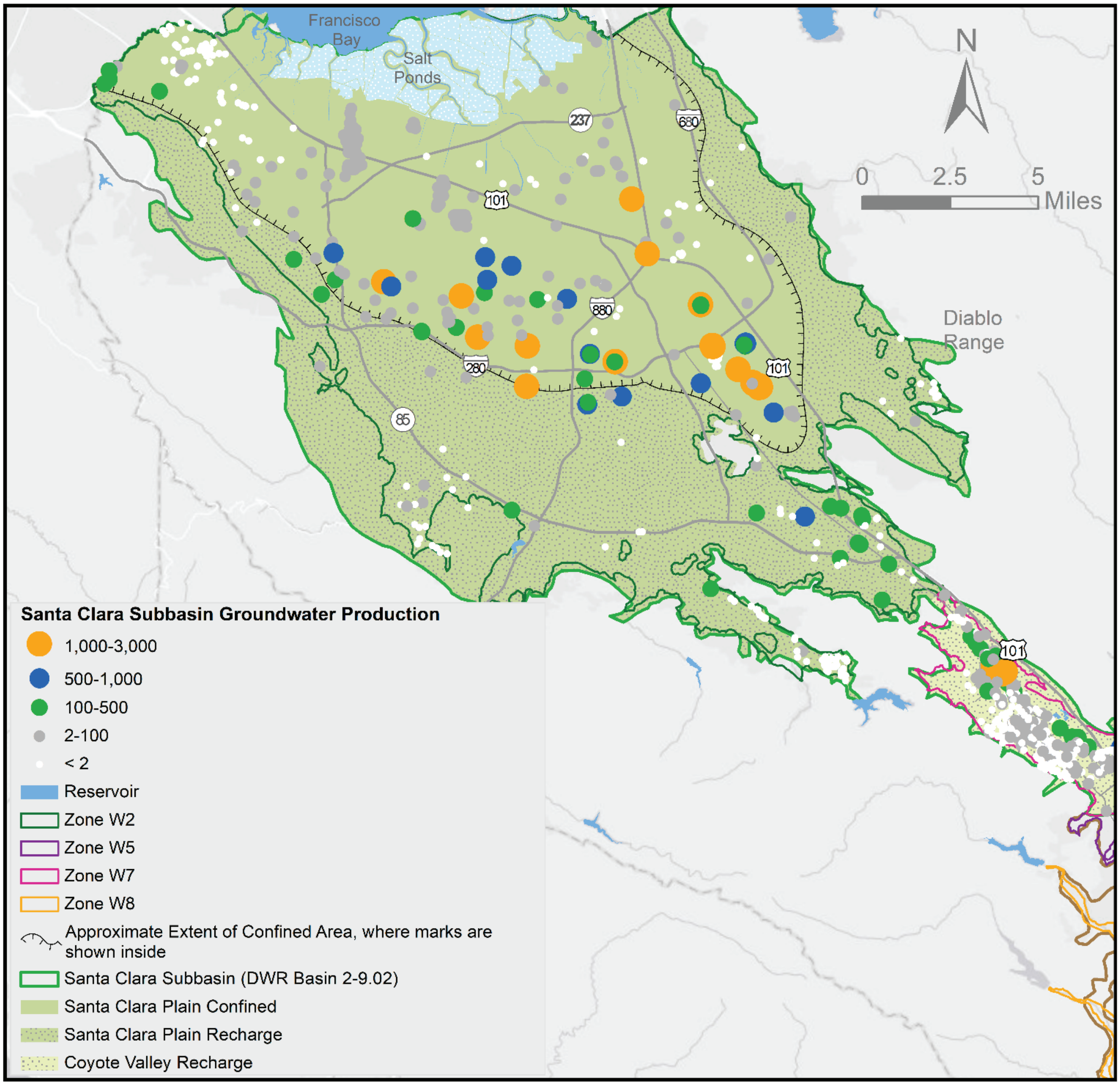

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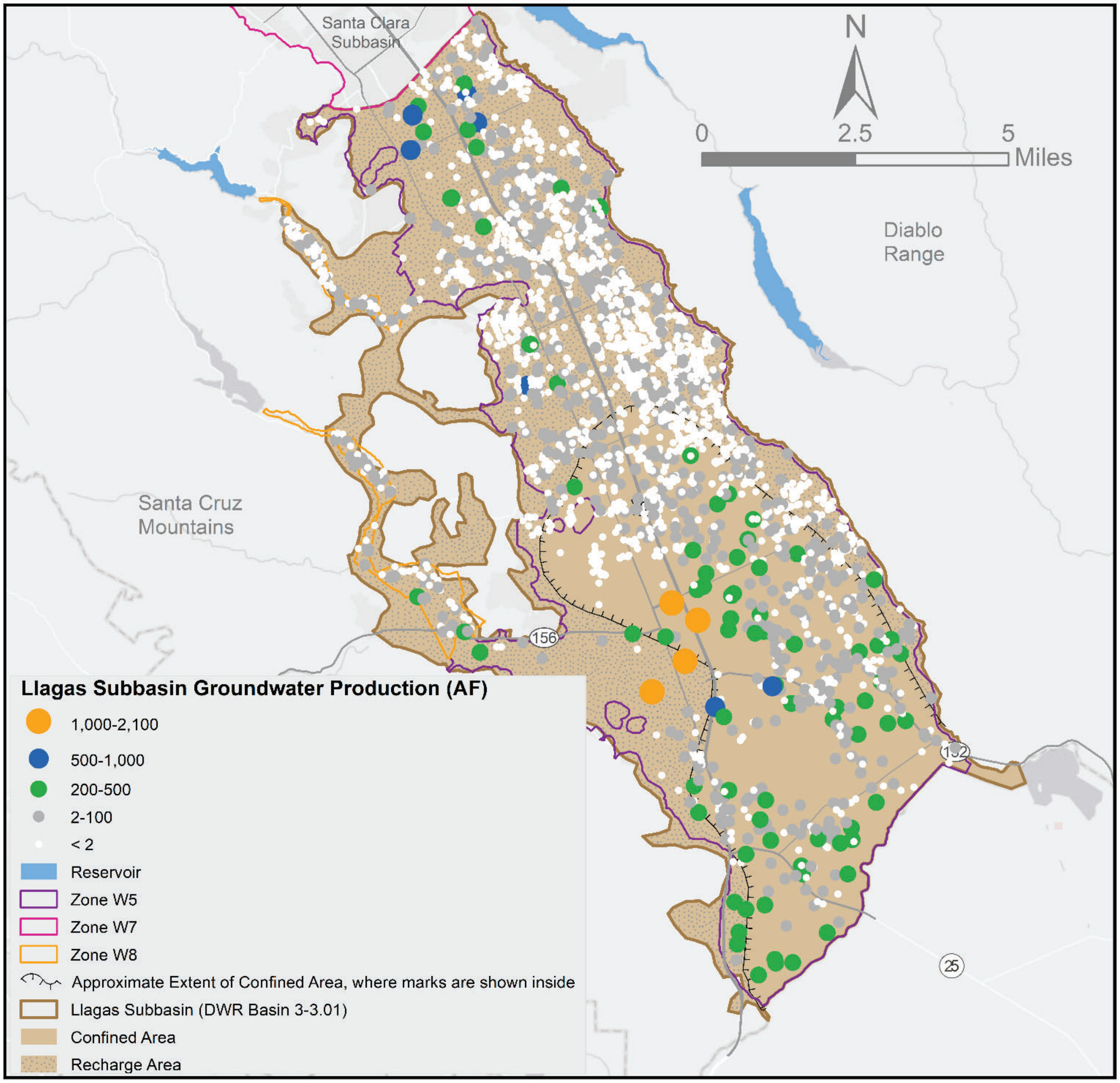
Figure 5. 2024 Llagas Subbasin Groundwater Pumping



Groundwater Pumping and Water Use Trends

Countywide, estimated total water use was 285,400 AF, an increase compared to 2023 (273,300 AF). Similarly, countywide groundwater pumping increased to 127,000 AF, up 18% from the previous year (107,700 AF) and 2% from the recent five-year average (125,000 AF), but 19% lower than the period of record (156,300 AF) (Table 3). Groundwater pumping was 82,900 AF in the Santa Clara Subbasin and 44,100 AF in the Llagas Subbasin, which are increases of 14,800 AF and 4,500 AF, respectively, compared to 2023. Compared to 2023, groundwater pumping increased about 27% in the Santa Clara

Plain, 1% in the Coyote Valley, and 11% in the Llagas Subbasin. These increases in countywide water use and groundwater pumping reflect rebound in demand following the recent (2020–2022) drought.

Table 3. 2024 Groundwater Pumping (AF) Compared to Other Periods

Period	Santa Clara Subbasin		Llagas Subbasin (Zones W-5 and W-8)	Total
	Santa Clara Plain (Zone W-2)	Coyote Valley (Zone W-7)		
2024	68,900	14,000	44,100	127,000
2023	54,300	13,800	39,600	107,700
5-Year Average (2020-2024)	70,500	12,900	41,600	125,000
Period of Record[1] (Average)	104,500	9,600	42,200	156,300

Notes:
[1] The period of record is 1981 to 2024 for Santa Clara Plain, 1988 to 2024 for Coyote Valley, and 1988 to 2024 for the Llagas Subbasin.

2.3 Surface Water Supply Used

Total water use and surface-water supplies are summarized in Table 4. Valley Water actively recharged 113,000 AF of imported and local surface water in the Santa Clara and Llagas subbasins. Equally as important to groundwater sustainability are in-lieu recharge activities, which included over 140,000 AF of surface water deliveries by Valley Water, San Francisco Public Utilities Commission (SFPUC), and San Jose Water Company (SJWC); 17,800 AF of recycled water deliveries; and 86,000 AF in savings from Valley Water's long-term water conservation programs. Collectively these activities provide critical in-lieu recharge by reducing the demand on groundwater.

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Table 4. 2024 Santa Clara County Total Water Use (AF)

Water Use[1]	Santa Clara Subbasin	Llagas Subbasin	County-wide	Measurement Method	Accuracy	Source	Sector
Groundwater Pumped	82,900	44,100	127,000	Metered (88%) and estimated (12%)[2]	Within 2% (metered)	Managed recharge of local runoff & imported water[3], natural recharge	M&I, domestic, and agricultural[4]
Valley Water Treated Surface Water Deliveries	81,200	0	81,200	Metered	Within 2%	Local runoff and imported water	M&I
Valley Water Raw Surface Water Deliveries	1,100	400	1,500	Metered (95%) and estimated	Within 2% (metered)	Local runoff and imported water	M&I, domestic, and agricultural
SFPUC Supplies to Local Retailers[5]	47,700	0	47,700	Metered	Within 1.5%	Surface water reservoirs[6]	M&I
SJWC Surface Water Deliveries	10,200	0	10,200	Metered	Within 2% (metered)	Local surface water reservoirs	M&I
Recycled Water	15,500	2,300	17,800	Metered	Variable[7]	Treated wastewater	M&I and agricultural
Total[8]	**238,600**	**46,800**	**285,400**				

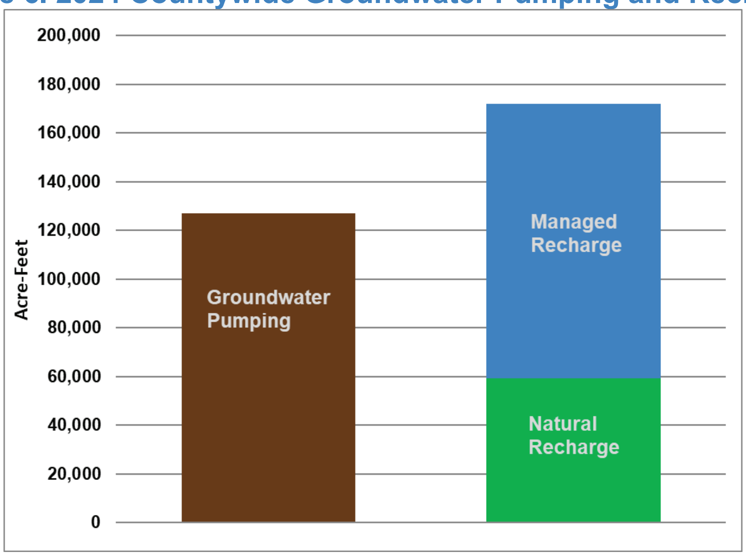
Notes:
1 All water use values are rounded to the nearest hundred.
2 Production from some smaller wells and raw surface water users is estimated using a table of average uses or crop factors.
3 Valley Water's imported water supplies include the State Water Project (SWP) and the Central Valley Project (CVP).
4 Groundwater use by sector is shown in Table 1.
5 San Francisco Public Utilities Commission (SFPUC) supplies water to eight (8) retailers in Santa Clara County and NASA-AMES (https://sfwater.org/index.aspx?page=355).
6 SFPUC primary sources are surface water reservoirs with runoff mainly from the Hetch Hetchy watershed and also from the Alameda and Peninsula watersheds. More information is available at: https://sfwater.org/index.aspx?page=355.
7 Recycled water meter accuracy varies as each of the four producers within the county uses different methods to measure production and delivery of recycled water.
8 Local water rights used by Stanford within the Santa Clara Subbasin are not reflected in the total because their local water rights have historically amounted to <3% of the total for the Santa Clara Subbasin.

2.3.1 Managed Recharge

Since the 1930s, Valley Water's water supply strategy has been to maximize the conjunctive management of surface water and groundwater. Annual groundwater pumping far exceeds what is replenished naturally, so Valley Water ensures water supply reliability with its managed recharge and in-lieu recharge activities.

In 2024, countywide recharge (172,200 AF) exceeded groundwater pumping (127,000 AF) (Figure 6) due to the below average pumping, above average rainfall, and availability of surface water for managed recharge. Countywide recharge includes 113,000 AF of managed recharge and 59,200 AF of natural recharge. Appendix B has details about historical trends in managed recharge.

Figure 6. 2024 Countywide Groundwater Pumping and Recharge



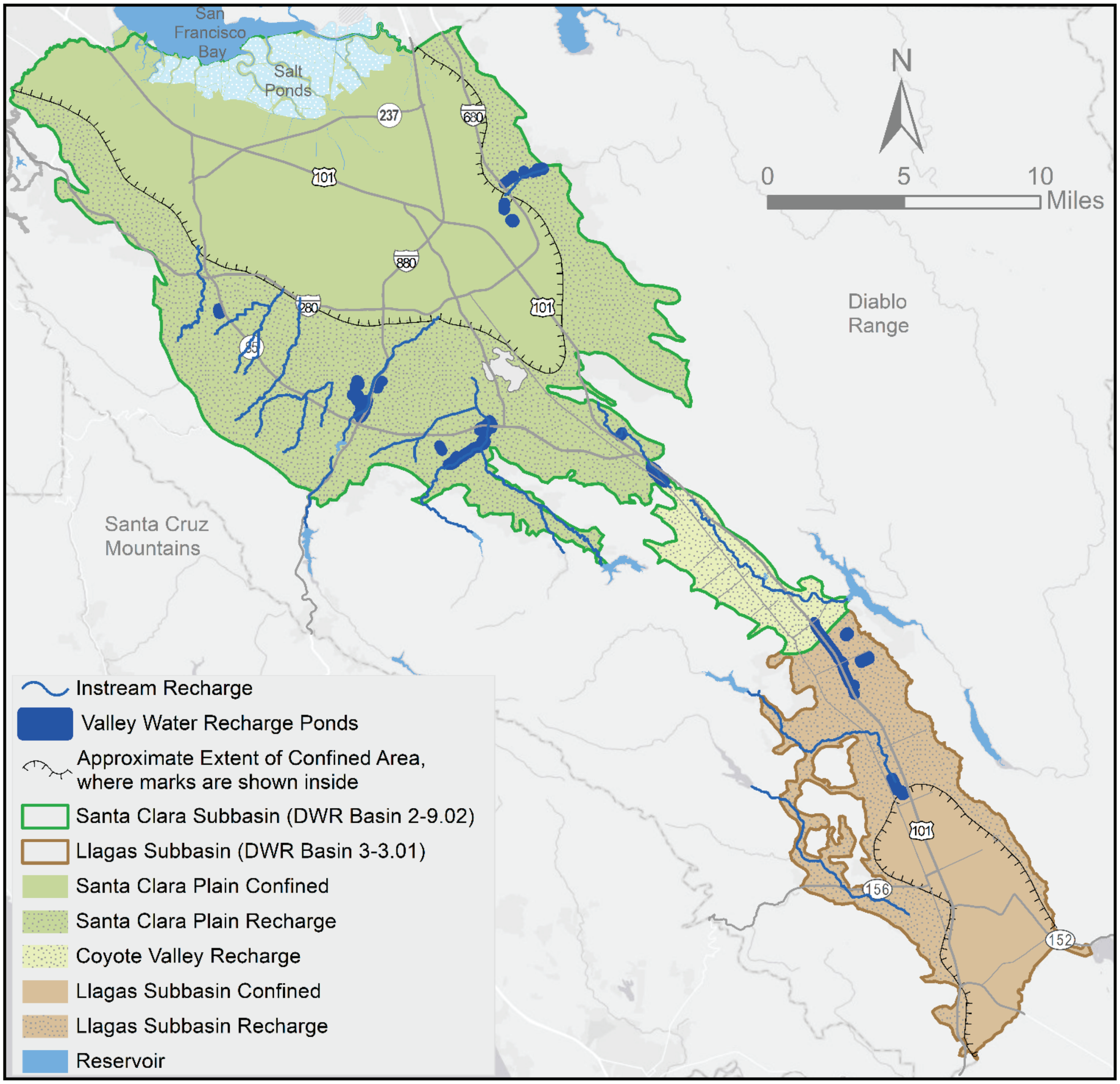
Valley Water's managed recharge supplies include imported water and surface runoff captured in 10 local reservoirs. Recharge facilities include 285 acres of recharge ponds and about 98 miles of controlled in-stream recharge (Figure 7). Imported water sources include the Federal Central Valley Project (CVP) and the State Water Project (SWP).

Valley Water's 10 local reservoirs were constructed in the 1930s and 1950s. Operating restrictions have been imposed on five of the reservoirs (including Anderson Reservoir, the largest in the county) while seismic stability concerns are mitigated. These dam safety operating restrictions reduce the amount of water that can be stored for groundwater recharge by 103,000 AF but are needed for public safety. The restrictions result in a loss of 62% of the total surface storage capacity of Valley Water reservoirs, primarily due to the ability to store water in Anderson Reservoir. Current or upcoming Valley Water facility projects include seismic upgrades of Anderson, Calero, and Guadalupe dams[11]. Valley Water's website[12] has details about the Anderson Dam Seismic Retrofit Project (ADSRP) and related Federal Energy Regulatory Committee (FERC) Order Compliance Project (FOCP).

[11] Additional details about the Capital Improvement Program are available on Valley Water's website here: https://www.valleywater.org/how-we-operate/five-year-capital-improvement-program.

[12] Additional details about the Anderson Dam seismic retrofit and FERC FOCP are available on Valley Water's website here: https://www.valleywater.org/project-updates/2012-c1-anderson-dam-seismic-retrofit.

Figure 7. Valley Water Managed Recharge Facilities



The relative amounts of imported or local water Valley Water uses for managed recharge each year depend on many factors including hydrology, imported water allocations, treatment plant demands, and environmental needs. In general, a greater percentage of local water is used for recharge in wet years due to increased capture of storm runoff in local reservoirs. In 2024, Valley Water recharged 87,300 AF of local and imported water in the Santa Clara Subbasin and 25,700 AF in the Llagas Subbasin (Table 5). Countywide, most of the managed recharge (57%) occurred in-stream, with the remainder (43%) through off-stream recharge (percolation) ponds.

Table 5. 2024 Managed Recharge (AF)

Period	Santa Clara Subbasin		Llagas Subbasin (Zones W-5 and W-8)	Total
	Santa Clara Plain (Zone W-2)	Coyote Valley (Zone W-7)		
In-Stream Recharge (Creeks)	25,100	16,200	23,200	64,500
Off-Stream Recharge (Recharge Ponds)	46,000	0	2,500	48,500
Total	**71,100**	**16,200**	**25,700**	**113,000**

2.3.2 Natural Recharge

In 2024, countywide natural recharge was 59,200 AF, including 34,200 AF in the Santa Clara Subbasin (31,000 AF in the Santa Clara Plain and 3,200 AF in Coyote Valley), and 25,000 AF in the Llagas Subbasin. Natural recharge is estimated from calibrated groundwater flow models, as described in Section 2.5 (Groundwater Balance).

2.3.3 In-Lieu Recharge

Valley Water's treated and raw surface water deliveries, SJWC surface water deliveries, SFPUC supplies to local retailers, and recycled water play a critical role in maintaining groundwater elevations and storage by reducing demands on groundwater. Table 4 summarizes the supplies from these categories in areas that were historically primarily or solely served by groundwater. In 2024, these supplies totaled 158,400 AF. Valley Water's long-term water conservation programs also saved 86,000 AF, further reducing the need for groundwater pumping.[13]

Valley Water is committed to advancing purified and recycled water use in the county. Valley Water's Silicon Valley Advanced Water Purification Center in San Jose is a state-of-the-art facility producing up to 8 million gallons per day (9,000 AF per year) of purified water by treating recycled water using microfiltration, reverse osmosis, and ultraviolet light. This purified water is blended with tertiary-treated recycled water to improve the quality for landscape irrigation and industrial uses. This facility supports Valley Water's goal of expanding the use of recycled and purified water, which reduces the demand on groundwater and increases supply reliability. Valley Water is collaborating with the cities of San Jose and Santa Clara to explore a direct potable reuse facility at the Silicon Valley Advanced Water Purification Center.

2.4 Total Water Use

Total estimated water use in Santa Clara County in 2024 was 285,400 AF as shown in Table 4 with water use categories, measurement methods and accuracy, water sources, and use sectors. While the

[13] Santa Clara Valley Water District, Protection and Augmentation of Water Supplies, FY 2025-26 (PAWS), 54rth Annual Report, February 2025.

county boundary extends beyond the subbasins, the vast majority of the county's population resides in the valley floor, which essentially coincides with the subbasins.

2.5 Groundwater Balance

While groundwater storage may increase or decrease each year, Valley Water's comprehensive managed and in-lieu recharge programs ensure long-term balance. The annual groundwater balance presented in Figure 8 evaluates annual inflows and outflows for the Santa Clara Plain, Coyote Valley, and Llagas Subbasin. It should be noted that some terms presented in the groundwater balance cannot be directly measured and represent estimated values from Valley Water's calibrated groundwater flow models.

Most values in this report are presented for the water year to comply with SGMA reporting requirements. However, the groundwater balance in Figure 8 is presented for the calendar year to align with and support Valley Water operations and related planning. Change in groundwater storage based on the water year is also presented in Table 6 to comply with SGMA annual reporting requirements.

Inflows

Major inflows to the subbasins are primarily from:

- Managed recharge by Valley Water, using local and imported surface water; and
- Natural recharge, which includes deep percolation of rainfall, natural seepage through creeks, subsurface inflow from adjacent aquifers, water loss from transmission and distribution lines, mountain front recharge, and return flows from septic systems and irrigation.

Valley Water quantifies managed recharge using streamflow measurements and measured releases from reservoirs and raw water pipelines. Rainfall is measured at precipitation gage stations in San Jose (NOAA[14] Station USW00023293), Los Gatos (NOAA Station USC00045123), and Morgan Hill (Valley Water Station 41). These stations provide rainfall data used in Valley Water's three calibrated numerical groundwater flow models (MODFLOW) for the Santa Clara Plain, Coyote Valley, and Llagas Subbasin. Subsurface inflows and outflows to and from adjacent aquifer systems and mountain front recharge are derived from the groundwater flow models.

Total inflow to both subbasins was 168,600 AF in CY 2024, with managed recharge providing 63% of total inflows (Figure 8). Local precipitation was above average but lower than 2023. This explains why CY 2024 natural recharge and other inflows (62,200 AF) were above average but about 6% lower than the prior year.

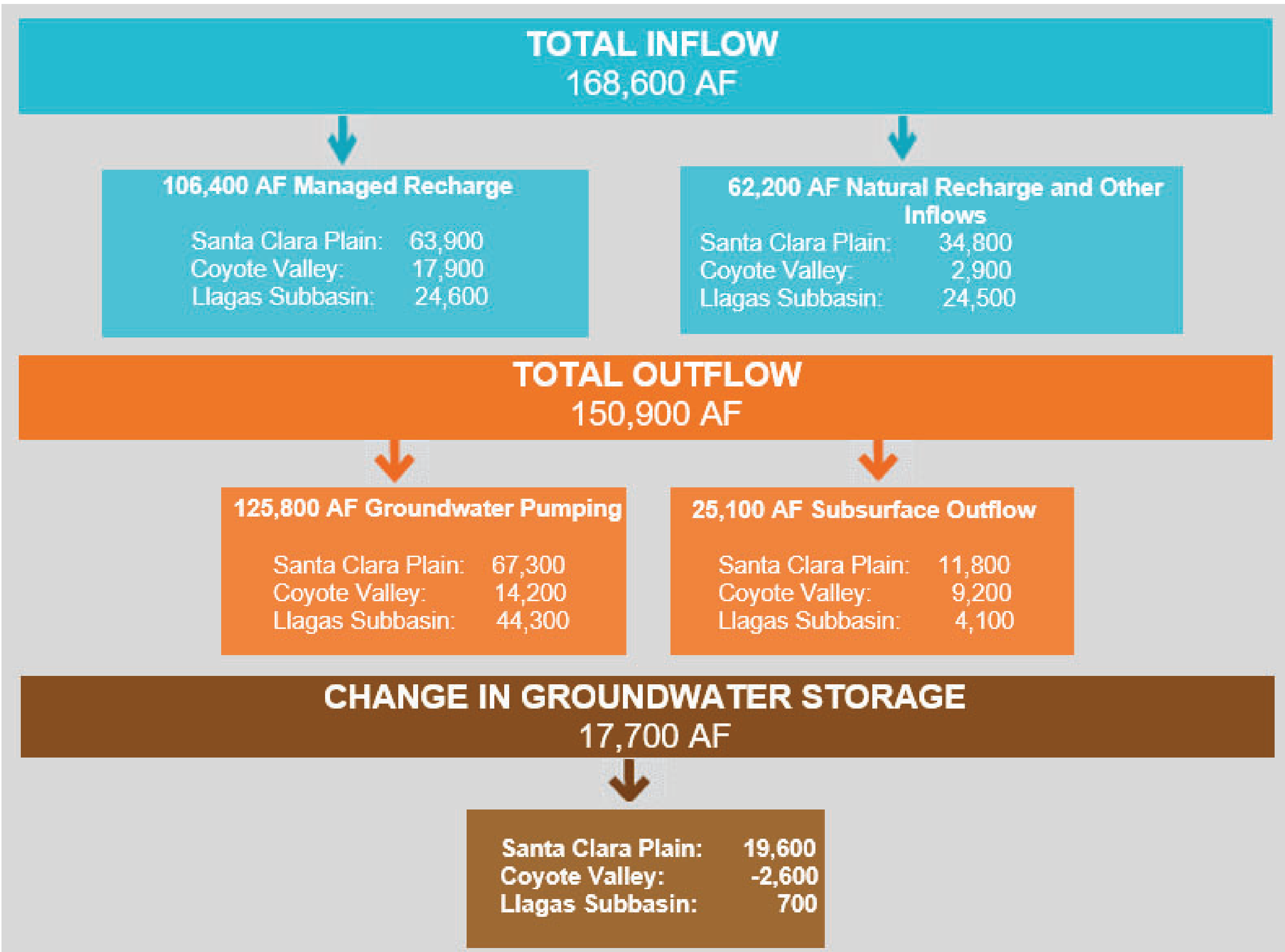
Outflows

The primary outflow of groundwater is pumping, which was 125,800 AF and accounted for 83% of the total outflow of 150,900 AF in CY 2024 (Figure 8). Most groundwater pumped is metered. In Zone W-2, meters are required for wells pumping more than 1 AFY of non-agricultural water or 20 AFY of agricultural water. In Zones W-5, W-7, and W-8, meters are required for wells producing more than 2 AFY of non-agricultural water or 20 AFY of agricultural water. Where meters are not installed, crop factors are used to estimate agricultural water use, whereas domestic use is estimated from a table of

[14] U.S. Department of Commerce National Oceanic and Atmospheric Administration (NOAA).

average uses. Subsurface outflow to adjacent aquifer systems, creeks, storm and sewer systems, and plant uptake was 25,100 AF, or 17% of the total outflow in CY 2024.

Figure 8. CY 2024 Groundwater Balance



Notes:

- Groundwater balance terms presented are estimates as of December 2024. These estimates are refined as additional data becomes available. Values shown are based on measured quantities or calibrated groundwater flow models, with all values rounded to the nearest 100 AF.
- Managed recharge represents direct replenishment by Valley Water using local and imported water. Estimates from the groundwater models (shown here) may differ slightly from surface water accounting estimates.
- Natural recharge and other inflows include the deep percolation of rainfall, septic system and/or irrigation return flows, natural seepage through creeks, storm and sewer system seepage, and inflow from adjacent aquifer systems.
- The groundwater pumping estimate is based on pumping metered by Valley Water or reported by low-volume groundwater users.
- Subsurface outflow represents outflow to adjacent aquifer systems. In the Santa Clara Plain, this includes outflows to San Francisco Bay; in the Coyote Valley, this includes outflow to the Santa Clara Plain; and in the Llagas Subbasin, this includes outflows to the North San Benito Subbasin in San Benito County.

2.6 Change in Storage

Table 6 summarizes estimated end of year groundwater storage. Valley Water's groundwater storage outcome measure is based on the calendar year to align with water supply operations, planning, and shortage response. WY values are also reported to align with SGMA annual reporting requirements.

Countywide groundwater storage increased by 17,700 AF in CY 2024 because the groundwater inflows exceeded the outflows (Figure 8). Compared to 2023, storage in the Santa Clara Plain, Coyote Valley, and Llagas Subbasin increased by 19,900 AF, decreased by 2,600 AF, and increased by 700 AF, respectively (Table 6, Figure 8).

Estimated countywide groundwater storage at the end of WY 2024 was 409,000 AF, which is 24,200 AF higher than 2023 (Table 6). End of 2024 groundwater storage under both year types is greater than 300,000 AF, within the normal stage (Stage 1) of Valley Water's Water Shortage Contingency Plan and indicating good water supply conditions.

Table 6. Estimated End of Year Groundwater Storage (AF)

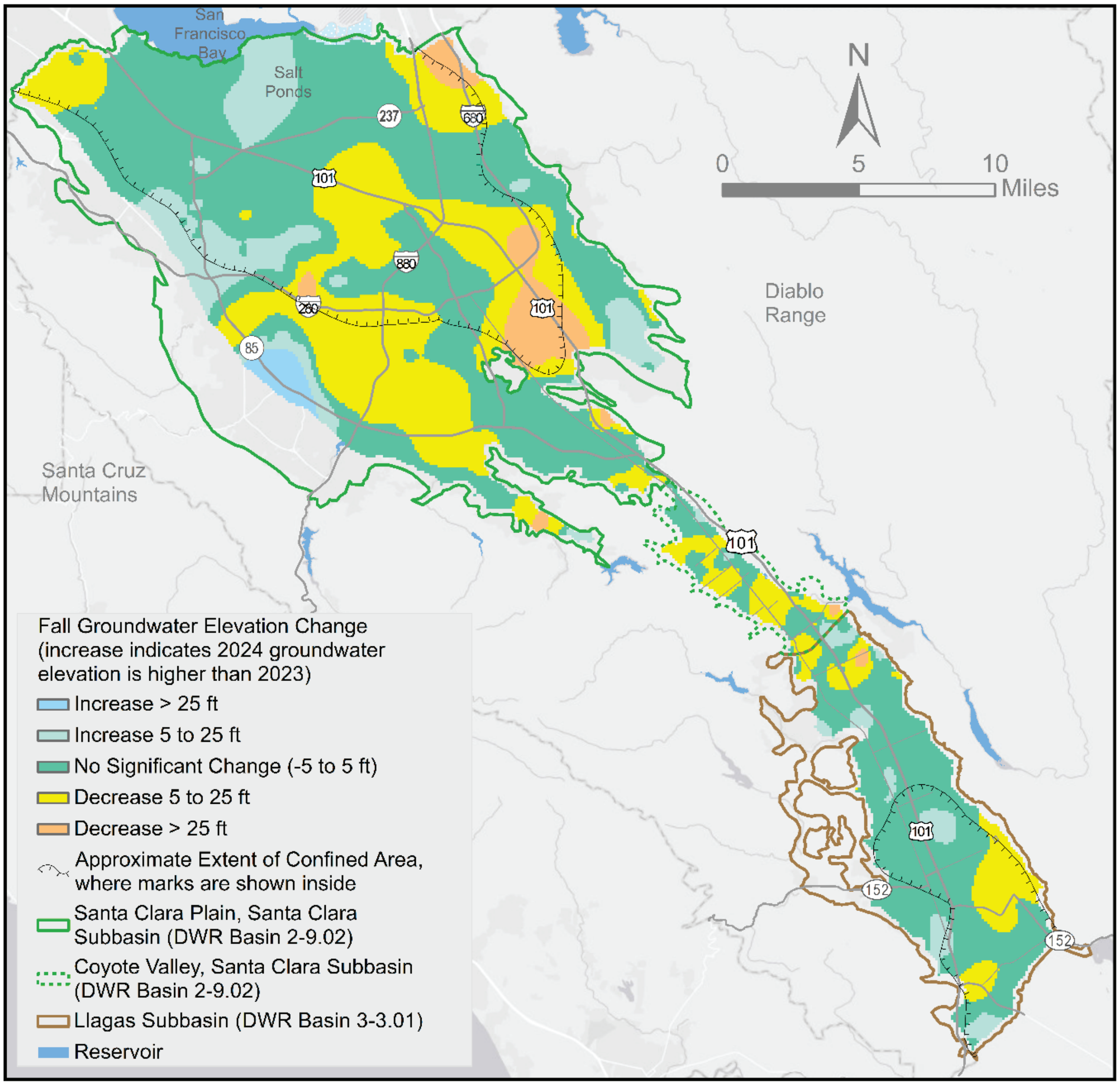
Period	Santa Clara Subbasin		Llagas Subbasin (Zones W-5 and W-8)	Total
	Santa Clara Plain (Zone W-2)	Coyote Valley (Zone W-7)		
Outcome Measure	278,000	5,000	17,000	**300,000**
Water Year				
End of Year 2023	350,600	11,200	23,000	**384,800**
End of Year 2024	375,800	8,100	25,100	**409,000**
Change in Storage	25,200	-3,100	2,100	**24,200**
Calendar Year				
End of Year 2023	361,200	9,600	25,200	**396,000**
End of Year 2024	380,800	7,000	25,900	**413,700**
Change in Storage	19,600	-2,600	700	**17,700**

Notes: Groundwater storage estimates are as of December 2024, and are based on accumulated storage since 1970, 1991, and 1990 for the Santa Clara Plain, Coyote Valley, and Llagas Subbasin, respectively. These estimates are refined as additional pumping and managed recharge data become available.

While groundwater conditions remain sustainable, the ten-year loss of storage in Valley Water's largest reservoir (Anderson) due to seismic retrofit poses significant near-term risks to local water supplies. During the recent 2020–2022 drought, Valley Water asked the community to reduce water use and secured emergency imported water supplies to support managed recharge and treated water deliveries. These actions to maintain healthy groundwater conditions in WY 2022 and two subsequent wet winters enabled groundwater storage to remain in the Normal stage in 2023 and 2024.

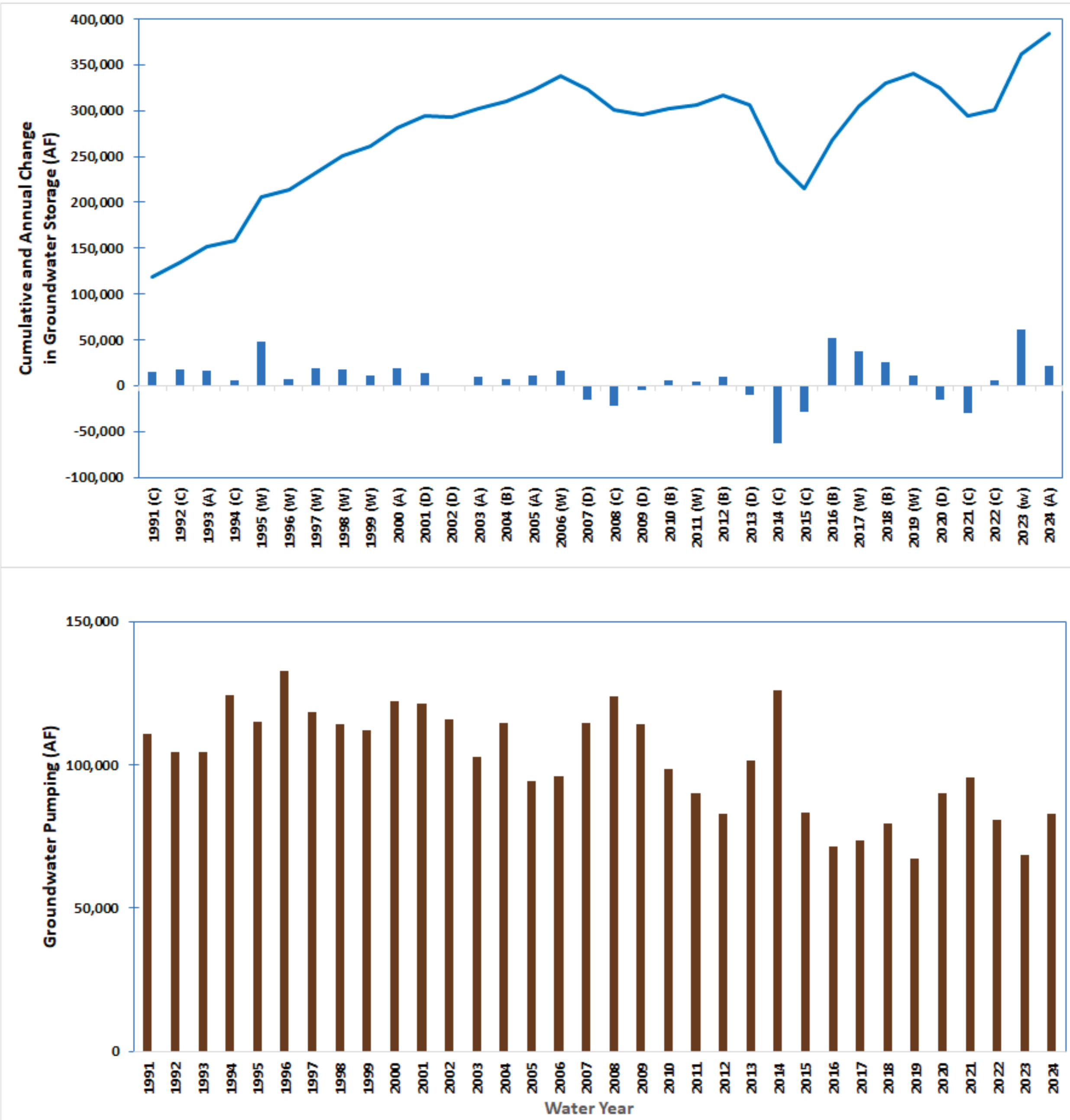
Figure 9 depicts the change in groundwater elevation from October 2023 to September 2024 at more than 188 principal aquifer water level wells in the Santa Clara Subbasin and more than 61 wells in the Llagas Subbasin. The corresponding change in groundwater storage of 22,100 AF and 2,100 AF for the Santa Clara and Llagas subbasins, respectively, (Figure 9) is estimated from Valley Water's calibrated groundwater flow models.

Figure 9. Change in Groundwater Elevation from October 2023 to September 2024



Figures 10 and 11 present the water year type, groundwater use, annual change in groundwater storage, and cumulative change in groundwater storage for the Santa Clara and Llagas subbasins, respectively, from 1991 through 2024. These figures show that over this period, the annual change within each basin has most frequently been an increase in groundwater storage. The most notable exceptions, also evident in hydrographs, occur during droughts as expected. However, Valley Water programs to recharge and manage groundwater support rapid recovery of water levels and storage after droughts, helping ensure long-term sustainability. As mentioned previously, groundwater levels and storage in the Santa Clara and Llagas subbasins quickly recovered from the recent droughts (2012–2016 and 2020–2022).

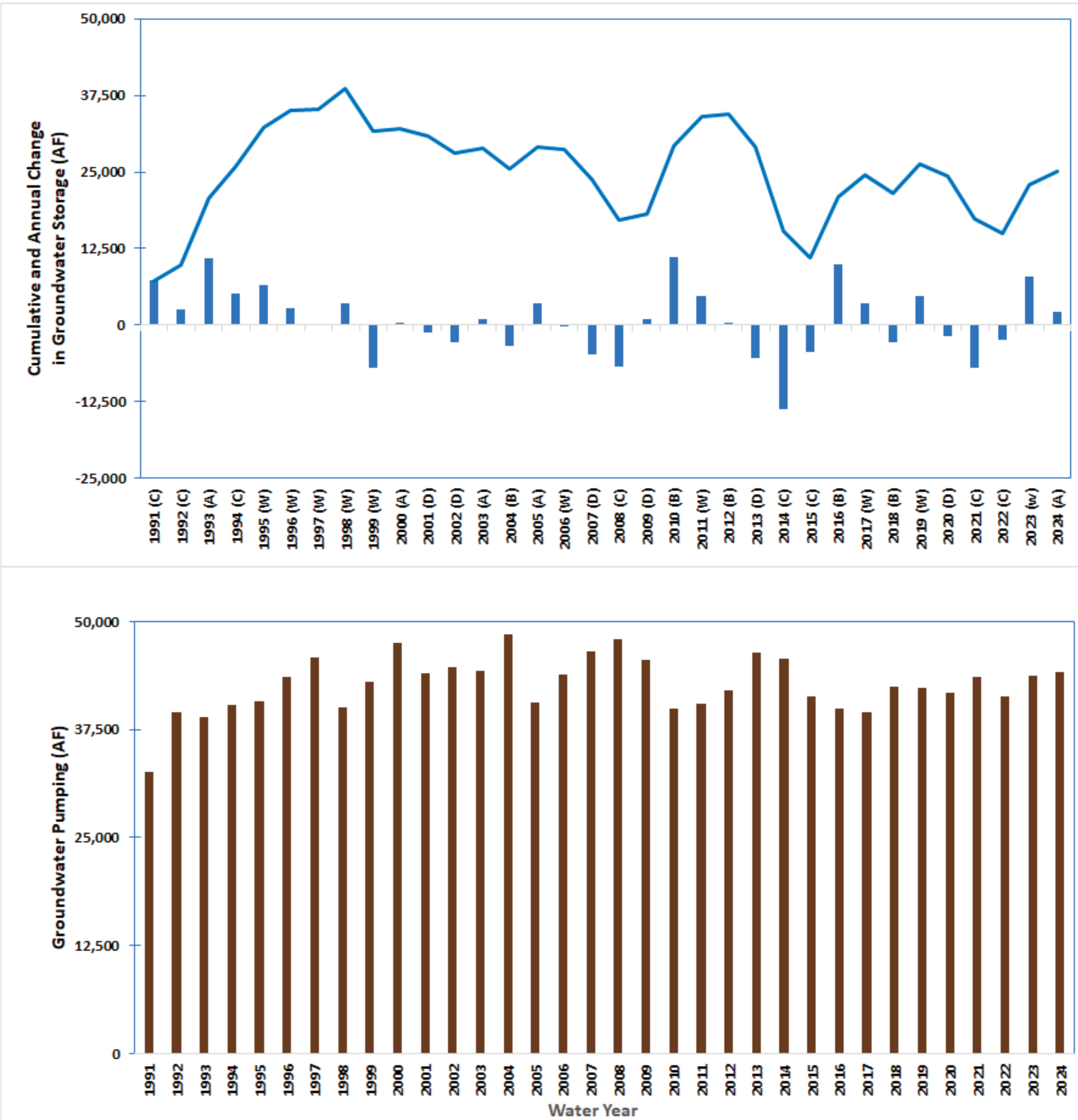
Figure 10. Groundwater Use and Change in Storage in the Santa Clara Subbasin



Notes:

- DWR SRI water year types are: Critical (C), Dry (D), Below Normal (B), Above Normal (A), and Wet (W).
- The storage graph begins in 1991 because Valley Water estimates Santa Clara Subbasin storage using two numerical models. The Santa Clara Plain model begins in 1970 while the Coyote Valley model begins in 1991 as Valley Water did not begin managing that area until the late 1980s.
- Most groundwater pumping is reported monthly and is shown here by water year. However, pumpers that report semi-annually or annually provide data based on the fiscal year (July 1 to June 30). For these reporters, groundwater pumping shown represents the fiscal year, which is presumed to be similar to the water year.

Figure 11. Groundwater Use and Change in Storage in the Llagas Subbasin



Notes:

- DWR SRI water year types are: Critical (C), Dry (D), Below Normal (B), Above Normal (A), and Wet (W).
- The storage graph begins in 1991 because Valley Water estimates Llagas Subbasin storage using a numerical model that begins in 1991 as Valley Water did not begin managing that area until the late 1980s.
- Most groundwater pumping is reported monthly and is reported here by water year. However, pumpers that report semi-annually or annually provide data based on the fiscal year (July 1 to June 30). For these reporters, groundwater pumping shown represents the fiscal year, which is presumed to be similar to the water year.

CHAPTER 3 – GROUNDWATER LEVELS AND SUBSIDENCE

Chapter 3 summarizes 2024 groundwater levels, including hydrographs from key regional monitoring wells and water level contour maps. Subsidence monitoring results are also summarized here and detailed in Appendix A. All data in this chapter are for water year 2024 (October 1, 2023 to September 30, 2024), unless otherwise noted.

3.1 Groundwater Levels

Valley Water tracks groundwater elevations, groundwater quality, and land subsidence through comprehensive groundwater monitoring programs. In 2024, Valley Water collected monthly groundwater elevation readings at 168 wells in the Santa Clara Subbasin and 61 wells in the Llagas Subbasin. Furthermore, local water retailers shared groundwater elevation data at 85 wells (Appendix B, Figure B-7). While this report provides a summary of groundwater elevations based on 11 regional wells, all available countywide groundwater elevation data are accessible through the Monitoring Network Module within DWR's SGMA portal[15] and the Valley Water website.[16] All well information in the Monitoring Network Module was recently updated.

Groundwater elevation data from 11 regional wells in the Santa Clara and Llagas subbasins are shown in Figure 12; these wells are spatially distributed within the two subbasins and various cities in the county. Hydrographs for these regional wells show the static water level trend over the period of record, which varies by well (Figure 13).

While 2024 was an above-normal water year, rainfall was less than in 2023, which was characterized as "weather whiplash" and began with statewide drought but ended very wet with precipitation and snowpack far above normal[17]. As a result of these recent hydrologic trends, increased managed recharge, and decreased groundwater pumping, groundwater elevations in many regional wells ended 2024 lower than 2023 but far above average levels. Groundwater elevations in 2024 remain far above the historical minima and levels observed during the last major droughts of 1987–1992, 2012–2016, and 2020–2022. Artesian pressures were observed at many locations in the northern Santa Clara Subbasin. Groundwater elevations in 2024 were also well above Valley Water thresholds established to minimize the risk of land subsidence in the Santa Clara Subbasin.[18]

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[15] https://sgma.water.ca.gov/portal/

[16] https://gis.valleywater.org/GroundwaterElevations The water level data uploaded to DWR's Monitoring Network Module are from wells monitored by Valley Water and are a subset of the wells available on Valley Water website that includes water level data from Valley Water and Retailers.

[17] DWR, 2023, Water Year 2023: Weather whiplash, from drought to deluge, available at https://water.ca.gov/-/media/DWR%20Website/Web%20Pages/Water%20Basics/Drought/Files/Publications%20And%20Reports/Water%20Year%202023%20wrap%20up%20brochure_01?utm_medium=email&utm&#:~:text=The%20theme%20of%20Water%20Year,part%20of%20the%20water%20year.

[18] See Section 3.2 and Appendix A for additional information.

Figure 12. Regional Groundwater Elevation Monitoring Wells

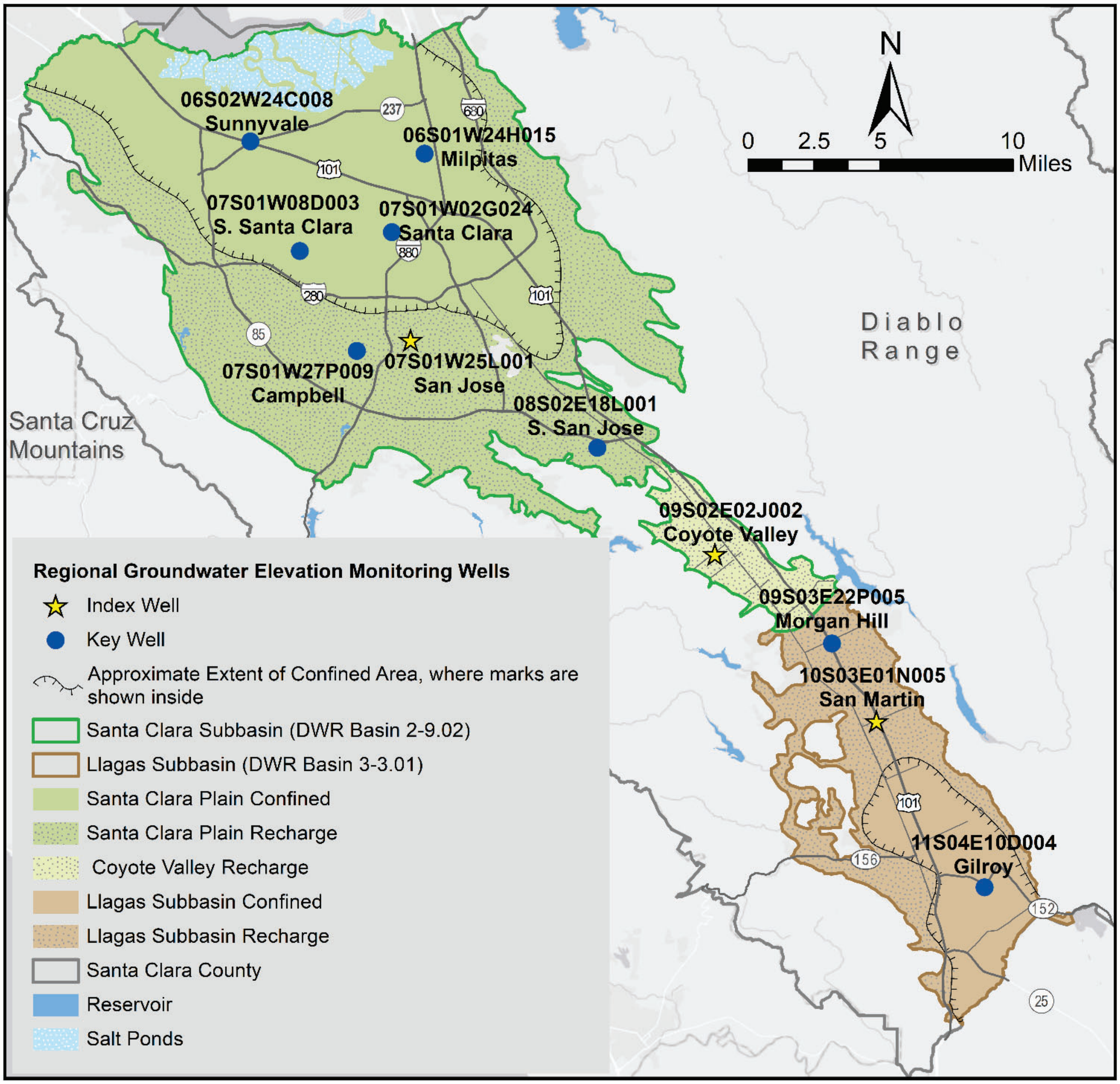

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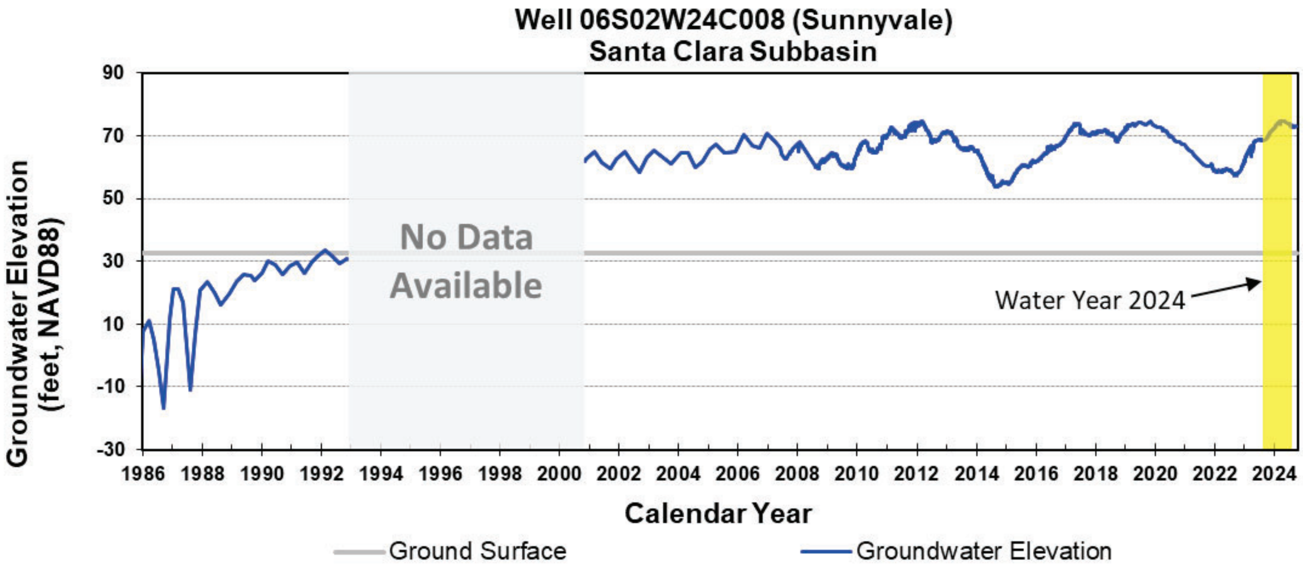
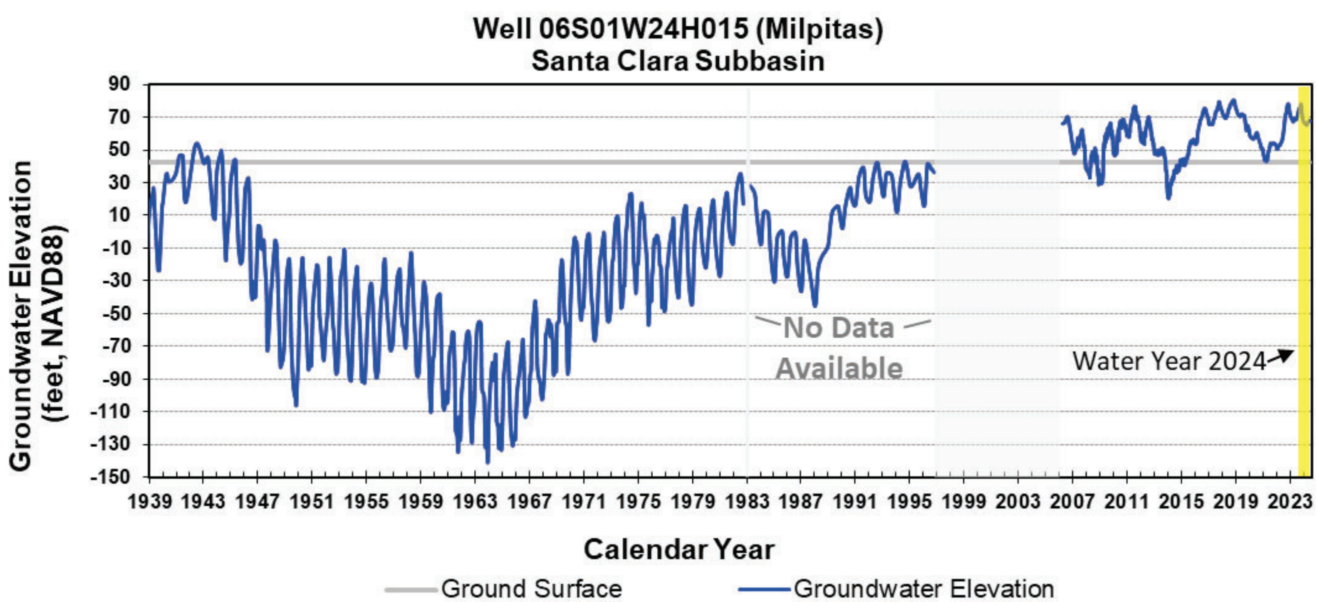
Figure 13. Hydrographs at Regional Groundwater Elevation Monitoring Wells

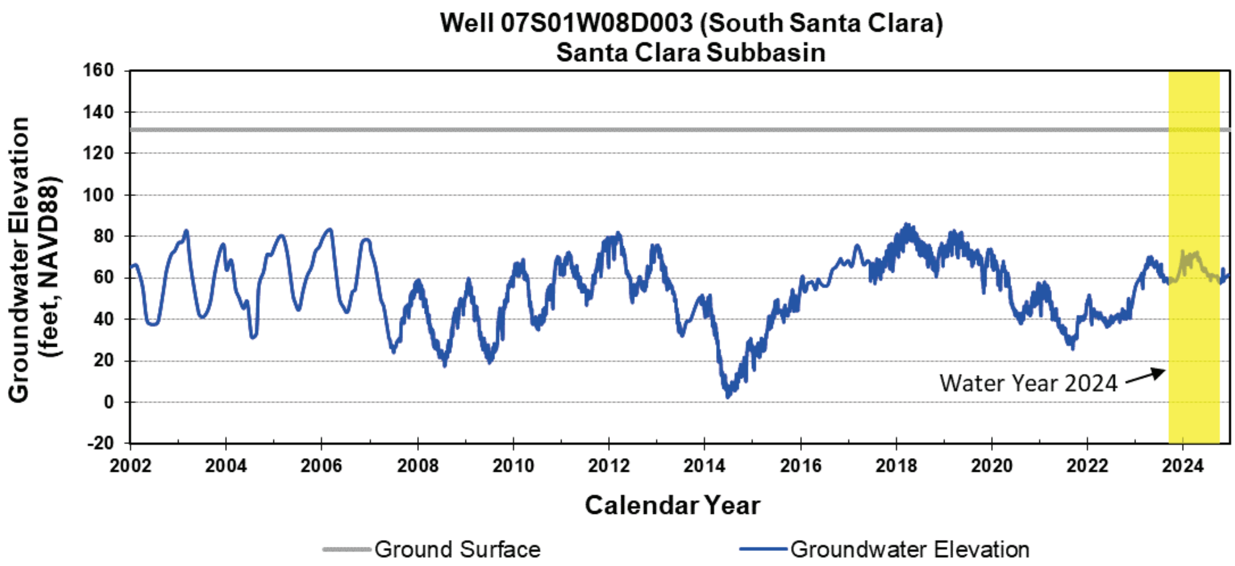


During period with no data available, well was observed to be artesian but there was no pressure gauge installed.



During second period with no data available, well was observed to be artesian but there was no pressure gauge installed.

Figure 13. Hydrographs at Regional Groundwater Elevation Monitoring Wells (continued)



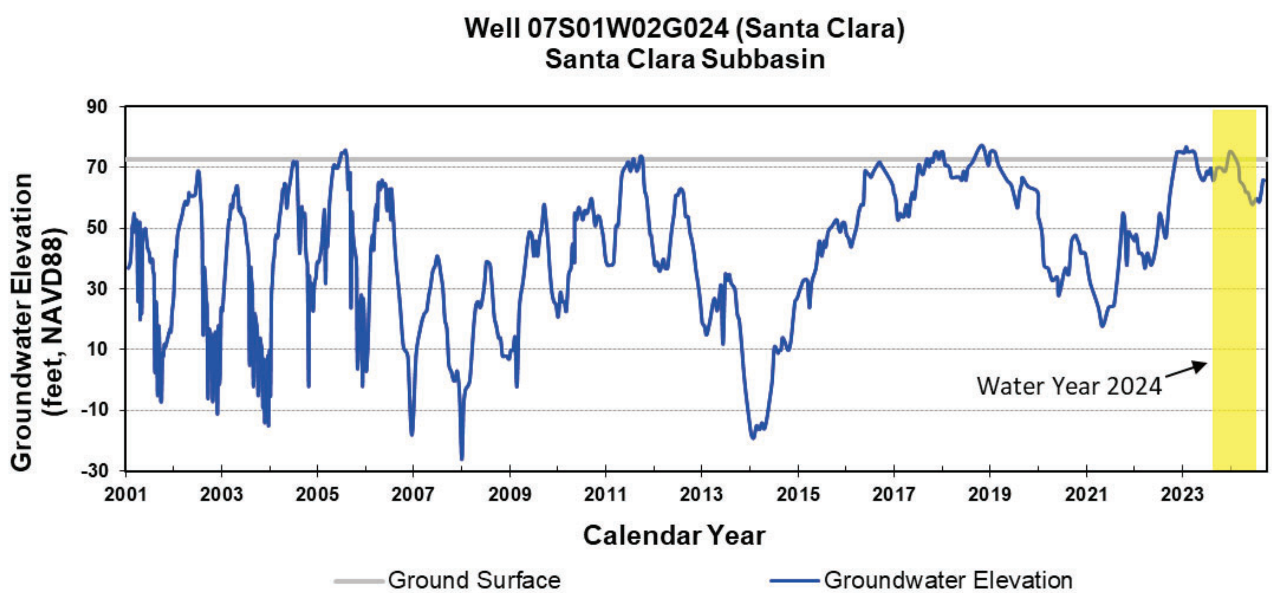
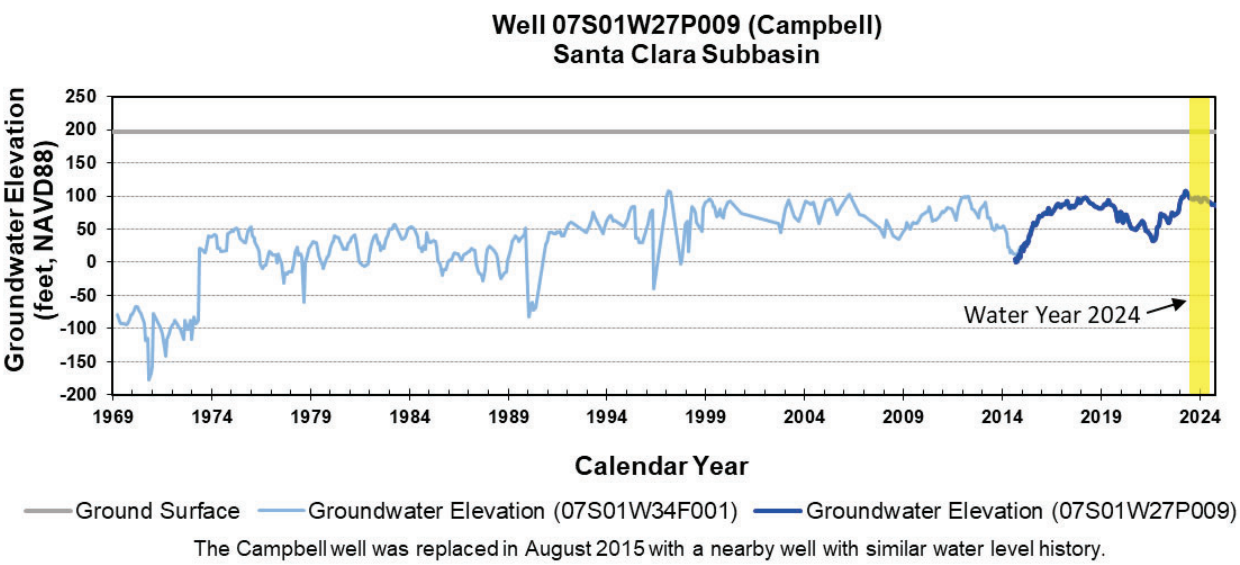


Figure 13. Hydrographs at Regional Groundwater Elevation Monitoring Wells (continued)



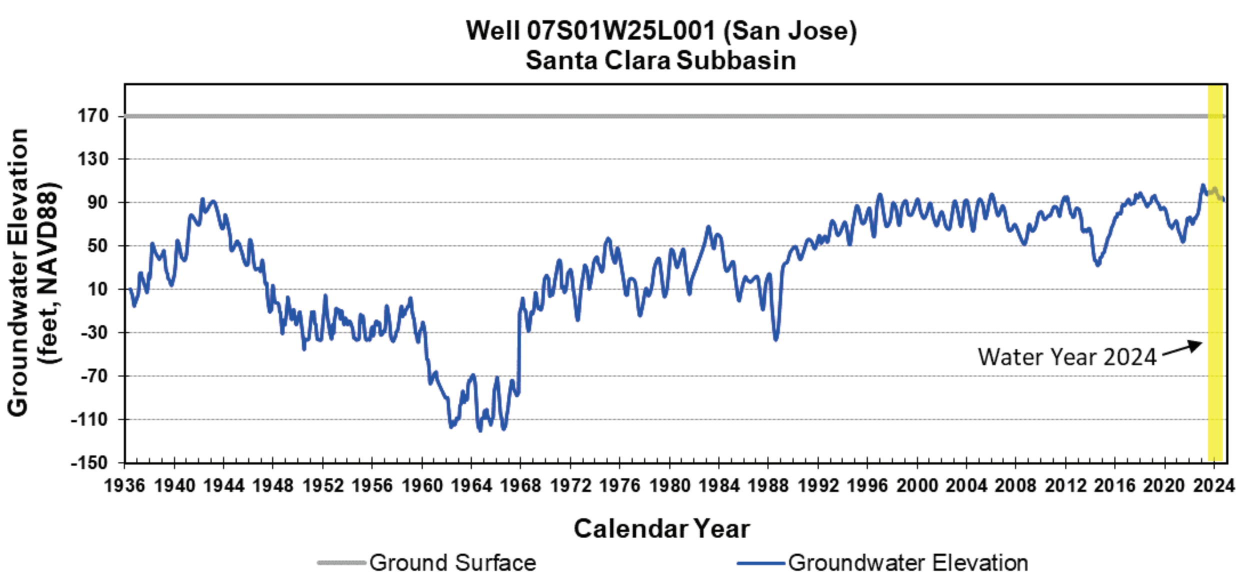
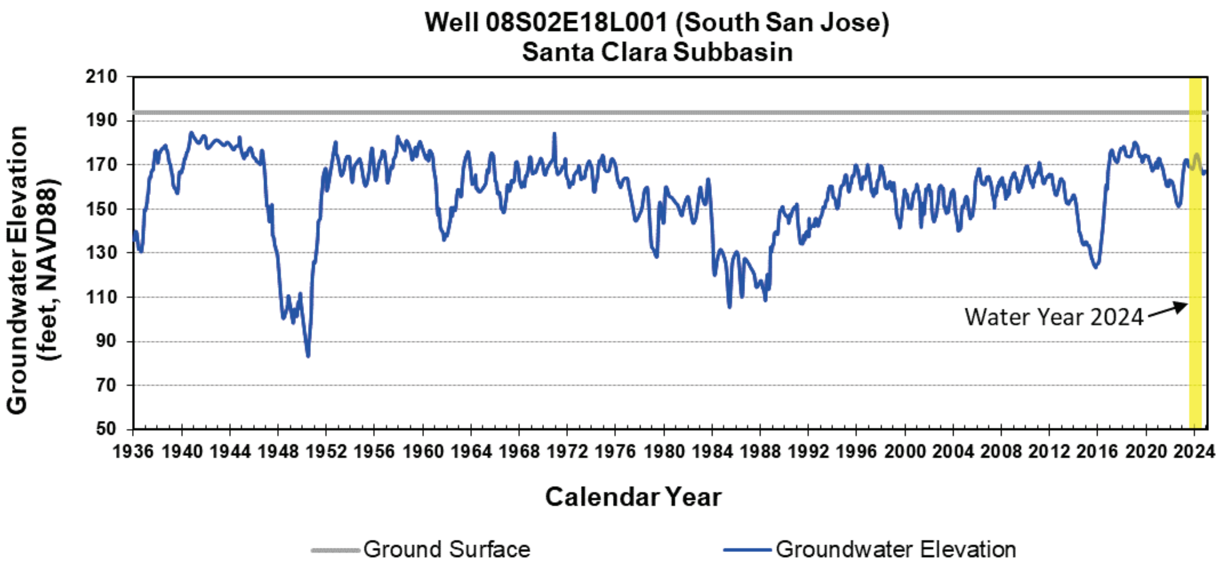


Figure 13. Hydrographs at Regional Groundwater Elevation Monitoring Wells (continued)



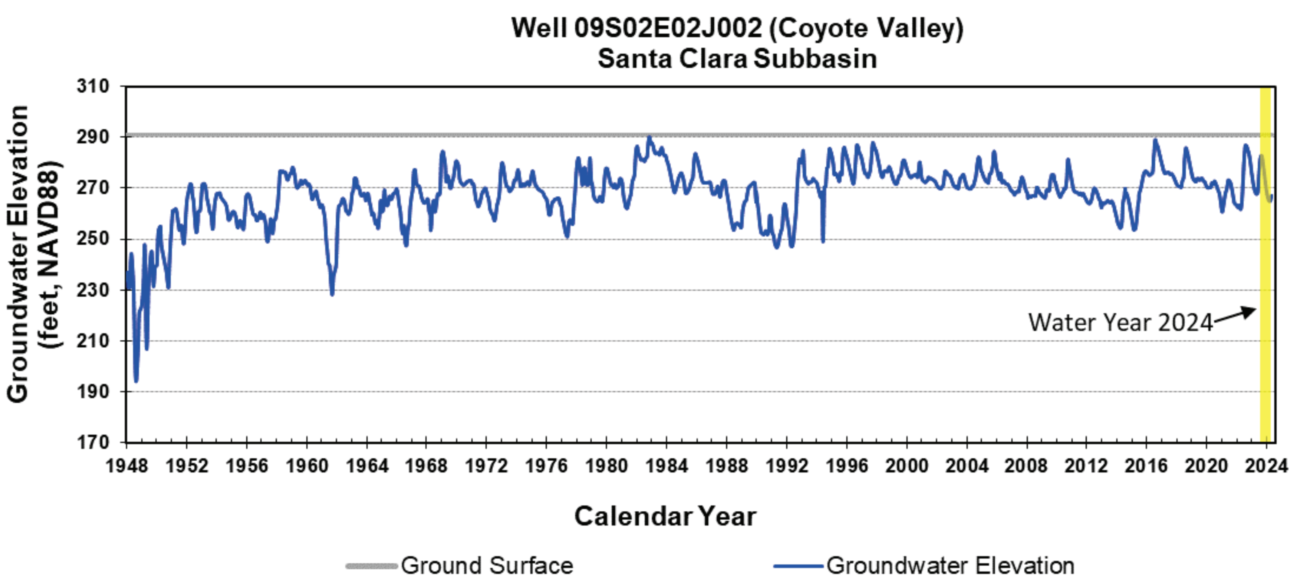
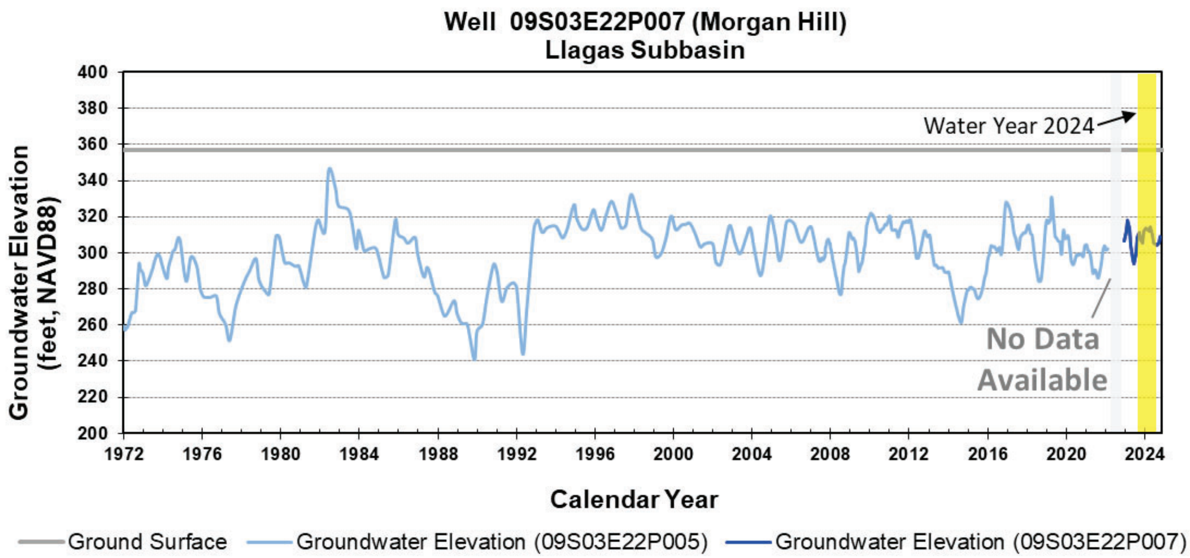


Figure 13. Hydrographs at Regional Groundwater Elevation Monitoring Wells (continued)



The Morgan Hill well was replaced in September 2022 with a nearby well with similar water level history.

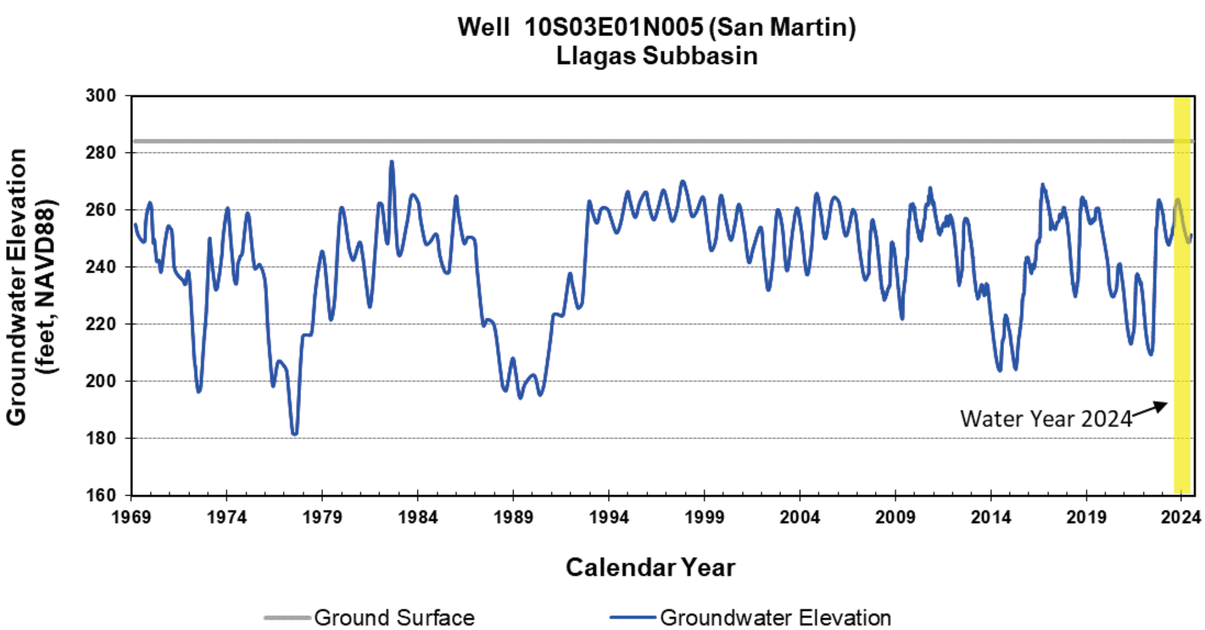
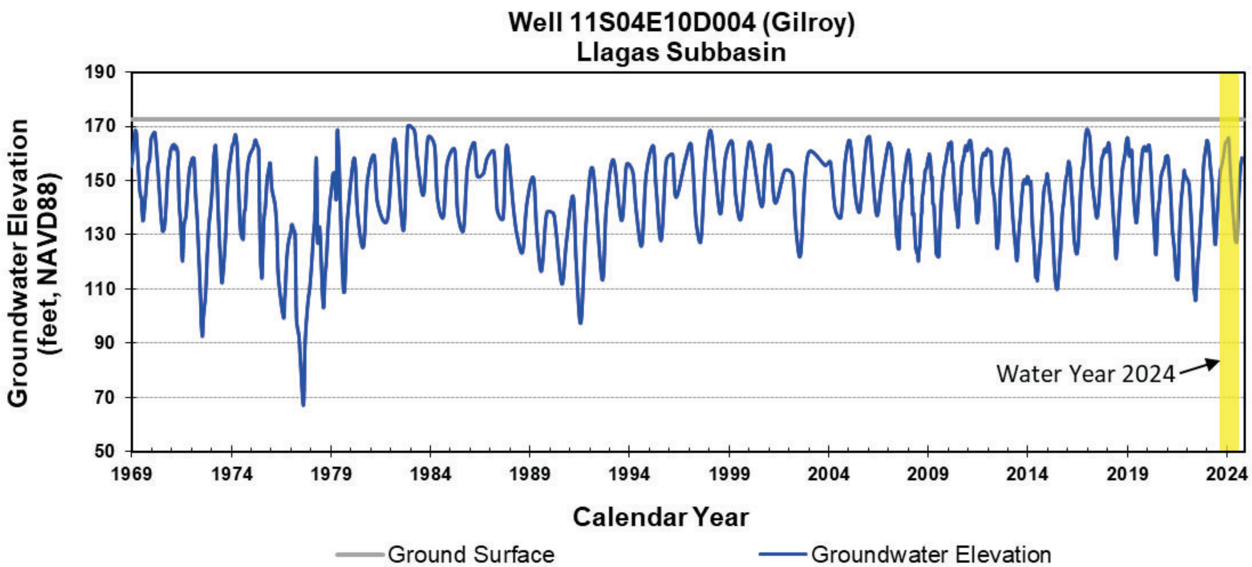


Figure 13. Hydrographs at Regional Groundwater Elevation Monitoring Wells (continued)



Valley Water uses three groundwater level index wells (Figures 12 and 13) to represent broad regional conditions in the Santa Clara Plain (well 07S01W25L001), Coyote Valley (well 09S02E02J002), and Llagas Subbasin (well 10S03E01N005). Table 7 shows March and September 2024 groundwater elevations for the three index wells since these months typically represent the seasonal high and low groundwater elevations, respectively. Compared to 2023, the 2024 average groundwater elevation was 4.6 feet higher in the Santa Clara Plain, 2.7 feet lower in the Coyote Valley, and 11.6 feet higher in the Llagas Subbasin. Groundwater elevations remained well above the 5-year average and period of record average. All available groundwater elevation and depth-to-water data can be accessed on Valley Water's website at https://gis.valleywater.org/Wells.html.

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Table 7. Groundwater Elevations at Regional Index Wells (feet, NAVD88)

Period	Santa Clara Subbasin		Llagas Subbasin (10S03E01N005)
	Santa Clara Plain (07S01W25L001)	Coyote Valley (09S02E02J002)	
March 2024	103.1	281.2	263.6
September 2024	95.0	266.2	250.8
2024 Average	99.2	273.1	255.8
2023 Average	94.6	275.8	244.2
5-Year Average (2020-2024)	81.9	271.3	240.1
Period of Record Average[1]	22.2	267.3	242.1

Notes:
[1] The period of record for the index wells begins in 1936 for the Santa Clara Plain, 1948 for the Coyote Valley, and 1969 for the Llagas Subbasin.

Groundwater elevation contour maps for the Santa Clara and Llagas subbasins with related measurement locations are presented in Figures 14 and 15 for Spring 2024 and Fall 2024, respectively. These contours represent the principal aquifer within each subbasin because those aquifers support the majority of pumping. Seasonal lows generally occur in September or October after dry summer conditions and increased pumping. Groundwater levels usually rise with the late fall and winter rains and reduced demands leading to seasonal high groundwater levels, which typically occur in March or April. The spring and fall maps (Figures 14 and 15) were created using the water level readings measured closest to March 31, 2024 and September 30, 2024, respectively.

In the Santa Clara Subbasin, the general groundwater flow direction is northwest from the Coyote Valley toward San Francisco Bay (Figures 14 and 15). Valley Water's managed recharge helps maintain adequate pressures in the principal aquifer zone such that groundwater flows toward the bay and maintains an upward vertical gradient near the bay. The upward gradient minimizes the potential for seawater intrusion into the principal aquifers. Artesian conditions occurred in some wells in the confined area of the Santa Clara Plain in 2024.

The highest groundwater elevations in the Llagas Subbasin are in the recharge area in Morgan Hill near Cochrane Road, and groundwater generally flows southeast toward the Pajaro River and San Benito County. Managed and natural recharge within the recharge area maintain groundwater pressures within the southern confined area in the Llagas Subbasin, where deeper groundwater occurs in partially to fully confined (artesian) conditions. Similar to the Santa Clara Plain, artesian pressures in the Llagas Subbasin were maintained during 2024 in wells that historically have artesian conditions.

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Figure 14. Spring 2024 Groundwater Elevation Contours in the Principal Aquifers

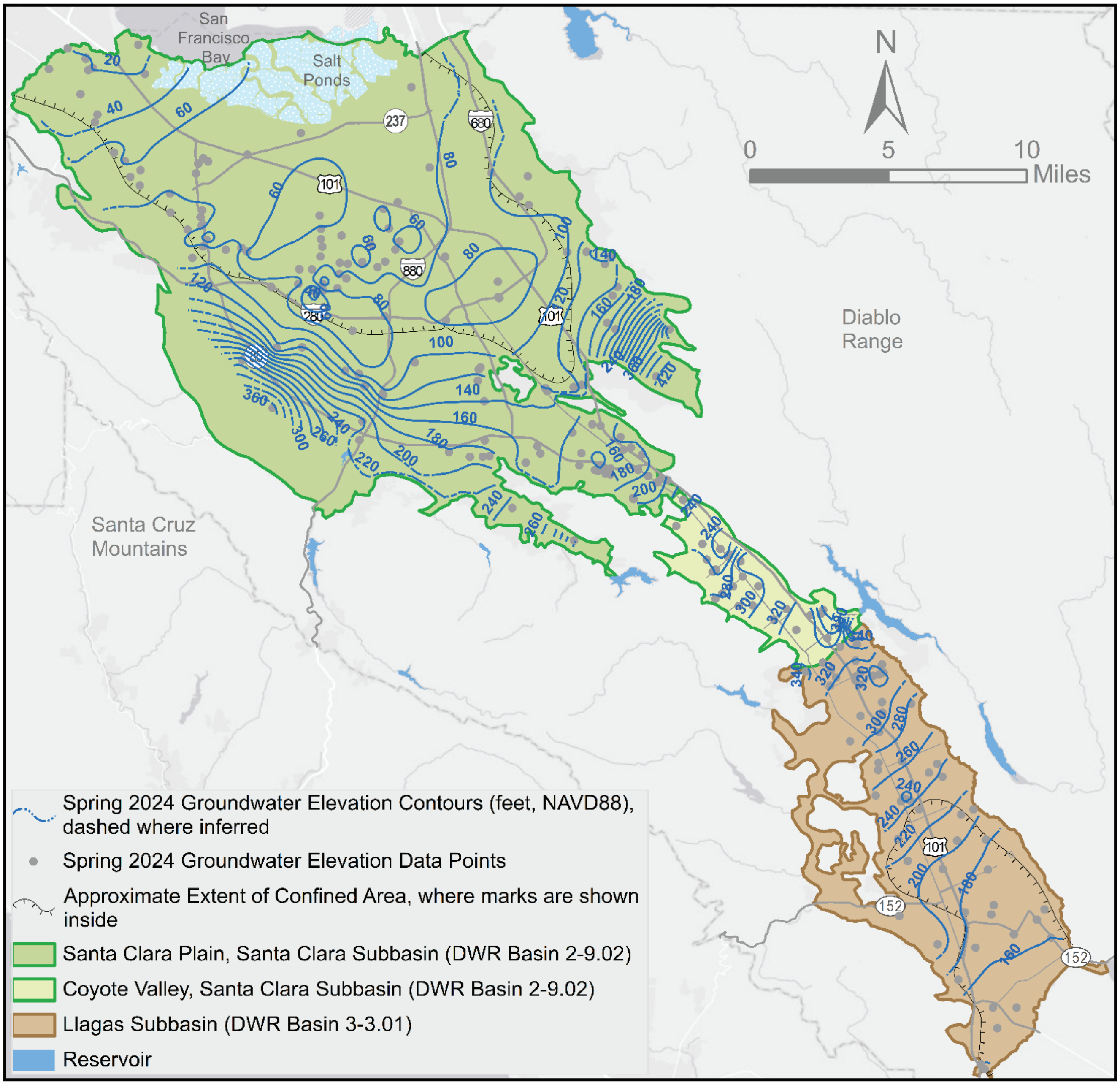

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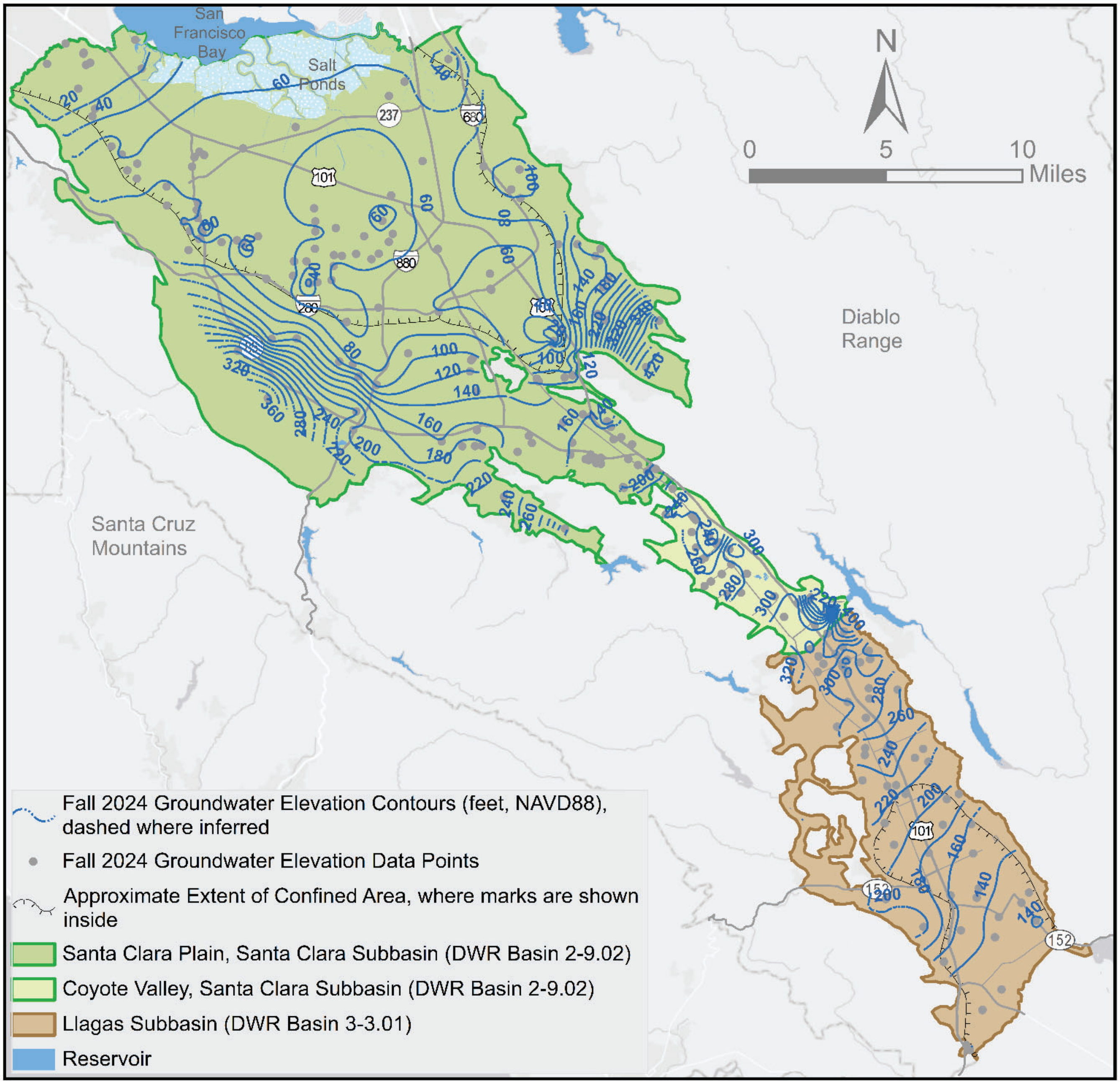
Figure 15. Fall 2024 Groundwater Elevation Contours in the Principal Aquifers



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3.2 Subsidence

Subsidence is a concern in the Santa Clara Plain due to historical occurrence that caused an increased risk of flooding, seawater intrusion, and damage to settlement-sensitive infrastructure and utilities. Between 1915 and 1969, land subsidence occurred due to groundwater overdraft, with up to 14 feet of permanent (inelastic) land subsidence observed in San Jose. Permanent subsidence was halted by about 1970 through Valley Water's expanded conjunctive water management programs that enabled the return of groundwater to levels above subsidence thresholds. Preventing resumed permanent subsidence is a key Valley Water focus.

In 2024, Valley Water monitored subsidence at 142 benchmarks along three cross valley land surface level circuits and at two extensometers. Groundwater levels at ten subsidence index wells were also monitored and compared to thresholds established at each well to minimize the risk of permanent land subsidence.

Elastic (non-permanent) subsidence and recovery occurs annually in response to seasonal pumping and recharge as indicated by satellite studies and extensometer measurements (Appendix A).[19] To avoid resumption of permanent subsidence, Valley Water has established subsidence thresholds at ten index wells in the Santa Clara Plain[20] based on a tolerable rate of 0.01 feet per year of subsidence.[21] Groundwater levels must be maintained above these thresholds to ensure a low risk of permanent land subsidence. Subsidence has not been observed in the Coyote Valley or the Llagas Subbasin, so there is no related outcome measure in those areas.

Valley Water conducts ongoing monitoring of benchmarks, extensometers, and subsidence index wells to determine if land subsidence is occurring or threatening to exceed established thresholds. Recent monitoring data indicate the subsidence outcome measure was met in 2024 and that there is a low risk of subsidence as described further below and in more detail in Appendix A.

3.2.1 Extensometer Monitoring

Valley Water monitors two 1,000-foot deep extensometers that measure aquifer compaction or expansion, respectively associated with subsidence or uplift, by comparing vertical ground elevation relative to a central, isolated pipe set beneath the water-bearing units. The extensometers, located in Sunnyvale near Moffett Field ("Sunny") and near downtown San Jose ("Martha"), are equipped with data loggers to provide hourly aquifer compaction/expansion and water level readings. Valley Water evaluates the average land subsidence measured during the last 11 years at two extensometers to determine if it meets the tolerable rate of land subsidence of 0.01 feet per year.

The 2024 subsidence values at Sunny and Martha are -0.018 feet (uplift) and -0.002 feet (uplift), respectively. Over the last 11 years (2014 to 2024), an average annual rate of -0.004 feet per year was

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[19] Schmidt, D. A., and R. Bürgmann, 2003, Time-dependent land uplift and subsidence in the Santa Clara valley, California, from a large interferometric synthetic aperture radar data set, *J. Geophysical Res., 108* (B9), 2003.

[20] Geoscience Support Services Inc. for Santa Clara Valley Water District, Subsidence Thresholds in the North County Area of Santa Clara Valley, 1991.

[21] The tolerable subsidence rate of no more than 0.01 feet per year on average was endorsed by Valley Water's Water Retailer Groundwater Subcommittee.

measured at the extensometers, which is indicative of land uplift (or aquifer expansion)[22].

3.2.2 Benchmark Elevation Surveys

Periodic benchmark surveys of land surface elevation have been conducted in Santa Clara County since 1912.[23] Valley Water's current benchmark leveling program consists of annual surveys along three cross valley level circuits in the Santa Clara Plain. In 2024, Valley Water analyzed land surface elevation data from 142 benchmarks to evaluate the spatial variability of land subsidence.

The 2024 survey data showed a trend of positive land surface elevation change (land uplift) from 2023 at most benchmarks, with only minor subsidence observed at one benchmark. Based on the average annual land surface elevation change along the three circuits over the last 11 years (2014 to 2024), most locations had uplift. All benchmarks but one had average annual change less than -0.01 feet/year[24].

3.2.3 Subsidence Index Wells

Groundwater level measurements are an integral part of land subsidence monitoring because declining water levels due to long-term overdraft were the driving force of historical subsidence in the Santa Clara Plain. Valley Water measures water levels at ten subsidence index wells on a daily to monthly basis. If water levels stay near or drop below subsidence thresholds for extended periods, permanent subsidence may resume, resulting in an increased risk of flooding, seawater intrusion, and damage to infrastructure and utilities.

The lowest historical water levels at the ten subsidence index wells were generally observed in the 1960s and 1970s. Since then, groundwater levels have recovered substantially to sustainable levels, primarily due to Valley Water's managed and in-lieu recharge programs. While groundwater levels generally decline during droughts, Valley Water has strong groundwater management programs in place to make sure water levels recover quickly after droughts.

The 2024 average groundwater elevation among the ten subsidence index wells was about 3 feet lower than 2023 (ranging from 23 feet lower to 8 feet higher) and about 115 feet higher than subsidence thresholds (ranging from 53 to 230 feet higher). Three subsidence index wells near the Baylands continue to have upward vertical gradients and artesian conditions. In addition to keeping water levels above subsidence thresholds, maintaining an upward hydraulic gradient in the principal aquifer zone is critical for preventing shallow groundwater with elevated salts from entering the principal aquifer through abandoned wells and other vertical conduits. Valley Water will continue to frequently track data from the subsidence index wells to support water supply operations and planning.

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[22] Unlike benchmarks (which have an opposite sign convention), negative values for extensometer measurements indicate aquifer expansion and positive values indicate aquifer compaction.

[23] USGS, Land Subsidence in the Santa Clara Valley, California as of 1982, Professional Paper 497-F, 1988.

[24] While the tolerable rate of 0.01 feet/year was used to establish the subsidence threshold water levels at the ten index wells and does not directly apply to benchmarks, the average change in benchmark land surface elevation is compared to the tolerable rate here to provide context.

CHAPTER 4 – GROUNDWATER QUALITY

This chapter presents water quality analysis for data collected from regional monitoring wells, domestic wells, public water systems, recycled water irrigation sites, and recharge monitoring sites. Data analysis includes evaluating long term water quality trends, drinking water and salt/nutrient management comparisons, extent of seawater intrusion, and Well Ordinance Program activities. All data in this chapter are for water year 2024 (October 1, 2023 to September 30, 2024) unless otherwise noted.

4.1 Regional Groundwater Quality Summary

Valley Water's regional groundwater quality monitoring network includes 63 monitoring wells and 23 domestic, municipal, and agricultural wells. These wells are sampled annually for 46 water quality parameters including major and minor ions, nutrients, and trace metals. Data from this consistent well network is supplemented with data from Valley Water's voluntary domestic well testing program (201 wells in 2024) and public water supply wells (251 wells in 2024). Data for the latter are collected by public water systems and reported to the State Water Resources Control Board Division of Drinking Water (DDW). All wells used to analyze regional groundwater quality in 2024 are shown in Figure 16.

Water quality results for water supply and monitoring wells with the median and range for each subbasin and aquifer zone[25] are summarized in Appendix C, with applicable drinking water standards provided for context[26]. Sample results indicate that groundwater in the Santa Clara and Llagas subbasins is generally of high quality, with the primary exceptions being nitrate and PFAS as discussed in subsequent sections.

Water quality indicators, ions, and trace elements were within the normal range expected in groundwater, except for nitrate. Elevated nitrate concentrations are primarily an issue in the Coyote Valley and Llagas Subbasin due to historic and ongoing sources including natural and/or synthetic fertilizers, septic systems, and animal enclosures. Median and trend information for nitrate and TDS, common water quality indicators, are discussed in Section 4.3

Twelve volatile organic compounds (VOCs) were detected in groundwater in 2024. However, none were confirmed to be present above drinking water standards, and maximum concentrations were typically well below the MCLs. VOCs occur primarily from industrial use of solvents and from leaking underground fuel tanks. No pesticides were detected in 2024 and there were no radioactive parameters analyzed in the Llagas Subbasin. Detailed results can be found in Appendix C.

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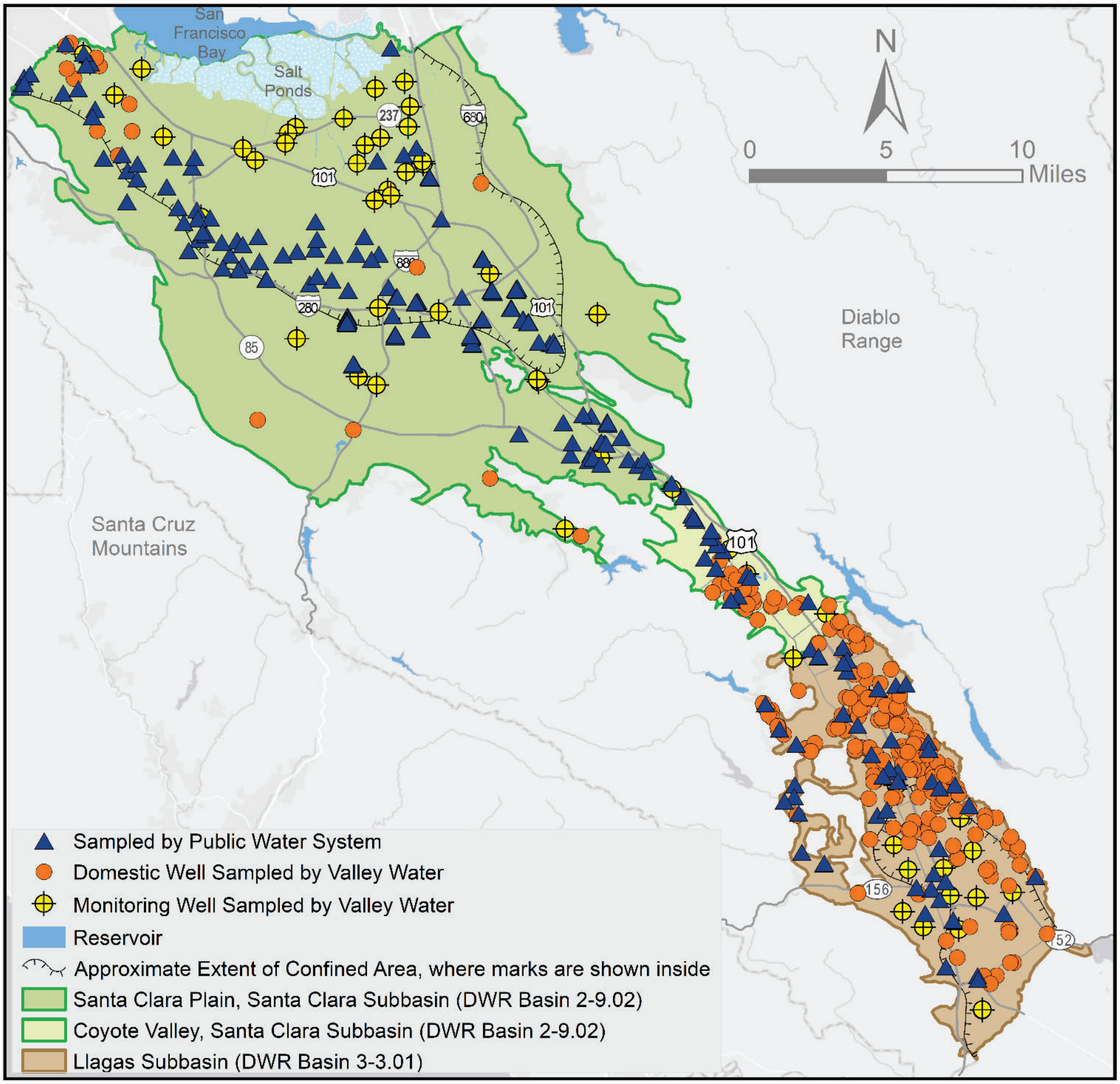
[25] Public water supply wells were assumed to represent the principal aquifer if no construction information was available, as these are typically deep wells.
[26] Note these summary tables do not include data from wells with elevated influence from San Francisco Bay water and that Table B-7 only includes data from water supply wells.

Figure 16. 2024 Groundwater Quality Wells



In 2024, several local water retailers tested their wells for PFAS: San Jose Water Company (SJWC) sampled 81 wells, the City of San Jose sampled five wells, California Water Service Company sampled 19 wells, the City of Palo Alto sampled seven wells, and the City of Gilroy sampled two wells. Valley Water continued to sample Campbell Well Field[27] Well C under a DDW PFAS Order. Valley Water also sampled PFAS at 28 domestic wells. Appendix C shows the locations of water supply wells sampled for PFAS in 2024 and includes related results, which are summarized in Section 4.2.

[27] The Campbell Well Field is a backup supply source and has never been used to deliver water to customers.

Valley Water continues to evaluate and analyze PFAS data from all sources including public water supply wells and Valley Water's voluntary sampling programs. Since October 2020, staff from Valley Water, San Jose Water Company, the San Francisco Bay Regional Water Quality Control Board, and DDW have met regularly to discuss regional PFAS conditions, including impacted water supply wells. Valley Water will continue to collaborate with water retailers and regulatory agencies to better understand PFAS occurrence, evaluate potential sources, and identify any actions that may be needed to protect local water supplies.

4.2 Water Supply Well Results Compared to Drinking Water Standards

Public water systems are required to meet all drinking water standards for water delivered to customers. While domestic wells are not subject to federal or state drinking water standards, related results are compared to those standards to provide a summary of groundwater quality in all water supply wells tested. For ease of reporting, any single result reported above an MCL is considered as an exceedance (i.e., not meeting drinking water standards). However, it is important to note that based on drinking water regulations and follow-up sampling, a single detection above an MCL in a public water system may not constitute a violation of a drinking water standard.

In 2024, 79% of all water supply wells tested, including public and private domestic wells, met all MCLs for all parameters tested. Parameters detected above MCLs include nitrate, nitrate + nitrite, PFOS, and PFOA. Figure 17 shows the locations of water supply wells tested in 2024 with sample results above an MCL.

For Santa Clara Subbasin water supply wells, the primary parameters detected above MCLs were PFOS and nitrate. PFOS was detected above the MCL in 15 Santa Clara Plain wells (Figure 17). Nitrate was present above the MCL in eight Coyote Valley wells. For Llagas Subbasin water supply wells, nitrate was above the MCL in 71 wells (30% of water supply wells tested). PFOA and/or PFOS were also detected above MCLs in six wells. Nitrate + nitrite was detected in one Coyote Valley well and two Llagas Subbasin wells.

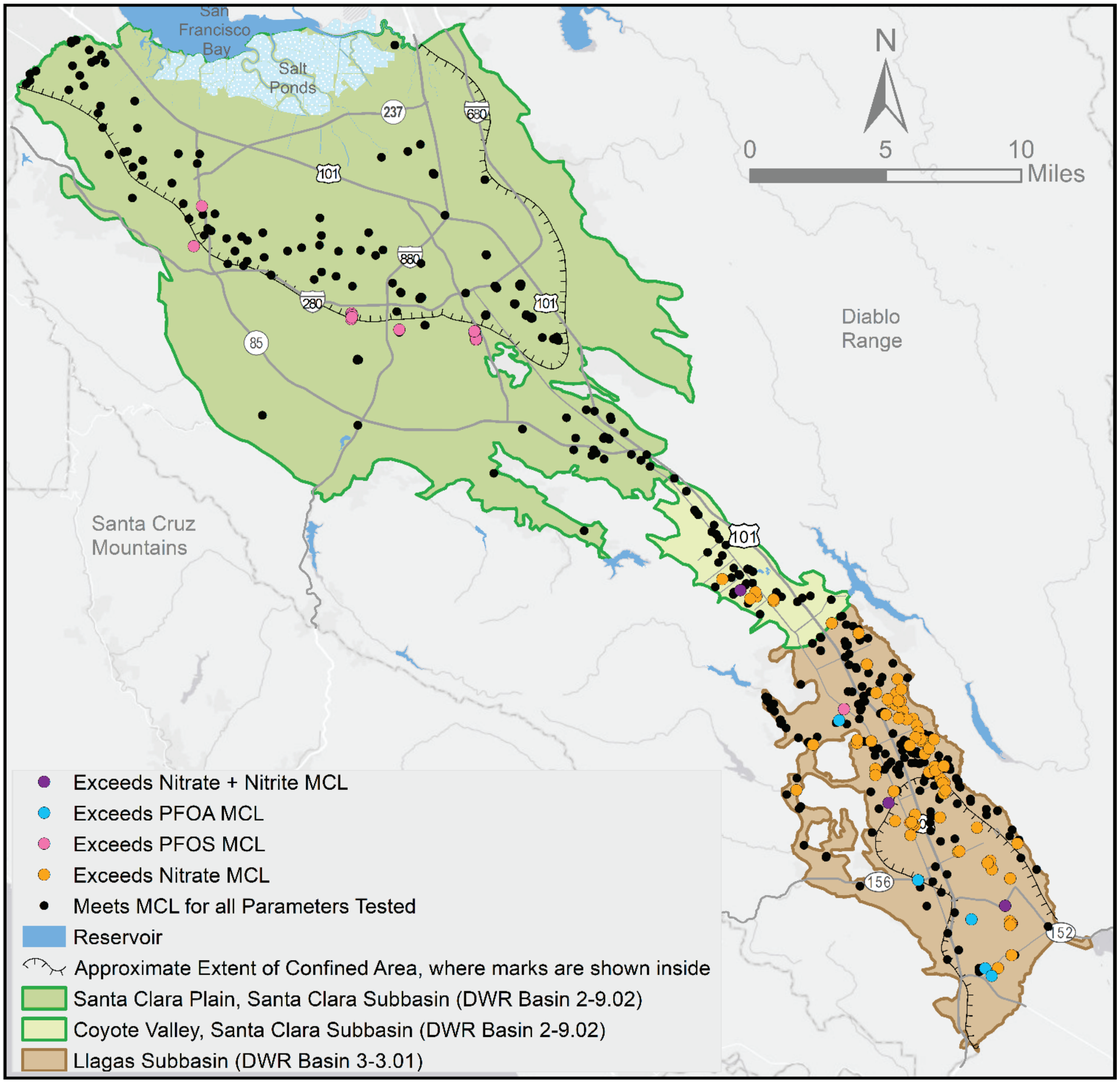
Nitrate continues to be the parameter most frequently detected above the MCL; in 2024, nitrate was present above the MCL in 18% of water supply wells tested countywide. Most detections were from private domestic wells sampled in Coyote Valley and the Llagas Subbasin that are not regulated by the state, but five wells were part of public water systems that must comply with all drinking water standards through further sampling, blending, and/or treatment. Based on communication with private well owners participating in Valley Water sampling programs, many use bottled water for drinking and cooking, or reverse osmosis treatment to reduce nitrate exposure. As described in section 4.3, nitrate trends in groundwater are generally stable or decreasing.

Most PFAS compounds analyzed were not detected in most water supply wells. Notable findings for PFAS with drinking water standards are summarized below, with detailed information in Appendix C.

- Perfluorohexane sulfonic acid (PFHxS) was detected at low levels in a number of wells, though none exceeded the 10 parts per trillion (ppt) MCL.
- Perfluorooctanoic acid (PFOA) was detected above the 4 ppt MCL in four domestic wells and one retailer well.
- PFOS was detected above the 4 ppt MCL in five domestic wells and 16 retailer wells. Thirteen of these wells are owned by a single retailer that has taken wells offline, notified customers, and is actively pursuing well head treatment.

- Perfluorononanoic acid (PFNA) was detected at low levels in a few wells, but no results exceeded the 10 ppt MCL.
- Hexafluoropropylene oxide dimer acid (HFPO-DA), or GenX, was not detected in any wells.

Figure 17. 2024 Water Supply Well Detections Above MCLs



Notes: For ease of reporting, any single result reported above an MCL is shown as an exceedance. However, based on drinking water regulations and follow-up sampling, a single detection above an MCL may not constitute a violation of a drinking water standard. Public water systems are required to meet all drinking water standards for water delivered to customers.

4.3 Nitrate and TDS Trends

To assess changes in groundwater quality over time, Valley Water evaluated nitrate and TDS concentrations for water supply wells in the Santa Clara and Llagas subbasins over a 15-year period (October 2010 – September 2024). Statistical trend tests were conducted for individual wells with at least five sample results for each parameter. Countywide, a total of 90% and 92% of the wells evaluated have stable or decreasing concentrations of nitrate and TDS, respectively (Table 8). Figures 18 and 19 also present information on nitrate and TDS trends.

In the Santa Clara Subbasin, stable or decreasing concentrations were observed in 90% and 93% of the wells evaluated for nitrate and TDS, respectively. In the Llagas Subbasin, stable or decreasing nitrate and TDS concentrations were noted in 91% of water supply wells for both parameters (Table 8).

While most wells have stable or decreasing long-term nitrate and TDS concentration trends, some increasing trends were observed and warrant further evaluation. Valley Water will assess the potential cause, continue to implement the Salt and Nutrient Management Plans, and engage with regulatory and/or land use agencies as needed.

Table 8. Nitrate and TDS Concentration Trends in Water Supply Wells (October 2010 – September 2024)

Subbasin	Parameter	2024 Median Concentration (mg/L)	Number of Wells Evaluated	Percent of Wells with Stable or Decreasing Concentrations	Percent of Wells with Increasing Concentrations
Santa Clara	Nitrate (as N)	2.3	228	90%	10%
	TDS	420	116	93%	7%
Llagas	Nitrate (as N)	5.2	182	91%	9%
	TDS	407	68	91%	9%
Santa Clara and Llagas	Nitrate (as N)	--	410	90%	10%
	TDS	--	184	92%	8%

Notes: The median concentrations are from water supply wells screened in the principal aquifers of the Santa Clara and Llagas subbasins.

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Figure 18. Nitrate Trends in Water Supply Wells (October 2010 – September 2024)

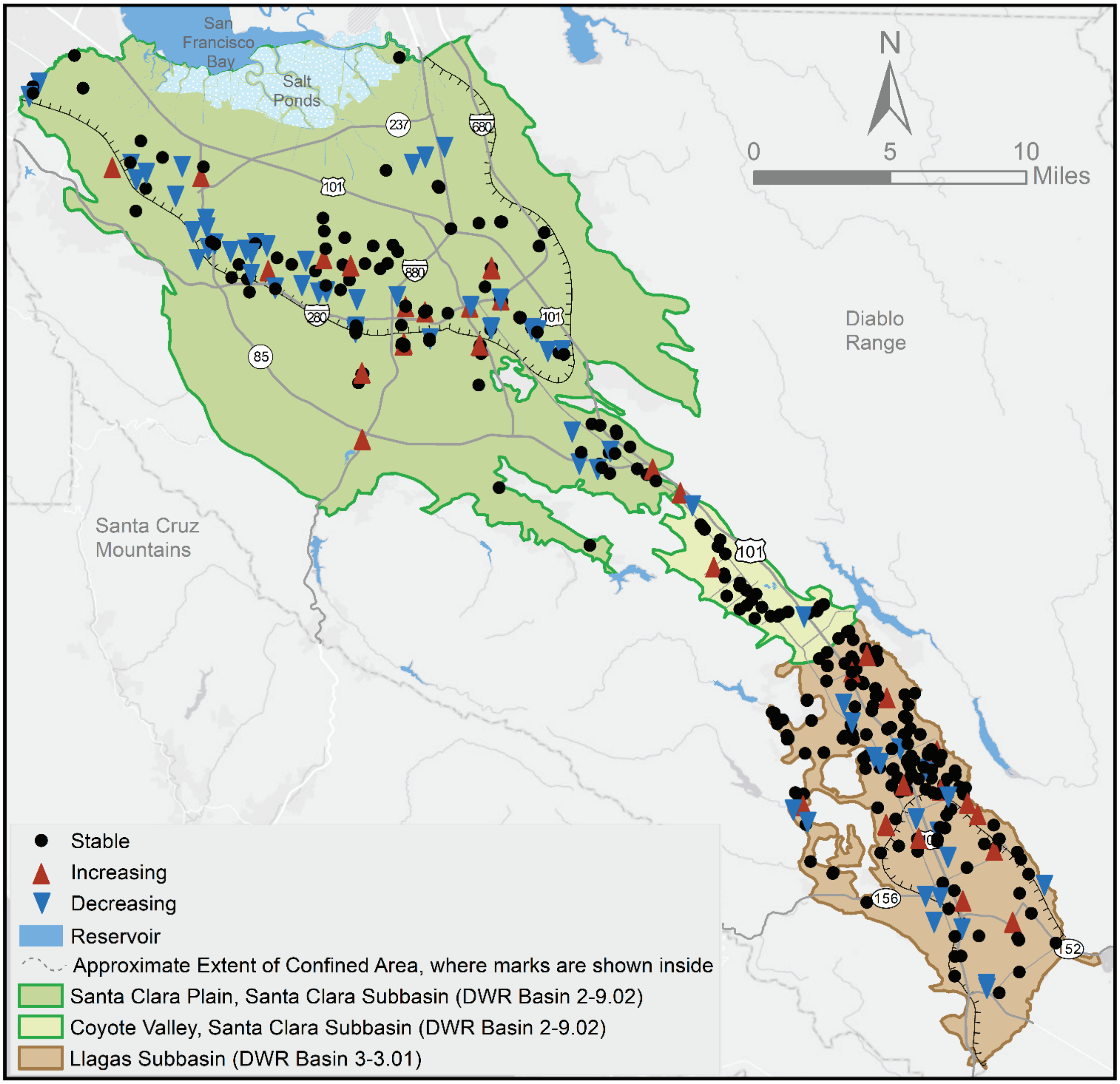

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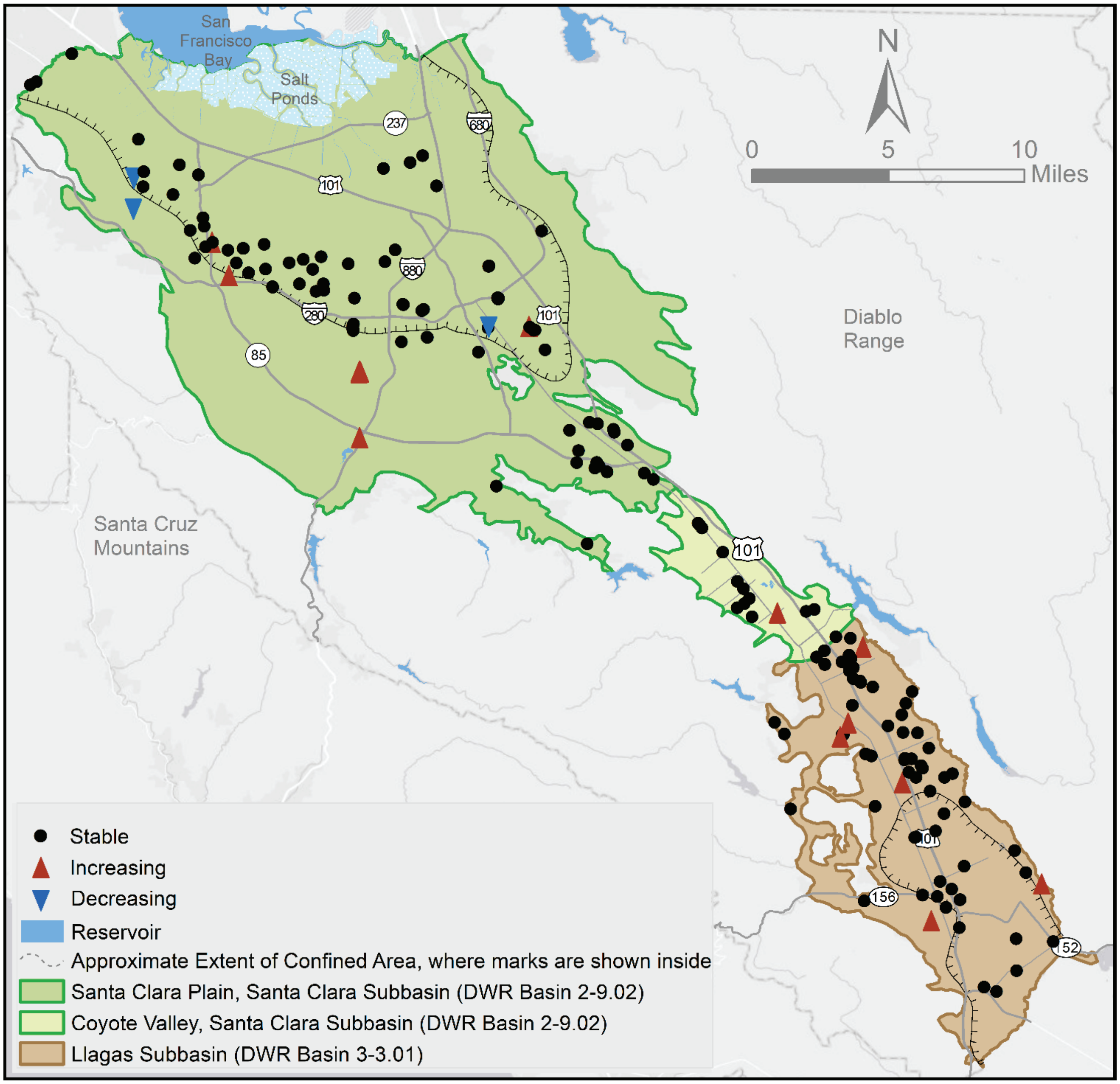
Figure 19. TDS Trends in Water Supply Wells (October 2010 – September 2024)



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4.4 Salt and Nutrient Management Plans

The State Board's 2009 Recycled Water Policy required the development of regional Salt and Nutrient Management Plans (SNMPs) to address current and future regional salt and nutrient loading to groundwater from all sources, including recycled water and agriculture. Valley Water completed separate SNMPs for the Santa Clara and Llagas subbasins by working with local stakeholders and regulators. The plans[28] include salt and nutrient source identification, loading, assimilative capacity estimates, recycled water projections, implementation measures, groundwater monitoring provisions, and an anti-degradation analysis. The San Francisco Bay Regional Water Quality Control Board adopted resolution R2-2016-0046 approving the Santa Clara Subbasin SNMP in November 2016. The Central Coast Regional Water Quality Control Board does not plan to endorse specific SNMPs. Both agencies will use these plans to evaluate future recycled water projects.

The SNMPs estimate and project long-term trends in concentrations of salts (using TDS) and nutrients (using nitrate) in groundwater through 2035. In general, the main sources for salt loading in the Santa Clara Plain by volume are landscape irrigation and managed recharge, followed by recycled water, whereas agricultural irrigation and managed recharge are the main contributors for the Llagas Subbasin. Table 9 compares the SNMP 2024 projections with the actual concentrations from samples collected in 2024.

Table 9. Comparison of 2024 Actual and Projected SNMP Median Concentrations

Subbasin	Groundwater Management Area or Aquifer Zone	2024 SNMP Projected Median[1]	2024 Actual Median[2]	2024 SNMP Projected Median	2024 Actual Median
		TDS (mg/L)		Nitrate as N (mg/L)	
Santa Clara[3]	Santa Clara Plain	441	420	2.2	2.3
	Coyote Valley	307	401	2.4	5.3
Llagas[4]	Shallow Zone	396	392	6.9	5.6
	Principal Zone	376	407	6.5	5.2

Notes:

[1] The projected medians for both subbasins are based on CY 2024 estimates from the SNMPs.

[2] The actual medians for both subbasins are based on WY 2024.

[3] The Santa Clara Subbasin SNMP does not project median concentrations separately for shallow and principal aquifer zones; the principal aquifer actual median is shown.

[4] The Llagas Subbasin SNMP projects separate medians for the northern and southern portions of the subbasin. The projected SNMP median shown is the average of these medians.

Measured median concentrations of TDS and nitrate generally correspond with SNMP projections except for TDS in Coyote Valley and the Llagas principal aquifer zone, which is slightly higher than projected. Also, measured median concentrations of nitrate in Coyote Valley are higher than the projected median. Discrepancies may be attributed to water quality changes due to recent land-use changes, interannual hydrologic variability between drought and wet years, and changes in the number of results or wells sampled.

[28] https://www.valleywater.org/your-water/where-your-water-comes-from/groundwater/groundwater-studies

Both projected and actual medians remain below water quality thresholds established in the Regional Water Quality Control Board's Basin Plans that cover the Santa Clara and Llagas subbasins. As shown in Table 8 and Figures 18 and 19, regional long-term trends for both TDS and nitrate are generally stable or decreasing in both subbasins. Valley Water will continue to evaluate measured and projected TDS and nitrate concentrations to better understand the causes for fluctuations and effects on shallow and principal groundwater aquifers.

4.5 Seawater Intrusion

Seawater intrusion refers to the temporary or permanent flux of seawater into coastal freshwater aquifers. Seawater intrusion is a groundwater management concern because it can degrade groundwater quality and, if severe enough, could limit groundwater as a water supply for beneficial uses, or degrade groundwater dependent ecosystems or infrastructure.

Seawater intrusion in the shallow aquifer zone of the Santa Clara Plain is largely attributed to flow of water from San Francisco Bay (Bay) into the tidal reaches of creeks and subsequent transport to shallow groundwater through streambed percolation. Historical land subsidence exacerbated seawater intrusion by decreasing the land surface elevation adjacent to the Bay, causing further inland movement of bay water along tidal creeks. The degree of seawater intrusion in the shallow aquifer zone is assessed by the chloride concentration in groundwater monitoring wells within the Baylands area surrounding the southern Bay. Valley Water uses a chloride concentration of 100 mg/L to indicate the first sign of influence from seawater (Figure 20). This is a conservative threshold, since the aesthetic-based secondary MCL for chloride is 250 mg/L.

Wells with chloride over 100 mg/L are in a relatively narrow band adjacent to the former salt evaporation ponds and bordering Guadalupe River, Coyote Creek, and other streams where inland tidal flow occurs (Figure 20). Some localized areas immediately adjacent to the Bay may have a direct subsurface connection with Bay water. However, the leakance of seawater beneath tidal stream flow has a greater influence on the spatial extent of the 100 mg/L chloride isocontour and is likely the source for elevated chloride concentrations at many wells shown in Figure 20. However, the well with a chloride concentration of 28,100 mg/L is likely from connate water trapped from the geologic past or an evapoconcentrated source of chloride.

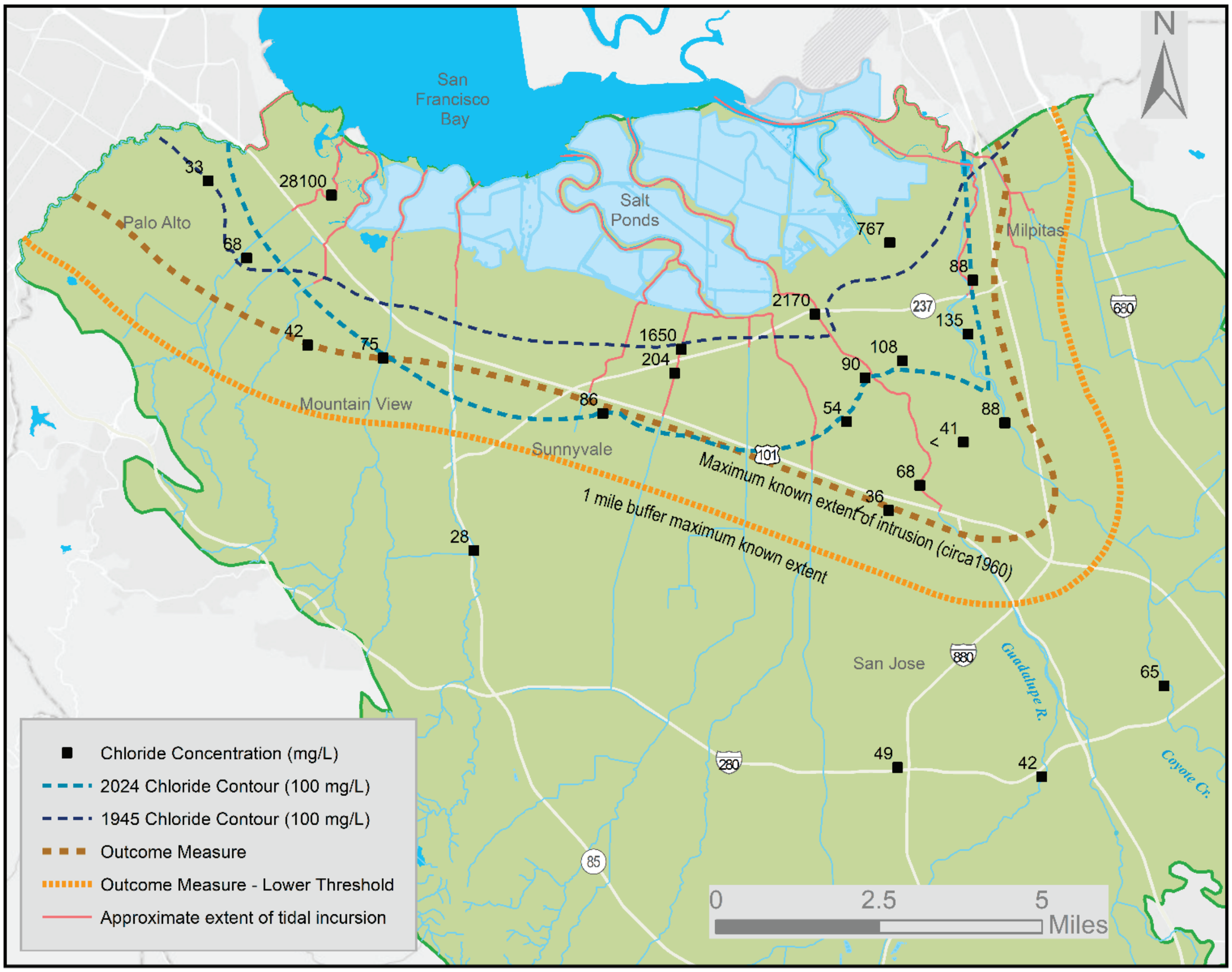
Few wells in the principal aquifer zone have highly elevated TDS or chloride concentrations. Historically, the classic case of seawater intrusion has affected only localized areas of the shallow aquifer zone beneath and immediately adjacent to the Bay and salt ponds, and thus is a minimal threat to the principal aquifer zone, which is protected by the regional aquitard[29]. Beneath most areas where the shallow aquifer zone 100 mg/L chloride isocontour is mapped, chloride in the principal aquifer zone is relatively low at depth. The relatively minor intrusion into the deeper, principal aquifer zone is believed to be due to some classic seawater intrusion and inter-aquifer transfer through improperly destroyed wells when the vertical hydraulic gradient is downward.[30] At isolated locations in Palo Alto and southeast San Jose, the source of elevated TDS and chloride in deeper wells has been attributed to connate water (Figure 20), rather than recent seawater intrusion. Presently, the monitoring network in the Baylands area has limited coverage of the principal aquifer zone. As recommended in the 2021

[29] Described in Valley Water's 2021 Groundwater Management Plan, Appendix H.
[30] Vertical gradients in the Baylands area where seawater interaction occurs have been upward for the last 20 years (approximately).

GWMP, Valley Water is exploring new monitoring sites in the shallow and principal aquifer zones to improve monitoring of seawater intrusion and vertical gradients across aquifer systems.

There are no seawater bodies near the Llagas Subbasin. Therefore, the subbasin is not vulnerable to seawater intrusion and no seawater intrusion has been observed.

Figure 20. Groundwater and Seawater Interaction in the Santa Clara Plain Shallow Aquifer



Notes: The well with connate water (trapped from the geologic past) and chloride concentration of 28,100 mg/L is included in the figure but omitted from isocontour calculations.

4.6 Recharge Water Quality

In accordance with the 2021 GWMP, Valley Water samples facilities within each managed recharge system approximately every three years (depending on Valley Water recharge operations). Most recharge facilities (percolation ponds and managed reaches of creeks) can receive a combination of local and imported surface water, with the proportion varying depending on hydrologic conditions and recharge operations. Recharge monitoring typically occurs in the summer to best characterize the water quality of water used for managed recharge operations and minimize effects from natural winter flows. In 2024, Valley Water monitored five recharge facilities in the Lower Llagas and Penitencia recharge systems (Table 10 and Figure 21).

Basic water quality parameters were analyzed, including major and minor inorganics, anions, nutrients, TDS, total alkalinity, and field parameters (e.g., pH, dissolved oxygen, temperature). Organic parameters (e.g., herbicides, pesticides, and disinfection byproducts) were monitored at recharge facilities located near potentially contaminating activities such as industrial areas and highways. PFAS was also analyzed as Valley Water works to complete reconnaissance sampling of all recharge systems. Summary statistics are presented in Appendix D.

Although managed recharge water is not used for direct consumption, comparing it to drinking water standards provides context for results. No parameters were detected above health-based drinking water standards in any sample, except for three PFAS (PFOA, PFOS, and PFHxS), which were detected in one of the recharge locations tested (Appendix D, Table D-3). With the exception of PFAS in the Overfelt Pond[31], no organic parameters were detected at any of the other facilities tested. As shown in Appendix D, for the parameters tested, recharge water quality is generally of equal or better quality than receiving water (local groundwater).

Table 10. 2024 Recharge Water Quality Sampling Locations

Recharge System	Facilities Sampled in 2024
Lower Llagas (Sampled in July)	• Llagas Creek: Murphy Ave and Church Ave in San Martin • Uvas Creek: Grenache Way and Santa Teresa Blvd in Gilroy • Uvas Creek: Highway 152 and Burchell Rd in Gilroy
Penitencia (Sampled in July)	• Penitencia (Gross) Pond: Penitencia Creek Rd and Linda Vista St in San Jose • Overfelt Pond A: McKee Rd and Ludlow Way in San Jose

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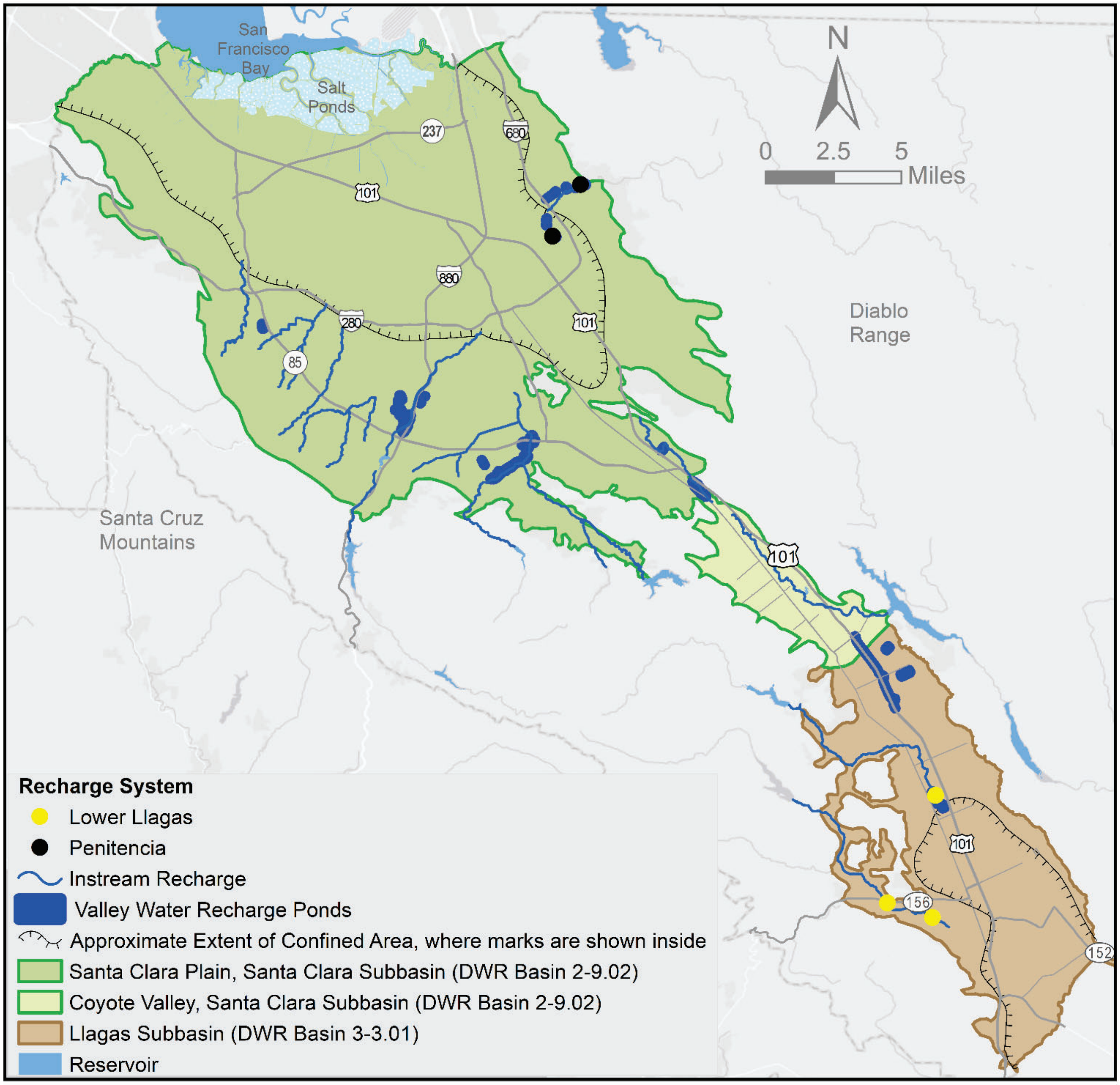
[31] The Overfelt Ponds have not been used for managed recharge operations since 2016.

Figure 21. Location of 2024 Sampling Sites in the Coyote and West Side Recharge Systems



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4.7 Monitoring Near Recycled Water Irrigation Sites

To ensure groundwater resources remain protected as recycled water use expands, Valley Water samples 20 monitoring wells and two turnouts at several irrigation sites in the Llagas Subbasin where recycled water is provided by the South County Regional Wastewater Authority (SCRWA). Valley Water also receives groundwater data from South Bay Water Recycling (SBWR), which monitors groundwater at up to 11 wells near sites irrigated with recycled water in the Santa Clara Plain.

In general, low concentrations of several water quality parameters related to recycled water have been detected near recycled water irrigation sites but not at levels that warrant a recommendation to modify recycled water use.[32] Summary statistics are presented in Appendix C.

For the Santa Clara Plain wells (Figure 22), most parameters show stable or decreasing trends over time. It is unclear whether recycled water irrigation is the cause of the increasing trends for chloride seen in a few wells since historical data suggest the changes pre-date recycled water irrigation in the area.[33] Past geochemical analyses indicate most of the deep wells have an ionic composition more similar to ambient groundwater than to recycled water. Past geochemical analyses of the shallow wells are inconclusive and suggest that multiple geochemical processes are in place, including the possibility of recycled water mixing with groundwater.

In the Llagas Subbasin wells (Figure 23), most parameters show stable or decreasing long-term concentration trends for the majority of the wells sampled. Some wells with increasing trends are located at the SCRWA facility and may be influenced by secondary effluent from the settling ponds, recycled water irrigation, or both. The remainder of the wells with increasing trends are mostly newer wells that may need time to reach steady-state concentrations. Additionally, some of these wells have been dry at times during the droughts of the past five to seven years and the role of flushing after periods of drought may have influenced concentration trends. Past geochemical analyses indicate that, except for the three shallow wells at the SCRWA facility[34], groundwater from all other wells (including the deep well at the SCRWA facility) has an ionic composition more like ambient groundwater than recycled water.

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[32] These results are correlative though not necessarily causative; hence, other sources besides recycled water may play a role in the detection of these parameters.

[33] Based on historical data from SBWR, summarized in the 2018 Annual Groundwater Report.

[34] The three shallow wells at SCRWA have an ionic composition more like recycled water than ambient groundwater.

Figure 22. Groundwater Monitoring Near Santa Clara Plain Recycled Water Irrigation Sites

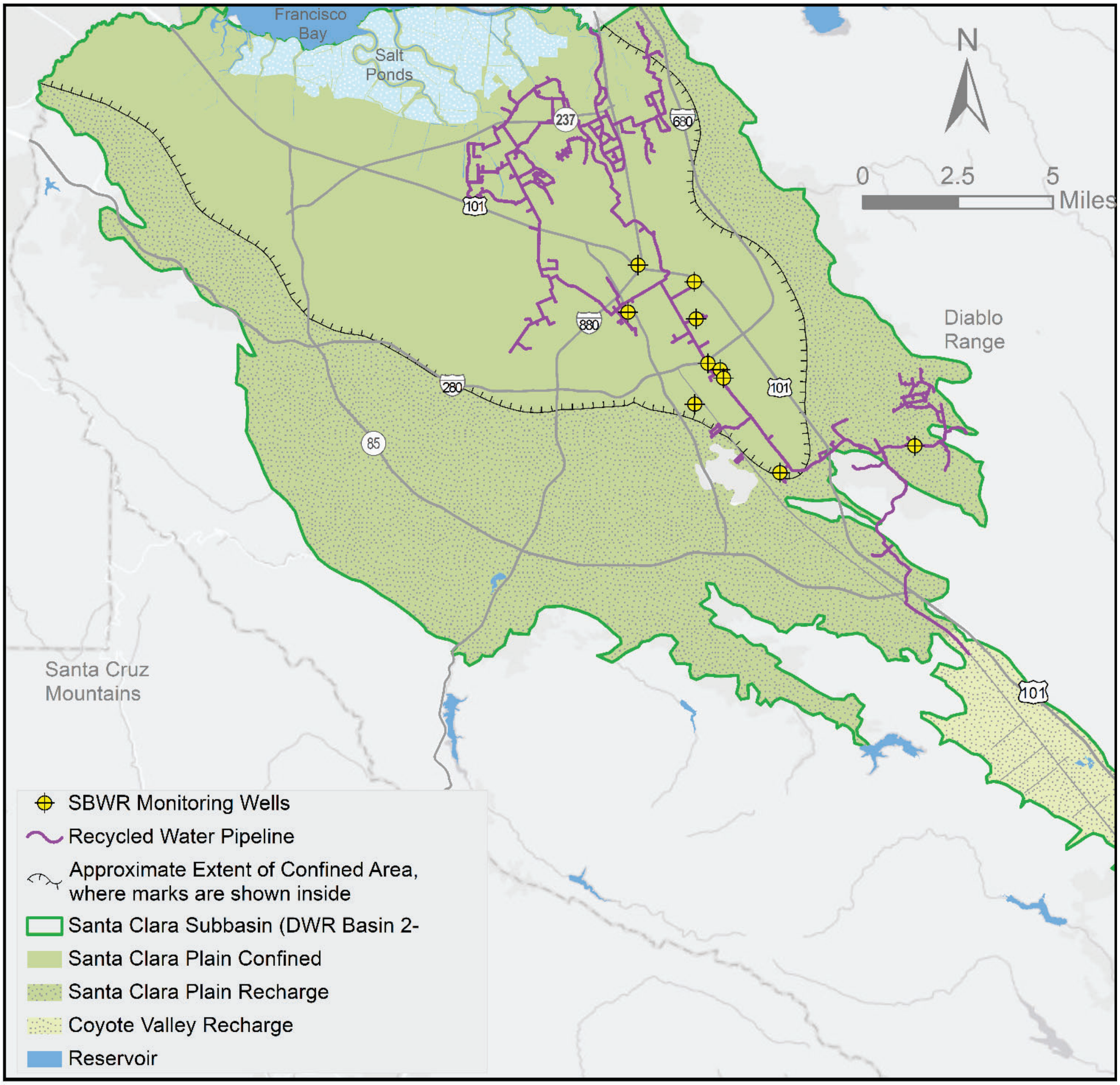

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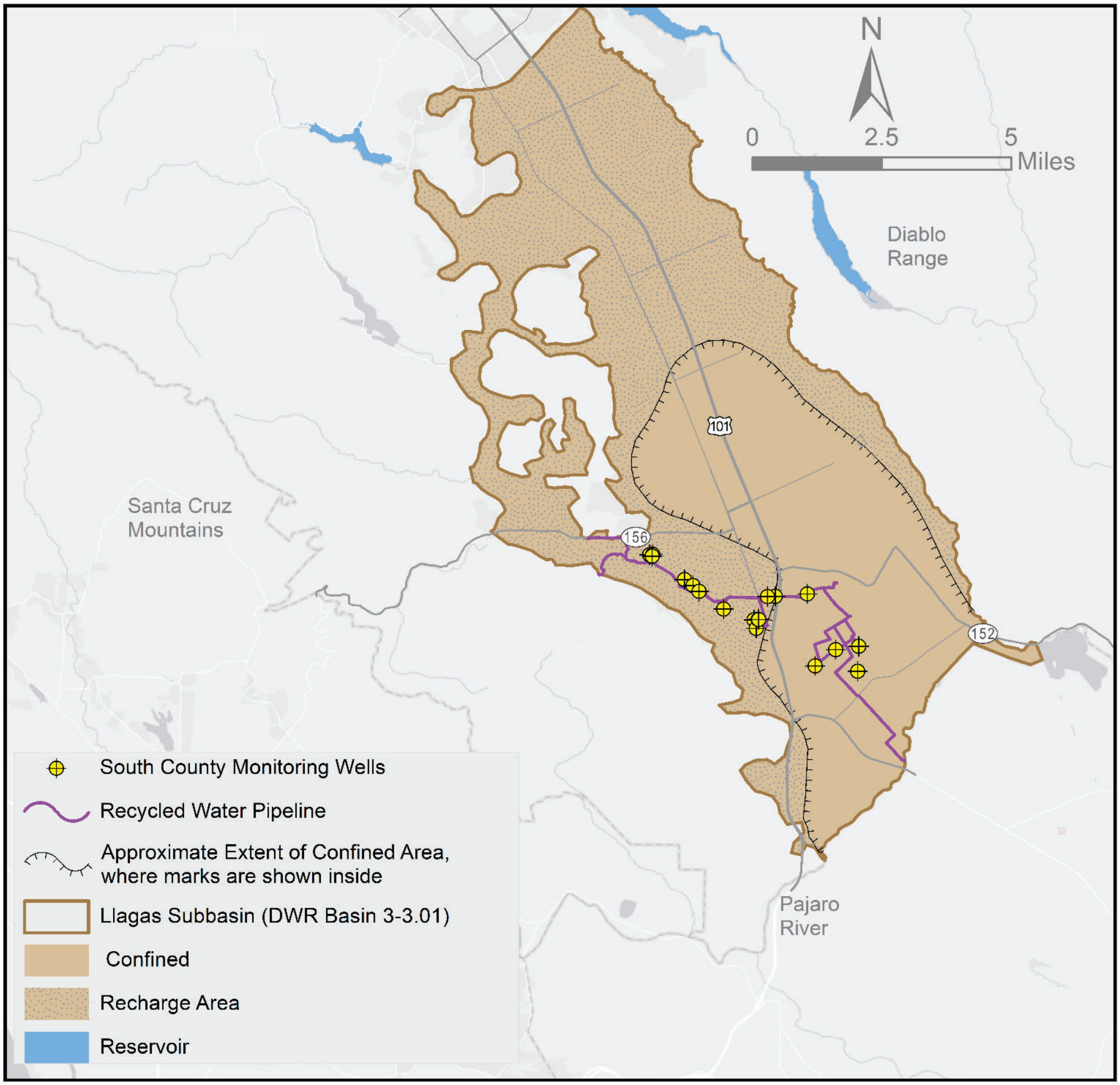
Figure 23. Groundwater Monitoring Near Llagas Subbasin Recycled Water Irrigation Sites



4.8 Contaminant Release Sites

There are 441 open cases in Santa Cara County where non-fuel contaminants have been released to soil and groundwater. Nearly 300 of these sites are in the site assessment or remediation phase as shown in Table 11. These cases are overseen by the EPA, California Department of Toxic Substances Control (DTSC), and the Central Coast and San Francisco Bay Regional Water Quality Control Boards (Water Boards). There are 42 open fuel leak cases overseen by the Santa Clara County Department of Environmental Health (DEH), 26 of which are in the site assessment or remediation phase. Additionally, there are 21 active Superfund sites overseen by the EPA. These sites are designated as active on the EPA's National Priorities List (NPL).

Table 11. 2024 Summary of Contaminant Release Sites

Site Type	Number of Sites
Non-Fuel Contaminated	
Site Assessment	146
Site Assessment and Interim Remediation	52
Remediation	91
Verification Monitoring	60
Long-Term Management	18
Open-Inactive	67
Eligible for Closure	7
Total	**441**
Fuel Leak	
Site Assessment	14
Site Assessment and Interim Remediation	6
Remediation	6
Verification Monitoring	11
Eligible for Closure	5
Total	**42**
Superfund	
EPA National Priorities List (NPL) Sites	21
Total	**21**

Notes: The number and status of regulated contaminant release sites are current as of December 2024, but are subject to change. For the most up-to-date totals or information on individual cleanup sites, refer to the State Water Resources Control Board's GeoTracker database and/or the EPA's National Priorities List.

Although there have been limited impacts to principal drinking water aquifers from these cases, contaminant releases pose an ongoing threat to groundwater quality. In 2024, 12 water supply wells had low-level detections of 15 different VOCs.[35] All concentrations were below established regulatory thresholds, as summarized in Appendix C. Additionally, 10 different PFAS compounds were detected in 86 water supply wells; in 26 of these wells, PFAS were detected above drinking water standards. The interconnection between contaminant releases and drinking water supply wells underscores the importance of the ongoing work by the Water Boards, DTSC, EPA, and other regulatory agencies to ensure that contaminant release sites are properly characterized and remediated.

[35] None of the wells with VOC detections had all compounds detected; typically, just one or a few related compounds were detected in a single well.

Valley Water engages with regulatory agencies on certain contaminant release cases based on groundwater vulnerability, proximity or impacts to water supply wells or surface water, and contaminant concentration by reviewing monitoring and progress reports, regulatory orders, and correspondences submitted to regulatory agencies. Valley Water engages in various meetings for these higher-threat cases, advocates for expedited cleanup through collaboration with regulatory agencies, provides technical review of other contaminant release sites when requested by regulatory agencies, and shares groundwater data to support their work.

4.9 Well Ordinance Program

Valley Water's well ordinance program helps ensure wells and other deep excavations are properly constructed, maintained, and destroyed to prevent vertical transport of contaminants into deep drinking water aquifers. Over 800 permits were issued in 2024 for well construction, well destruction, and exploratory borings (Table 12).

Table 12. 2024 Valley Water Well Permit Summary

Permit Type	Number Processed		
	Santa Clara Subbasin		Llagas Subbasin
	Santa Clara Plain	Coyote Valley	
Well Construction - Water Producing Wells	15	2	36
Well Construction – Other Wells[1]	271	6	3
Well Destruction	446	1	32
Exploratory Boring[2]	130	3	6
Total	**862**	**12**	**77**

Notes:

[1] Includes all forms of environmental monitoring and remediation wells, such as geotechnical wells and inclinometers, cathodic protection wells, and heat exchange wells. Excludes groundwater extraction wells.

[2] Multiple exploratory borings may be advanced under one exploratory boring permit.

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CHAPTER 5 – GROUNDWATER MANAGEMENT PLAN IMPLEMENTATION

This chapter summarizes the status of Valley Water's GWMP implementation, including outcome measure performance, recommendations, and SGMA compliance.

5.1 Outcome Measure Performance and Action Plan

The GWMP identifies outcome measures to assess performance relative to Board policy and groundwater sustainability goals. The status based on 2024 data is shown below (Tables 13 and 14), with related actions to address measures not being met. Tables 13 and 14 are presented for WY 2024, unless otherwise noted. For example, water supply operational decisions and planning by Valley Water are done on a calendar year basis so related storage metrics are presented on that basis.

Table 13 Summary of 2024 Groundwater Supply Outcome Measure Performance

Sustainability Indicator	GWMP Outcome Measure	Outcome Measure – Lower Threshold
Groundwater Storage (Countywide)	Projected end of year groundwater storage is greater than 278,000 AF in the Santa Clara Plain, 5,000 AF in the Coyote Valley, and 17,000 AF in the Llagas Subbasin.	Projected end of year countywide groundwater storage is greater than Stage 5 (150,000 AF) of the Water Shortage Contingency Plan.
2024 Result	**Outcome measure met**: End of CY 2024 groundwater storage is 380,800 AF, 7,000 AF, and 25,900 AF in the Santa Clara Plain, Coyote Valley, and Llagas Subbasin, respectively.[1] The outcome measure is met for all groundwater management areas.	**Lower threshold not exceeded**: Countywide groundwater storage at the end of CY 2024 was 413,700 AF, well above the lower threshold.[2]
Subsidence (Santa Clara Subbasin only)	Groundwater levels are above subsidence thresholds at the Santa Clara Subbasin subsidence index wells.	Groundwater levels are above the historical low water levels at the majority of the Santa Clara Subbasin subsidence index wells.
2024 Result	**Outcome measure met**: Groundwater levels were far above subsidence thresholds at all ten subsidence index wells.	**Lower threshold not exceeded**: Groundwater levels were far above their historic lows at all ten subsidence index wells.

Notes:
[1] End of WY 2024 groundwater storage is 375,800 AF, 8,100 AF, and 25,100 AF in the Santa Clara Plain, Coyote Valley, and Llagas Subbasin, respectively.
[2] Countywide groundwater storage at the end of WY 2024 was 409,000 AF.

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Table 14. Summary of 2024 Groundwater Quality Outcome Measure Performance

Sustainability Indicator	GWMP Outcome Measure	Outcome Measure – Lower Threshold
Groundwater Quality (Santa Clara Subbasin)	For Santa Clara Subbasin water supply wells, at least 95% meet primary drinking water standards, and at least 90% have stable or decreasing trends for TDS.	At least 70% of water supply wells have stable or decreasing trends for nitrate and TDS.
2024 Result	**Outcome measure partially met:** 90% of wells tested met all primary drinking water standards (below 95% target). 93% of wells had stable or decreasing trends for TDS (above 90% target). **Action plan:** Continue to monitor, assess potential causes, implement the Salt and Nutrient Management Plan, and engage with regulatory, land use, and retail water agencies as needed.	**Lower threshold not exceeded**: Stable or decreasing nitrate and TDS trends were observed in 90% and 93% of water supply wells, respectively.
Groundwater Quality (Llagas Subbasin)	For Llagas Subbasin water supply wells, at least 95% meet primary drinking water standards, and at least 90% have stable or decreasing trends for TDS.	At least 70% of water supply wells have stable or decreasing trends for nitrate and TDS.
2024 Result	**Outcome measure partially met:** 68% of water supply wells tested met all primary drinking water standards (below 95% target). 91% had stable or decreasing trends for TDS (met 90% target). **Action plan:** Continue to monitor, assess potential causes, implement the Salt and Nutrient Management Plan, and engage with regulatory, land use, and retail water agencies as needed.	**Lower threshold not exceeded**: Stable or decreasing nitrate and TDS trends were observed in 91% and 91% of water supply wells, respectively.
Seawater Intrusion (Santa Clara Subbasin only)	In the Santa Clara Subbasin shallow aquifer, the 100 mg/L chloride isocontour area is less than the historical maximum extent area (57 square miles).	In the Santa Clara Subbasin shallow aquifer, the 100 mg/L chloride isocontour area is less than 81 square miles, which represents a one-mile radial buffer of the historical maximum extent area.
2024 Result	**Outcome measure met**: The 100 mg/L chloride isocontour area was 44 square miles in 2024.	**Lower threshold not exceeded**: The 100 mg/L chloride isocontour area was 44 square miles in 2024.

Notes: For ease of reporting, any single result reported above an MCL is considered as an exceedance. However, based on drinking water regulations and follow-up sampling, a single detection above an MCL may not constitute a violation of drinking water standards. Public water systems are required to meet all drinking water standards for water delivered to customers.

As shown in Table 13, all outcome measures related to groundwater storage and land subsidence were met in 2024. Valley Water's response and groundwater management actions during the recent (2020–2022) drought were effective in ensuring quick recovery of groundwater levels and storage as shown by outcome measure performance in 2024.

Table 14 shows that the groundwater quality outcome measures were only partially met in 2024. The outcome measure for seawater intrusion in the Santa Clara Subbasin was met, as were TDS trend outcome measures in both the Santa Clara and Llagas subbasins. These results indicate that seawater intrusion and groundwater quality trends are generally stable or improving countywide. However, the outcome measures for primary drinking water standards were not met in 2024 for the Santa Clara and Llagas subbasins due to nitrate and PFAS as described below.

For the 234 Santa Clara Subbasin water supply wells tested, 90% met primary drinking water standards. As described in Chapter 4, most detections above MCLs were for PFOS (15 Santa Clara Plain wells) and nitrate (8 Coyote Valley wells, most of which are domestic wells). The PFOS detections were localized in two areas. Nitrate + nitrite was also detected above the MCL in one well.

For the 234 Llagas Subbasin water supply wells tested, 68% met primary drinking water standards. As described in Chapter 4, nitrate was detected above the MCL in 71 wells (primarily domestic wells). Six wells (including public and domestic water supply wells) had PFOA and/or PFOS above the recently established MCL. Nitrate + nitrate was also detected above the MCL in two wells.

Elevated nitrate continues to be a primary groundwater protection challenge, especially in South County. This is not unique to Santa Clara County as nitrate contamination is an issue in agricultural and rural areas throughout California and the United States. Long-term nitrate trends in Santa Clara County indicate stable or improving conditions. However, a significant number of Coyote Valley and Llagas Subbasin wells (primarily domestic wells) have nitrate above the drinking water standard. Valley Water does not control land use or have regulatory authority over activities with the most nitrate loading to groundwater, such as agriculture or septic systems. However, Valley Water continues to coordinate with land use and regulatory agencies to influence policies, regulations, and decisions related to nitrate management. More directly, Valley Water's managed recharge programs help dilute nitrate in groundwater, and water quality testing helps to reduce well owner exposure.

With the April 2024 adoption of drinking water standards for six PFAS compounds (including PFOA and PFOS), public water systems will need to monitor their water supply for these chemicals within three years and include the results in their Annual Water Quality Reports to customers. Public water systems that detect PFAS above the drinking water limits will have up to five years to implement solutions, such as treatment or other actions, to ensure water delivered to customers does not exceed these limits. Water systems must also notify their customers if levels of regulated PFAS exceed these new standards.

The 2021 GWMP outcome measure for seawater intrusion is based on the area of the historical maximum extent of the 100 mg/L chloride isocontour (57 square miles), as observed circa 1960 (Figure 20). The outcome measure-lower threshold is defined as the area of a 1 mile (5,280 ft) radial buffer inland from the historical maximum extent of seawater intrusion (81 square miles) (Figure 20). In 2024, both outcome measures were met because the 100 mg/L chloride isocontour covered 44 mi2, which is about 77% of the outcome measure area and 54% of the outcome measure-lower threshold area.

No outcome measure lower thresholds were exceeded for any of the groundwater supply or quality sustainability indicators, indicating continued sustainable conditions in 2024.

5.2 Status of Groundwater Management Plan Recommendations

As described in the GWMP and demonstrated in this report, Valley Water's proactive groundwater management programs and activities have maintained sustainable groundwater levels and storage, minimized land subsidence, and improved groundwater protection. The GWMP presents five major recommendations to maintain the long-term sustainability of groundwater resources. A summary of the status of each recommendation is below.

1. **Maintain existing conjunctive water management programs and evaluate opportunities for enhancement or increased efficiency.**

This GWMP recommendation has several sub-recommendations, including items related to infrastructure reliability, high-priority capital project implementation, and securing imported water sources, among others. Valley Water continues to focus on extensive groundwater recharge through direct replenishment and in-lieu recharge.

Capital Projects Supporting Conjunctive Management

Valley Water's Fiscal Year 2025-29 Five-Year Capital Improvement Program (CIP) was approved by the Board of Directors on May 14, 2024.[36] With a significant portion of Valley Water's water supply infrastructure approaching fifty to sixty years of age, maintaining and upgrading the existing infrastructure to ensure each facility functions as intended for its useful life became the focus of the Water Supply CIP in recent years. Other CIP projects focus on expanding in-lieu and direct recharge through recycled and purified water projects. Major water supply capital improvements identified in the CIP include:

Storage:

- Almaden Dam Improvements
- Almaden Calero-Canal Rehabilitation
- Anderson Dam Seismic Retrofit
- Anderson Dam Tunnel
- Coyote Creek Flood Management Measure
- Coyote Creek Chillers
- Coyote Percolation Dam Replacement
- Cross Valley Pipeline Extension
- Calero and Guadalupe Dam Seismic Retrofit
- Coyote Pumping Plan ASD Replacement
- Coyote Warehouse
- Dam Seismic Stability Evaluation
- Small Capital Improvements, San Felipe Reaches 1-3
- Pacheco Reservoir Expansion

[36] The 2025-29 CIP is available at: https://www.valleywater.org/how-we-operate/five-year-capital-improvement-program.

Transmission:

- 10-Year Pipeline Rehabilitation
- Almaden Valley Pipeline Replacement
- Distribution System Master Plan Implementation
- Fisheries and Aquatic Habitat Collaborative Effort (FAHCE) Implementation
- IRP2 Additional Line Valves
- Pacheco/Santa Clara Conduit Right of Way Acquisition
- Supervisory Control and Data Acquisition (SCADA) Master Plan Implementation
- SCADA Master Plan Implementation Project (SMPIP) Upgrades – Phase 1
- Small Capital Improvements, Raw Water Transmission
- Small Capital Improvements, Treated Water Transmission
- Treated Water Isolation Valves
- Vasona Pumping Plant Upgrade

Water Treatment Plants (WTP):

- Penitencia Water Treatment Plant Residuals Management
- Rinconada Water Treatment Plant Residuals Remediation
- Rinconada Ammonia Storage and Metering Facility Upgrade
- Rinconada Water Treatment Plant Reliability Improvement
- Small Capital Improvements, Water Treatment
- Santa Teresa Water Treatment Plant Filter Media Replacement Project
- Water Treatment Plant Electrical Improvement Project
- Water Treatment Plant Master Plan Implementation

Recycled Water:

- San Jose Purified Water Project (SJPMP) – Phase 1
- Land Rights – South County Recycled Water Pipeline
- South County Recycled Water Pipeline

Detailed information on each of these water supply capital projects, including related description, costs, and schedule, is available in the CIP.

2. **Continue to aggressively protect groundwater quality through Valley Water programs and collaboration with land use agencies, regulatory agencies, and basin stakeholders.**

A reliable water supply depends not only on quantity, but on quality. Sub-recommendations from the GWMP include continued groundwater quality monitoring, including PFAS and other emerging contaminants, action when potentially adverse trends are identified, and continued and enhanced collaboration with local partners and stakeholders.

Groundwater quality is typically very good in the county, with no treatment beyond disinfection required at most water retailer wells. However, nitrate remains an ongoing groundwater protection challenge, particularly in the more rural Coyote Valley and Llagas Subbasin. Valley Water continues to conduct extensive groundwater quality monitoring, evaluate long-term trends, and compare current conditions against regulatory standards and projected concentrations (such as from Salt and Nutrient Management Plans).

Long-term trends are favorable for nitrate, with 90% of water supply wells tested showing stable or decreasing concentrations. However, since a significant number of domestic wells in the Llagas Subbasin still contain nitrate above the drinking water standard, more work remains to be done. Valley Water will continue to engage with regulatory and land use agencies to address existing nitrate contamination. For nitrate and other water quality issues, Valley Water will work to build and enhance this collaboration to protect high-quality groundwater and expedite the restoration of impacted groundwater.

Valley Water has been proactive in evaluating the potential threat posed by PFAS. Voluntary sampling by Valley Water does not indicate the widespread presence of PFAS in groundwater, but some water retailer wells have been impacted and one retailer is actively pursuing treatment. The presence of PFAS in local groundwater is concerning, and Valley Water is coordinating closely with local water retailers and regulatory agencies on this evolving issue.

Valley Water is working with municipalities to implement a Stormwater Resources Plan[37] that will increase infiltration while ensuring pollutants from urban runoff do not impact groundwater quality. Similarly, Valley Water continues to engage with various entities to ensure that recycled water expansion or the use of purified water for recharge will protect groundwater quality.

Engaging with land use and regulatory agencies on proposed policy, legislation, and projects that may impact groundwater remains a key strategy for protecting groundwater. For example, Valley Water tracks the progress of major contaminant release sites, interacting with regulatory agencies to promote expedited and thorough cleanup. Valley Water also engages with land use agencies on relevant projects and policies such as development, stormwater infiltration devices, septic systems, and small water systems.

Public outreach continues to be an important component of Valley Water's groundwater protection efforts. To provide information on well sampling by Valley Water and local water suppliers, each summer Valley Water sends an annual Groundwater Quality Summary[38] to well owners in the groundwater benefit zones. Although not required, this is similar to water retailer consumer confidence reports and provides basic groundwater quality information to domestic well owners who do not typically receive water from a water retailer.

Other groundwater-related public outreach conducted by Valley Water in 2024 included:

- Interaction with students through the Education Outreach program.
- Direct communication with well owners on groundwater quality, well maintenance, and treatment systems under the Domestic Well Testing program.
- Blog and social media posts related to groundwater, such as during Groundwater Awareness Week.
- Presenting information on sustainable groundwater management practices during the annual UC Davis short course "Introduction to Groundwater, Watersheds, and Groundwater Sustainability Plans."

[37] Santa Clara Basin Stormwater Resource Plan, Final August 2019 is available at https://scvurppp.org/swrp/docs-maps/

[38] The annual Groundwater Quality Summary Report is available at https://www.valleywater.org/your-water/groundwater/groundwater-quality

3. **Continue to incorporate groundwater sustainability in Valley Water planning efforts.**

   This recommendation focuses on continued sustainable groundwater management with thoughtful water supply planning and investments. The Water Supply Master Plan 2040[39] explains Valley Water's strategy for providing a reliable and sustainable water supply into the future. The Water Supply Master Plan 2040 helps informs investment decisions and provides a framework for annually monitoring the water supply strategy to ensure it will meet the water needs of Santa Clara County.

   The Valley Water investment strategy includes securing existing supplies and infrastructure, expanding water conservation and reuse, and optimizing the use of the existing system. Projects approved by the Board for planning include pipeline maintenance, local dam retrofit, water treatment plant improvements, water conservation and demand management measures (i.e., advanced metering infrastructure, leak repair incentives, graywater program, and stormwater capture), potable reuse, the Delta Conveyance Project, expanding Pacheco Reservoir, and the Transfer-Bethany Pipeline. Details about each of these projects can be found in Appendix H of the Water Supply Master Plan 2040.

   In 2023, Valley Water started the development of the Water Supply Master Plan 2050, which extends the planning horizon to 2050 and represents a comprehensive update to the existing plan. The updated plan will reassess Valley Water's future demand, supply, and recommended investment strategies including updated water conservation targets to achieve by 2050. Valley Water plans to complete the Water Supply Master Plan 2050 in 2025.

   Groundwater sustainability also remains an important factor during the planning and implementation of multi-benefit projects under Valley Water's Watershed Master Plan.[40] The Sustainable Groundwater and Water Quality objectives of the Watershed Master Plan align with the GWMP outcome measures and include a process for identifying priority actions to sustain and improve groundwater on a watershed scale.

   To support a proactive managed response to climate change, the Valley Water Board adopted the Climate Change Action Plan (CCAP)[41] on July 13, 2021, following input from both internal and external stakeholders. The CCAP is a comprehensive framework to guide Valley Water's responses to climate change. The CCAP framework includes goals, strategies, and possible actions to both mitigate Valley Water's contribution to climate change through reducing greenhouse gas emissions, and to adapt to climate change impacts that will affect Valley Water's mission areas. Valley Water is implementing an ongoing and adaptive program to implement the CCAP, which includes prioritizing, monitoring, and reporting progress on actions, developing a greenhouse gas reduction plan, and coordinating with local and regional partners' climate plans. The strategies of the CCAP are being incorporated into existing Valley Water plans, budgets, and long-term financial forecasts as appropriate.

4. **Maintain adequate monitoring programs and modeling tools.**

   This GWMP recommendation focuses on improving monitoring networks by identifying and addressing gaps, redundancies, and access issues; identifying and implementing improvements

[39] Santa Clara Valley Water District, Water Supply Master Plan 2040 is available at: https://www.valleywater.org/your-water/water-supply-planning/water-supply-master-plan

[40] https://www.valleywater.org/project-updates/one-water-plan

[41] https://www.valleywater.org/your-water/water-supply-planning/climate-change-action-plan

to the numerical groundwater flow models; and improving Valley Water's understanding of surface water/groundwater interaction, groundwater dependent ecosystems (GDEs), and seawater intrusion.

The GWMP included a monitoring gap analysis for both the water level and water quality monitoring programs. Valley Water has developed a process to annually evaluate access to wells, redundancies and gaps, and acquire and/or install new monitoring wells to fill those gaps in the existing monitoring networks. As part of this process, changes to the monitoring networks are subsequently updated by Valley Water in DWR's Monitoring Network Module, as described in Chapter 3. The GWMP included 229 water level and 108 water quality monitoring wells[42]. As of 2024, there are 231 water level and 107 water quality monitoring wells. These changes reflect 27 wells removed and 26 added to the water level network, and four wells removed and three added to the water quality network.

Valley Water uses three calibrated groundwater flow models – one for each groundwater management area (Santa Clara Plain, Coyote Valley, and the Llagas Subbasin). These models are used to evaluate groundwater storage and levels to inform operational decisions and long-term planning efforts. Staff is assessing each model to identify related improvements or enhancements that may be needed or desired to improve the use of these tools.

Regarding surface water/groundwater interaction, Valley Water staff is working on expanding the 2018 differential gauging study to include additional time periods, hydrologic conditions, and methods, as necessary. Valley Water has updated the GDE mapping process and will track new information on GDEs in preparation for updating that information in the next GWMP update.

Valley Water continues to evaluate the seawater intrusion monitoring network in the Baylands area of the Santa Clara Plain. As of 2024, Valley Water has installed 20 multi-parameter sensors in monitoring wells and one sensor at a surface water station on the Guadalupe River. Valley Water is using the network to better characterize seawater intrusion mechanisms and continue to meet the seawater intrusion outcome measure.

5. **Continue and enhance groundwater management partnerships with water retailers and land use agencies.**

   This GWMP recommendation focuses on continued collaboration and strong partnerships with water retailers and land use agencies. Valley Water continues to interact regularly with water retailers through quarterly Water Retailer meetings, including the Groundwater Subcommittee. In addition to these regular meetings, Valley Water and water retailers collaborate on various issues that arise regarding groundwater, treated water, wells, and water measurement.

   Valley Water also continues to coordinate with local land use agencies on General Plans, water supply assessments, Urban Water Management Plans, stormwater management, and various individual land use projects. Land use decisions fall under the authority of the local cities and the County of Santa Clara. Valley Water reviews land use and development plans related to Valley Water facilities and watercourses under Valley Water jurisdiction and provides technical review for other land use proposals as requested by the local agency. When provided by land use agencies, water supply assessments for new developments are also reviewed and evaluated in the context of Valley Water's long-term water supply plans. For all reviews, Valley

[42] Some wells are used to monitor both water levels and water quality.

Water's groundwater-related comments focus on potential impacts to groundwater quality and sustainability.

5.3 Status of Sustainable Groundwater Management Act Compliance

In December 2016, Valley Water submitted the GWMP for the Santa Clara and Llagas subbasins to DWR as an Alternative to a GSP. In July 2019, DWR issued an assessment, finding the Valley Water Plan satisfies the objectives of SGMA and is an acceptable Alternative. Under SGMA, periodic evaluations of approved plans are required at least every five years. The first periodic evaluation was approved by the Valley Water Board in November 2021 and was submitted to DWR before the statutory deadline of January 1, 2022. The 2021 GWMP updated and expanded technical information in the 2016 GWMP and addressed related recommendations from DWR and basin stakeholders. Basin management goals, strategies, programs, and outcome measures in the 2021 GWMP are very similar to the 2016 GWMP because they have been effective in ensuring sustainable conditions. DWR approved the periodic evaluation in June 2024, confirming the Alternative satisfies the objectives of SGMA, complies with related regulations, and was responsive to DWR comments on the 2016 GWMP.

Continued groundwater sustainability is central to the Valley Water mission to provide Silicon Valley safe, clean water for a healthy life, environment, and economy. As such, Valley Water will continue to "manage groundwater to ensure sustainable supplies and avoid land subsidence" and "aggressively protect groundwater from the threat of contamination" in accordance with Board Ends policy. Valley Water's approach to groundwater management has evolved over many decades to address numerous challenges, and this adaptive approach will help ensure continued sustainability.

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APPENDICES

APPENDIX A
2024 Subsidence Data Analysis

APPENDIX A – 2024 SUBSIDENCE DATA ANALYSIS

EXECUTIVE SUMMARY

This appendix presents land subsidence data analysis for calendar year (CY) 2024. Throughout the first two thirds of the 20th century, land subsidence occurred in the Santa Clara Plain in northern Santa Clara County due to groundwater overdraft causing declining groundwater elevations and pressures. Permanent (inelastic) subsidence was essentially halted in the 1970s through Valley Water's conjunctive management programs and investments (Valley Water, 2021). Today in the Santa Clara Plain, non-permanent (elastic) land subsidence and recovery (uplift) are observed that are caused by seasonal and drought variability in groundwater levels. Unlike permanent subsidence, elastic subsidence and uplift are recoverable and typically small-scale (millimeter to centimeter) changes to the land surface elevation. Unless otherwise noted, land compaction and uplift discussed in this appendix refer to elastic subsidence and uplift.

Ongoing monitoring is critical to fulfilling Valley Water's mission of managing groundwater to ensure sustainable supplies and avoid land subsidence, and to aggressively protect groundwater from the threat of contamination (Board Ends Policy E-2). Monitoring at extensometers, benchmarks, and monitoring wells provides data to evaluate current conditions and for early detection of the potential resumption of permanent subsidence[1]. Annually, Valley Water analyzes land subsidence monitoring data, evaluates subsidence conditions, and recommends improvements to the subsidence monitoring network. This analysis uses data collected mainly from 2014 to 2024 in the Santa Clara Plain and is based on the calendar year to align with Valley Water operations, shortage response, and planning.

2024 annual precipitation was 15.4 inches at the San Jose International Airport (Station ID SJC) and 123% of average. In CY 2024, the annual estimated groundwater pumping in the Santa Clara Plain was 67,300 acre feet (AF)[2]. CY 2024 total estimated groundwater recharge in the Santa Clara Plain was 98,700 AF, including 63,900 AF from managed recharge and 34,800 AF from natural recharge and other inflows. Compared to 2023, groundwater pumping increased and recharge decreased in 2024. Total recharge was greater than groundwater pumping in 2024, which resulted in overall groundwater storage increase in the Santa Clara Plain (see Chapter 2).

The data measured in 2024 from the Valley Water's subsidence monitoring network show that:

- Average annual groundwater elevations were higher at three subsidence index wells and lower at seven subsidence index wells compared to 2023.
- Groundwater elevations were above subsidence thresholds at all ten index wells for the entire year.
- Aquifer expansion (elastic uplift) was measured at Valley Water's two extensometer sites. The average annual subsidence rate from 2014 to 2024 at the San Jose (Martha)

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[1] DWR serves a statewide coverage of land surface change based on Interferometric Synthetic Aperture Radar (InSAR) data (https://data.cnra.ca.gov/dataset/tre-altamira-insar-subsidence). However, the DWR InSAR dataset has an 18 mm (0.06 ft) vertical accuracy at the 95% confidence level, which is greater than the annual compaction and uplift measured by Valley Water's Martha and Sunny extensometers and survey benchmarks. Therefore, the DWR InSAR data is not reported here.

[2] Groundwater balance terms for the Santa Clara Plain, including pumping and recharge, are in Chapter 2 (Figure 8).

and Sunnyvale (Sunny) sites is -0.004 feet/year (aquifer expansion), which meets Valley Water's established tolerable subsidence rate of not more than 0.01 feet/year.
- The average land surface elevation change at the survey benchmarks indicated uplift throughout much of the Santa Clara Plain in 2024. From 2014 to 2024, the average annual change in land surface elevations was 0.01 ft/year (land expansion or uplift) at all survey benchmarks.
- Stress-strain analysis indicates that the compaction[3] observed in 2024 remains in the elastic range.

The analysis of the data collected through Valley Water's subsidence monitoring network indicates a low risk of permanent land subsidence in 2024. Monitoring of the subsidence network will continue as it is needed to detect early signs of permanent land subsidence and to ensure a sustainable groundwater supply.

BACKGROUND

The Santa Clara Plain is a groundwater management area occupying the northwestern and largest part of the Santa Clara Subbasin (Figure A-1). The Santa Clara Plain extends from Santa Clara County's northern boundary to approximately Metcalf Road in the Coyote Valley and is bounded on the west by the Santa Cruz Mountains and the east by the Diablo Range. Land subsidence has caused serious problems in the Santa Clara Plain prior to about the 1970s, including up to 14 feet of permanent subsidence in downtown San Jose and more than a foot of permanent subsidence over 100 square miles (Valley Water, 2021).

Ongoing monitoring provides data for current land subsidence evaluation and early detection of potential permanent subsidence. The Valley Water land subsidence monitoring network (Figure A-1) includes:
- Two extensometers (approximately 1,000 feet deep): one in Sunnyvale (Sunny) and one in San Jose (Martha), both are monitored continuously by telemetry systems;
- Approximately 142 elevation benchmarks along three Cross Valley Level Circuits (CVLCs) that are surveyed in the fall of every year; and
- Ten subsidence index wells throughout the Santa Clara Plain with groundwater elevations monitored at least monthly.

Figure A-1 shows a map of the Valley Water subsidence monitoring network in the Santa Clara Plain. Two extensometers are in the confined area of the Santa Clara Plain. Benchmarks are grouped into three CVLCs: Guadalupe (northwest-trending circuit along the axis of the valley), Los Altos (west-east trending circuit to the north), and Alum Rock circuit (west-east trending circuit to the south). The ten subsidence index wells are located throughout the Santa Clara Plain.

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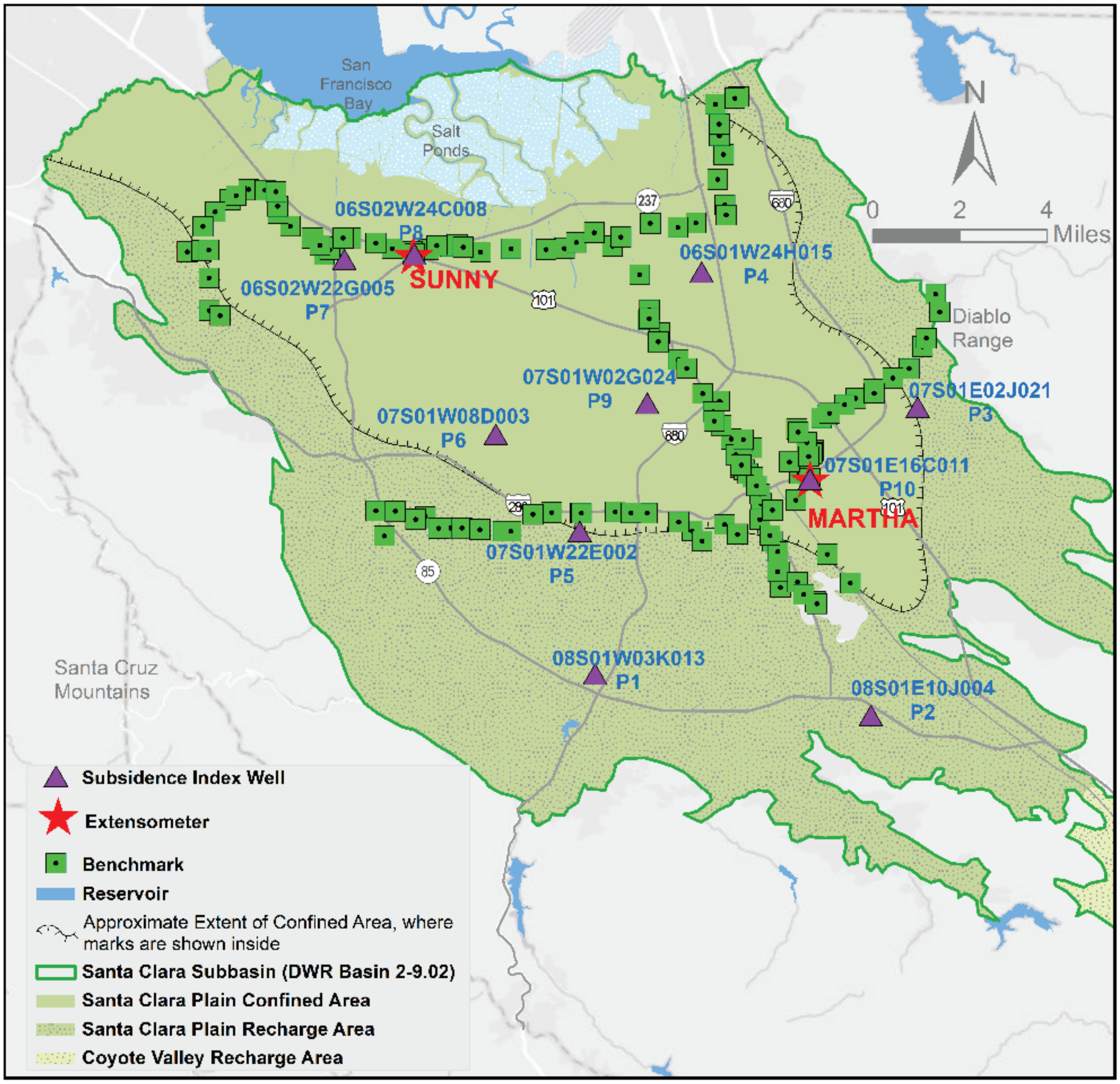
[3] The Sunny and Martha extensometers measured uplift from January to April 2024. With the start of the dry season in May 2024, compaction was measured by both extensometers. This compaction was within the track of the previous stress-strain loop, indicating the compaction in 2024 remains in the elastic range. However, the net land surface elevation change in 2024 was positive (uplift) at both extensometers.

Figure A-1. Valley Water subsidence monitoring network



EVALUATION

The evaluation of 2024 subsidence data from Valley Water's groundwater monitoring wells, benchmarks, and extensometers is presented below.

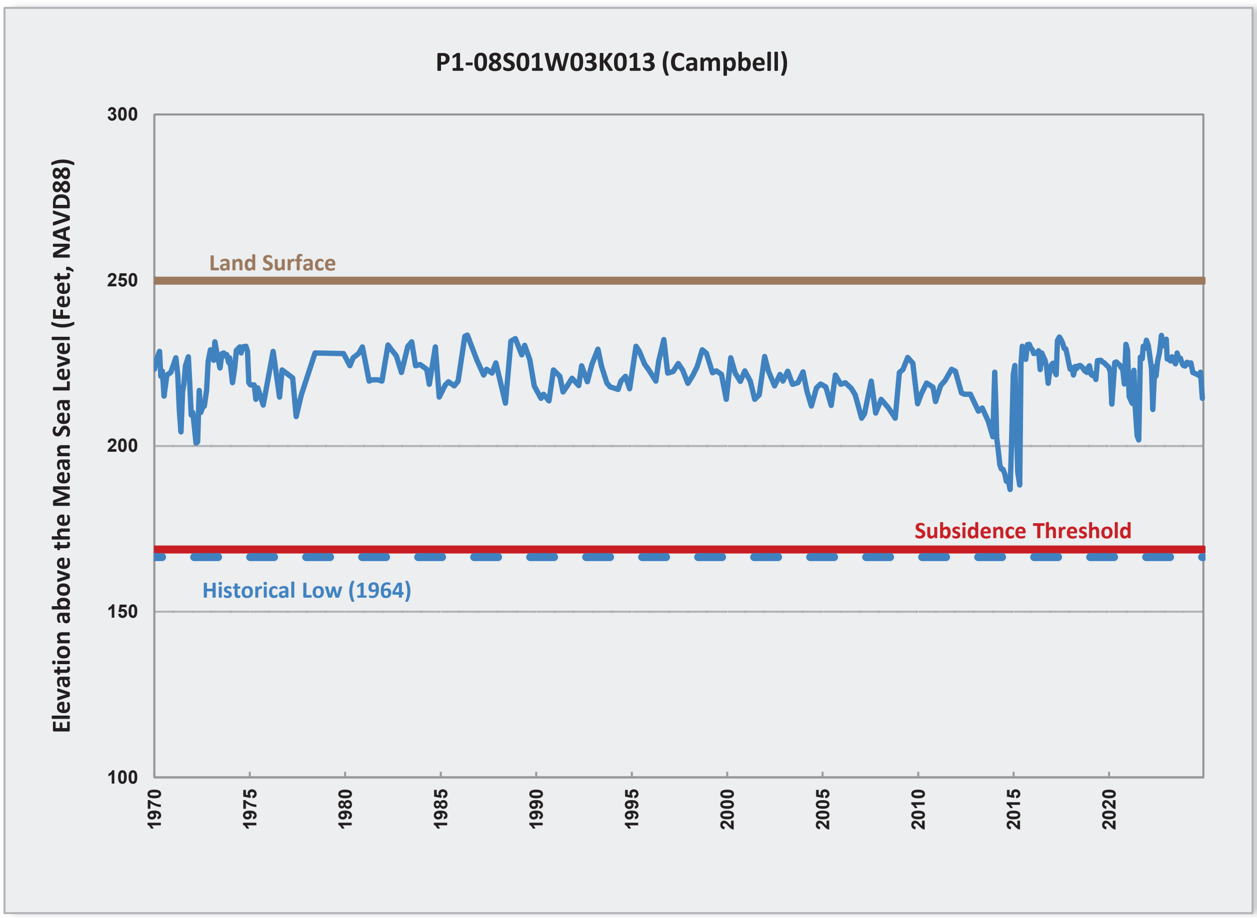
Groundwater elevation analysis

Groundwater elevation monitoring is an integral part of the subsidence monitoring since the decrease in water elevation is the driving force of land subsidence in the Santa Clara Plain. The current frequency of groundwater elevation monitoring at the ten subsidence index wells varies from daily to monthly. Water elevation hydrographs at the ten index wells are presented in Figure A-2, along with land surface elevations, historical low water levels, and subsidence groundwater elevation thresholds determined for each well (Geoscience, 1991). The North

American Vertical Datum of 1988 (NAVD88) is used for the groundwater elevation values in this document. The ten index wells are identified using the State well ID and the PRESS 1 to PRESS 10 (or P1 to P10) naming convention, which was first used in the Geoscience Support Services (1991) report. PRESS stands for Predictions Relating Effective Stress and Subsidence model, which is a numerical model that is based on sediment consolidation theory and can be used to simulated and predict subsidence caused by groundwater level decline (Geoscience Support Services, 1991).

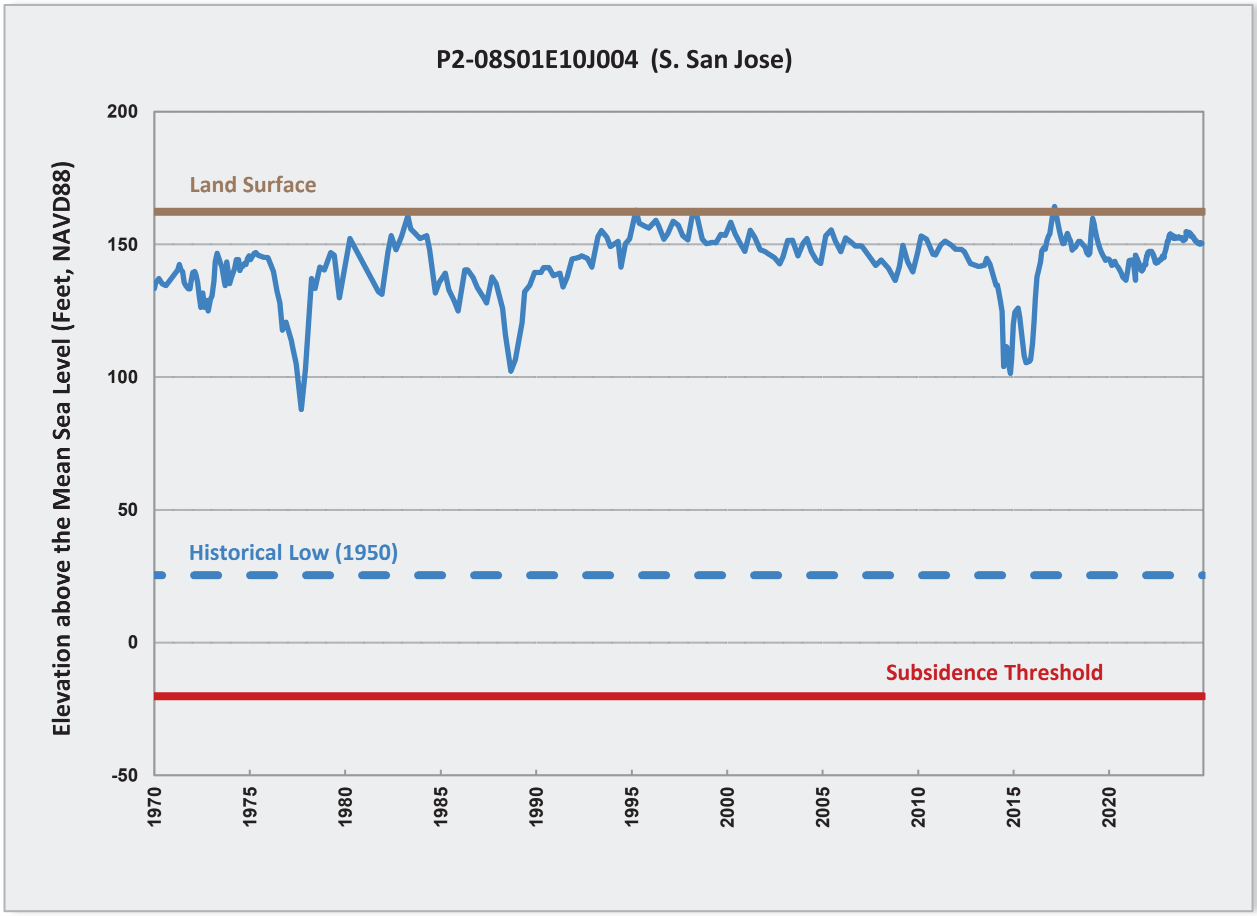
A subsidence threshold is a recommended groundwater elevation; maintaining groundwater at elevations near or below the threshold for extended periods of time increases the risk of subsidence resumption and potential damage to facilities and infrastructure. Historically, permanent land subsidence was observed mainly in the confined area of the Santa Clara Plain. Accordingly, most index wells (eight out of ten) are in or near the confined area (Figure A-1). Valley Water's groundwater management outcome measure is to maintain groundwater elevations in the Santa Clara Plain above subsidence thresholds to minimize the risk of resuming permanent land subsidence (Valley Water, 2021).

Figure A-2. Measured groundwater elevation at subsidence index wells



Notes: This hydrograph for 08S01W03K013 contains primarily static water level readings and some pumping water level readings.

Figure A-2. Continued



Notes: Valley Water lost access to the former PRESS well 2 (well 08S01E05N002) in June 2021. A replacement well with similar water level history and period of record (08S01E10J004) was implemented as the new PRESS well 2 beginning in June 2021.Therefore, this hydrograph reflects data from well 08S01E05N002 prior to June 2021 and data from well 08S01E10J004 since June 2021. The land surface elevation is from well 08S01E10J004.

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Figure A-2. Continued

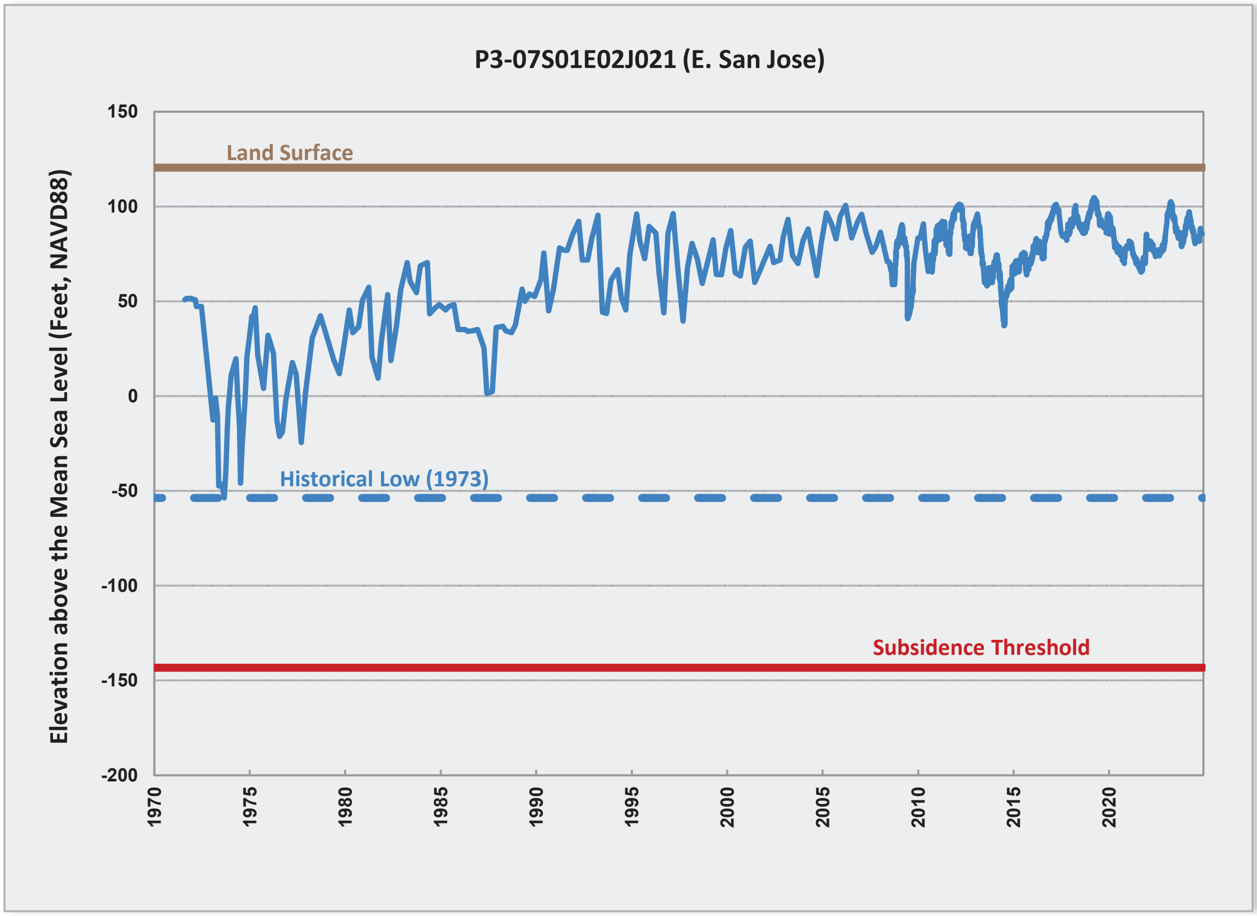

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Figure A-2. Continued

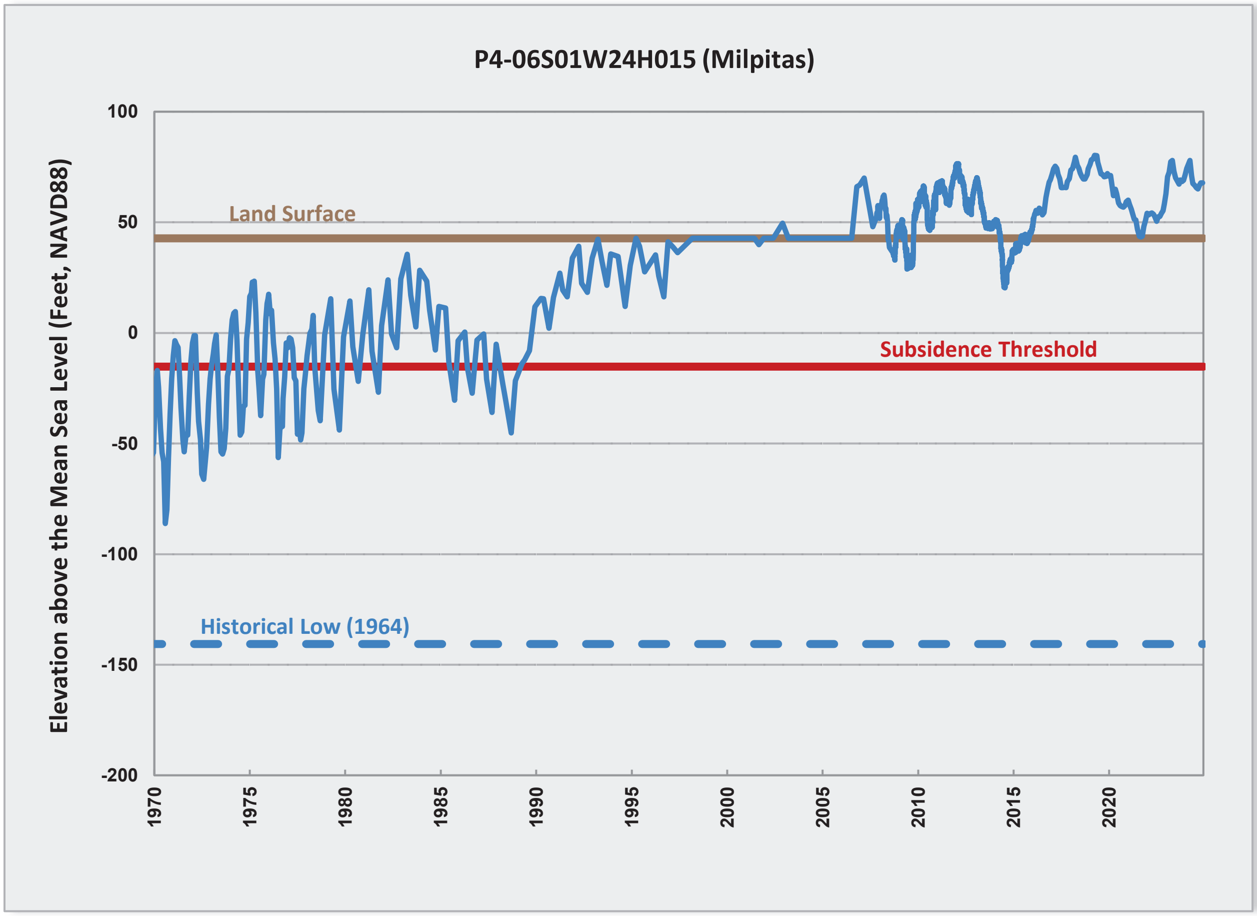

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Figure A-2. Continued

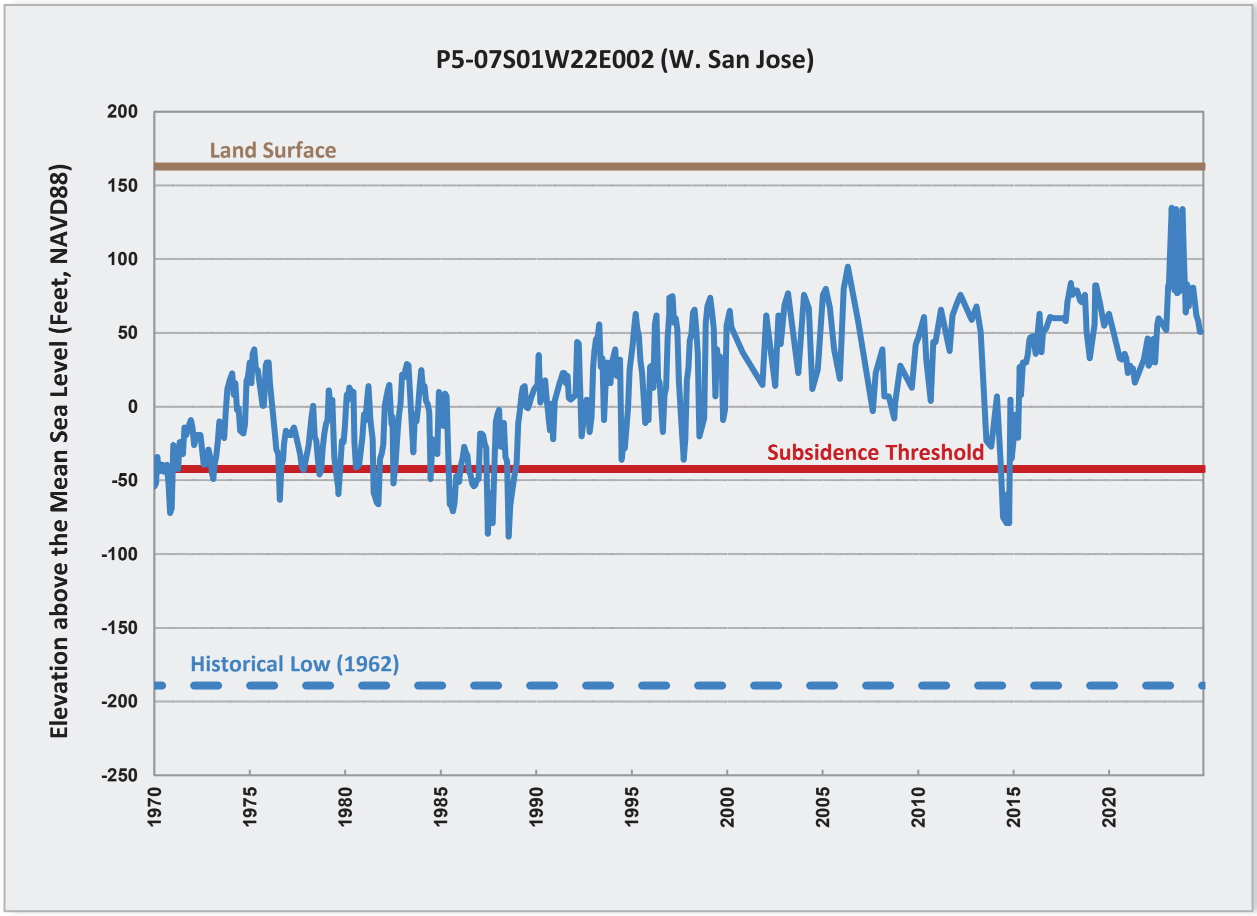

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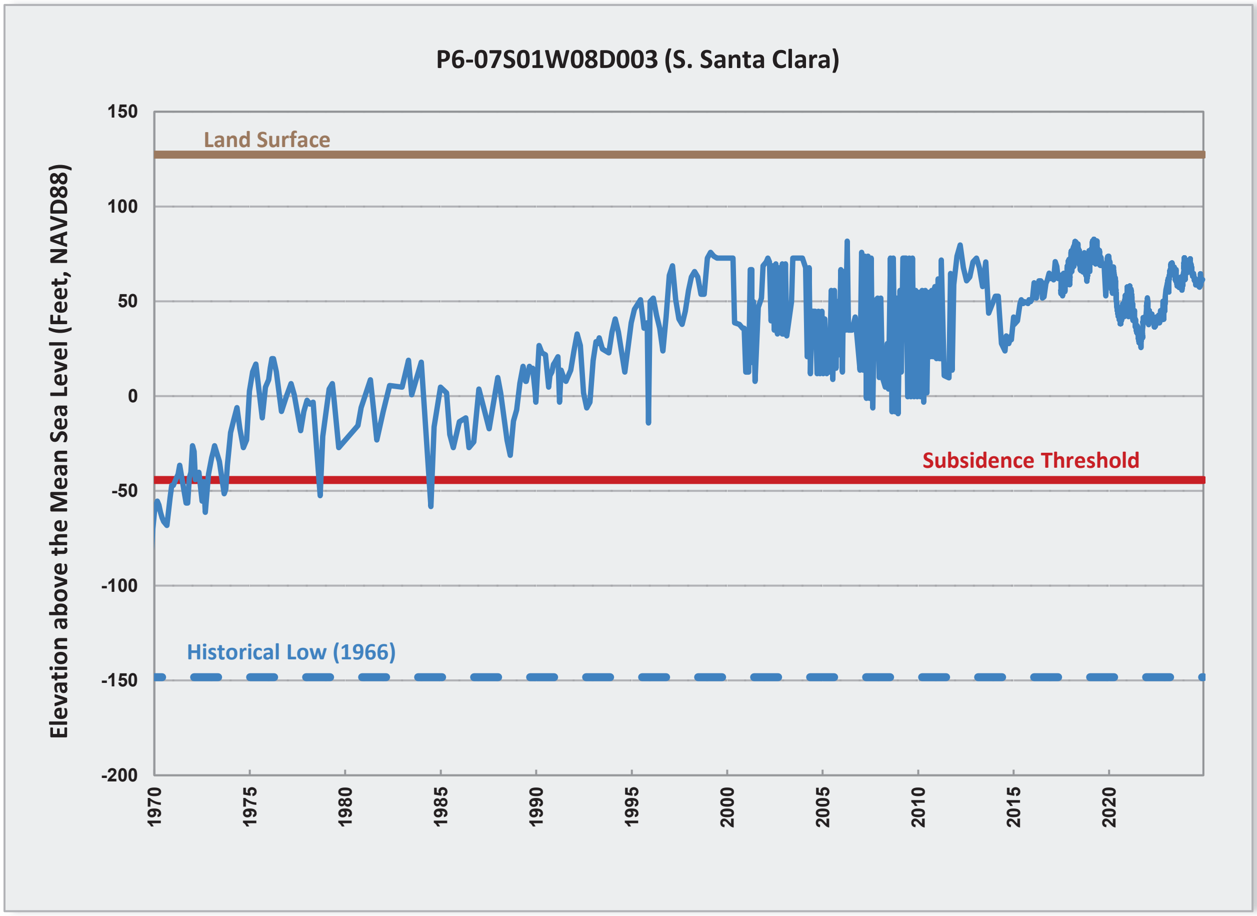
Figure A-2. Continued



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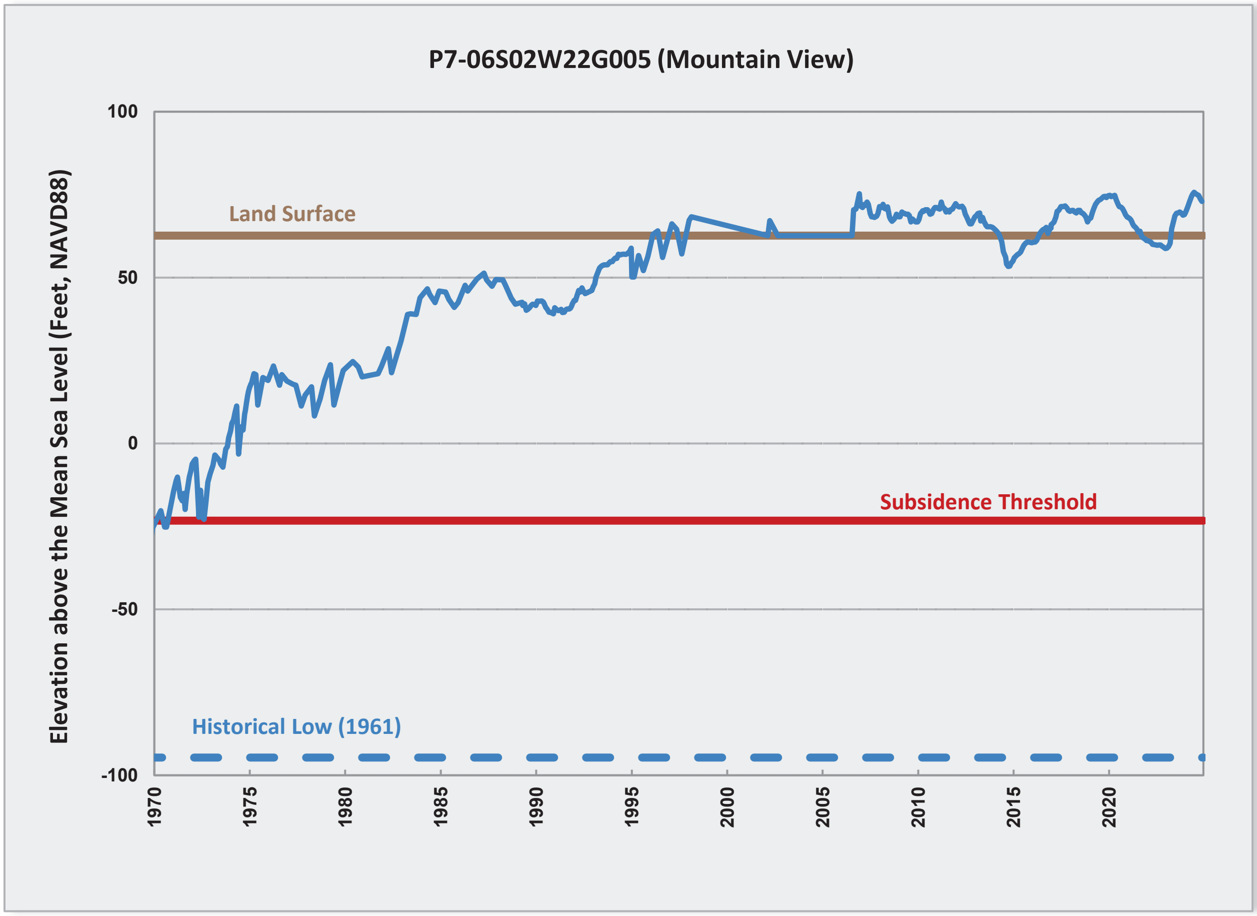

Notes: The flat line at land surface from approximately 2002 to 2006 represents the period when the well was under artesian conditions and prior to the installation of a pressure gauge.

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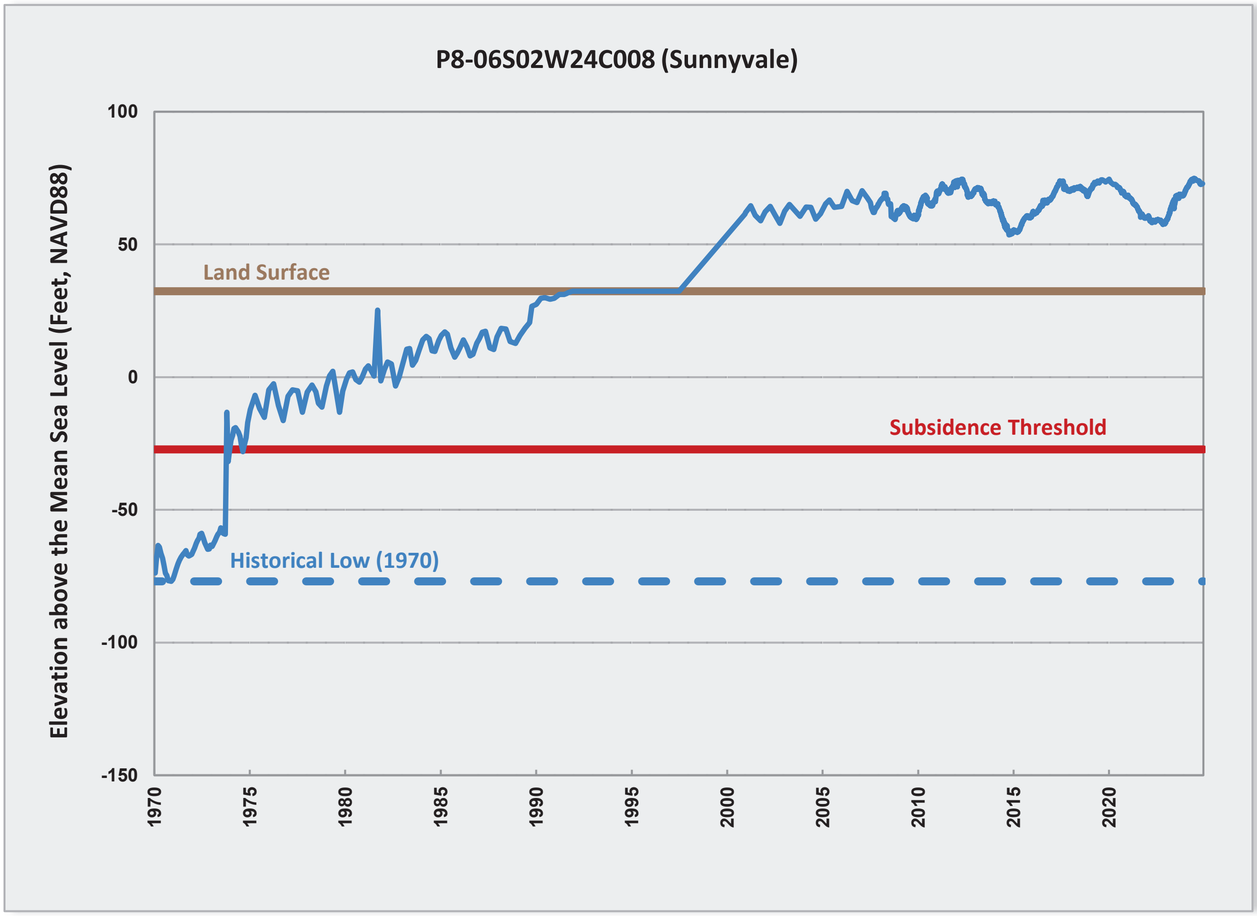
Figure A-2. Continued



Notes: The flat line at land surface from approximately 1991 to 1997 represents the period when the well was under artesian conditions and prior to the installation of a pressure gauge.

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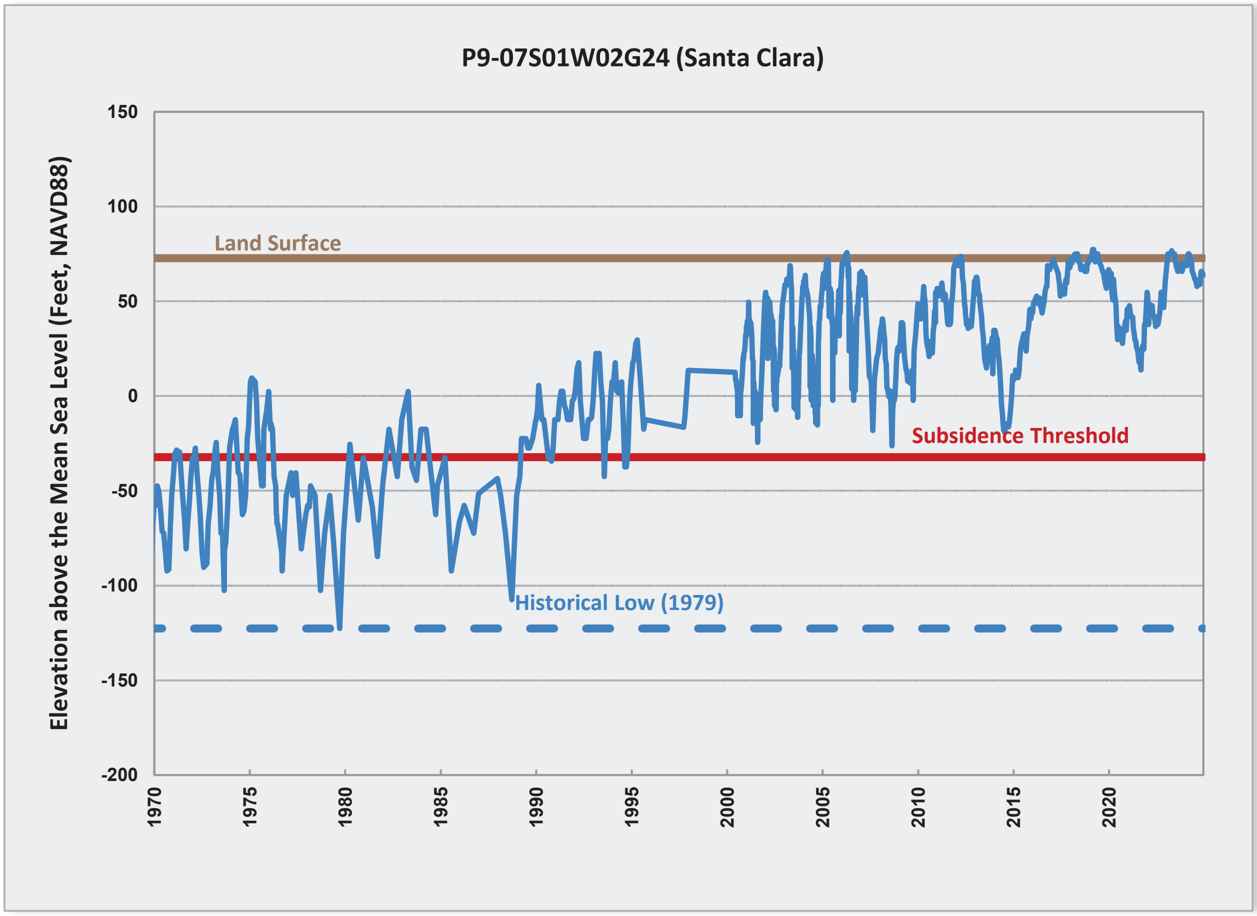
Figure A-2. Continued



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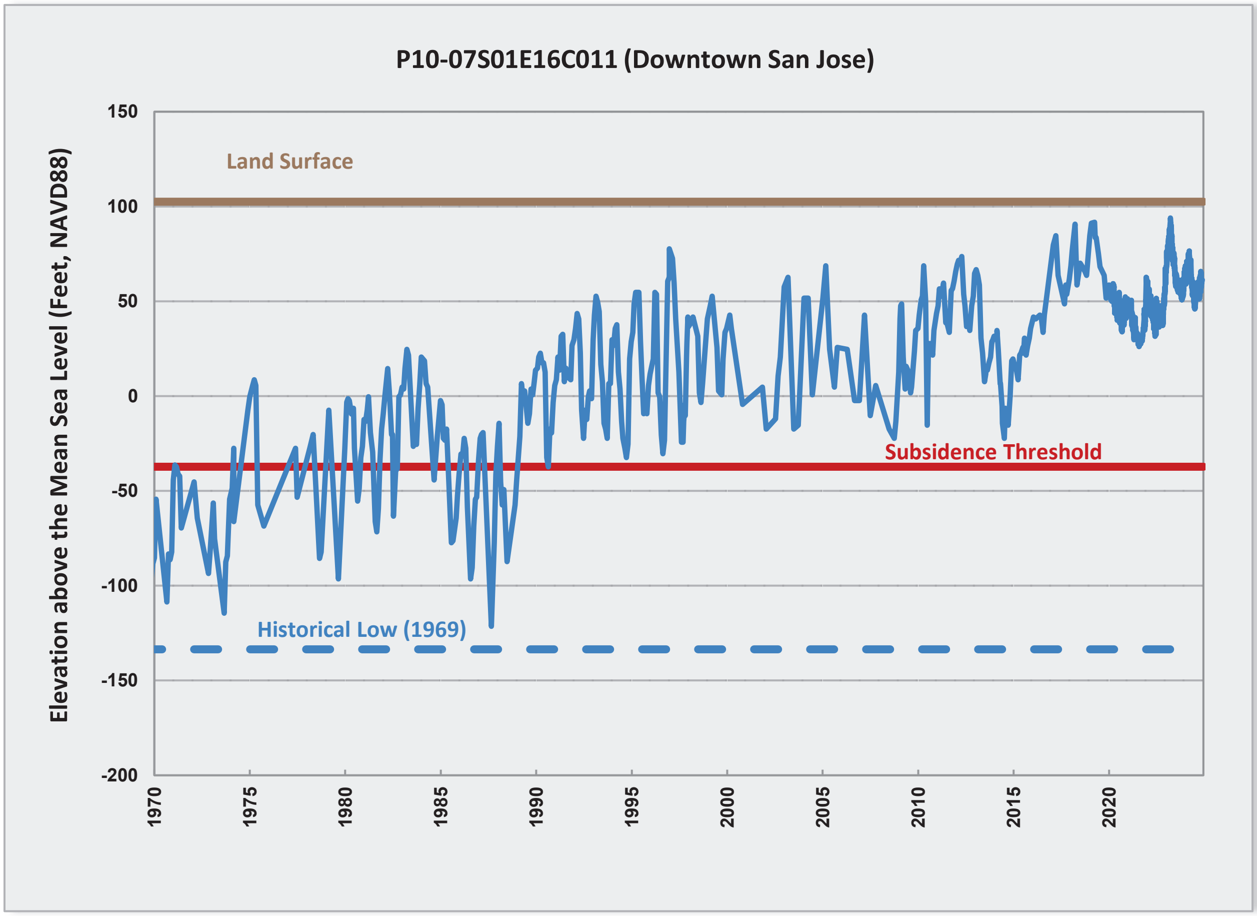


Notes: In November 2022, PRESS well 10 (07S01E16C006) was replaced with 07S01E16C011 for all subsequent subsidence monitoring and analysis. Well 07S01E16C011 is also located at the same 12th Street Station well field but has several advantages, including being Valley Water's primary extensometer at the 12th Street Station, improved well access, and an increased (daily) monitoring frequency with telemetry.

Historical low groundwater elevations at most wells in Santa Clara Plain were observed in the 1960s and 1970s (Figure A-2). Since then, the groundwater elevations have been generally in recovery due to the importation of surface water from the Delta and related increased managed recharge and reduced groundwater pumping. Although groundwater elevations decline during drought, they generally recover quickly post-drought due to Valley Water's groundwater management activities.

The recent (2020-2022) statewide drought ended in 2023 because it was a wet year with annual precipitation of 16.08 inches[4]. The wet conditions continued in 2024 with annual precipitation of 16.64 inches[5]. The 2024 average groundwater elevation among the ten subsidence index wells was about 3 feet lower than 2023 (ranging from 23 feet lower to 8 feet higher) and about 115 feet higher than land subsidence thresholds (ranging from 53 to 230 feet higher).

[4] Valley Water hydrology data interface available at https://alert.valleywater.org/
[5] Valley Water hydrology data interface available at https://alert.valleywater.org/

The 2024 average groundwater elevations were higher than 2023 in three index wells including PRESS well 6 (07S01W08D003), PRESS well 7 (06S02W22G005), and PRESS well 8 (06S02W24C008). At PRESS wells 7 and 8, the groundwater elevations were higher in 2024 than the last wet period from 2017 to 2019. The 2024 average groundwater elevation in PRESS well 5 (07S01W22E002) was 23 feet lower than 2023 based on monthly data collected in January to March, June to August and October to November[6]. For the other six index wells where the 2024 average groundwater elevations were lower than 2023, on average there was only a minor decline of 3 feet (ranging from 0 feet to 8 feet) in the groundwater elevations.

It is critically important to manage the Santa Clara Plain in a manner that maintains a groundwater gradient towards the San Francisco Bay to keep seawater from entering the groundwater aquifer. There are three index wells along the bay front: PRESS well 7 (06S02W22G005), PRESS well 8 (06S02W24C008), and PRESS well 4 (06S01W24H015) (Figure A-1). In 2024, all three wells along the bay front remained under artesian condition (i.e., water levels would rise above land surface if the well was uncapped), which reduces the risk of seawater intrusion.

In summary, 2024 groundwater elevations at the ten subsidence index wells were maintained well above subsidence thresholds. Three index wells had higher groundwater elevations compared to 2023, while seven index wells had lower elevations compared to 2023. Additionally, groundwater flow gradients toward the San Francisco Bay were maintained in 2024, which help to prevent seawater intrusion into the aquifer. Measured groundwater elevations indicate a low risk of land subsidence resumption and seawater intrusion in 2024.

Extensometer data analysis

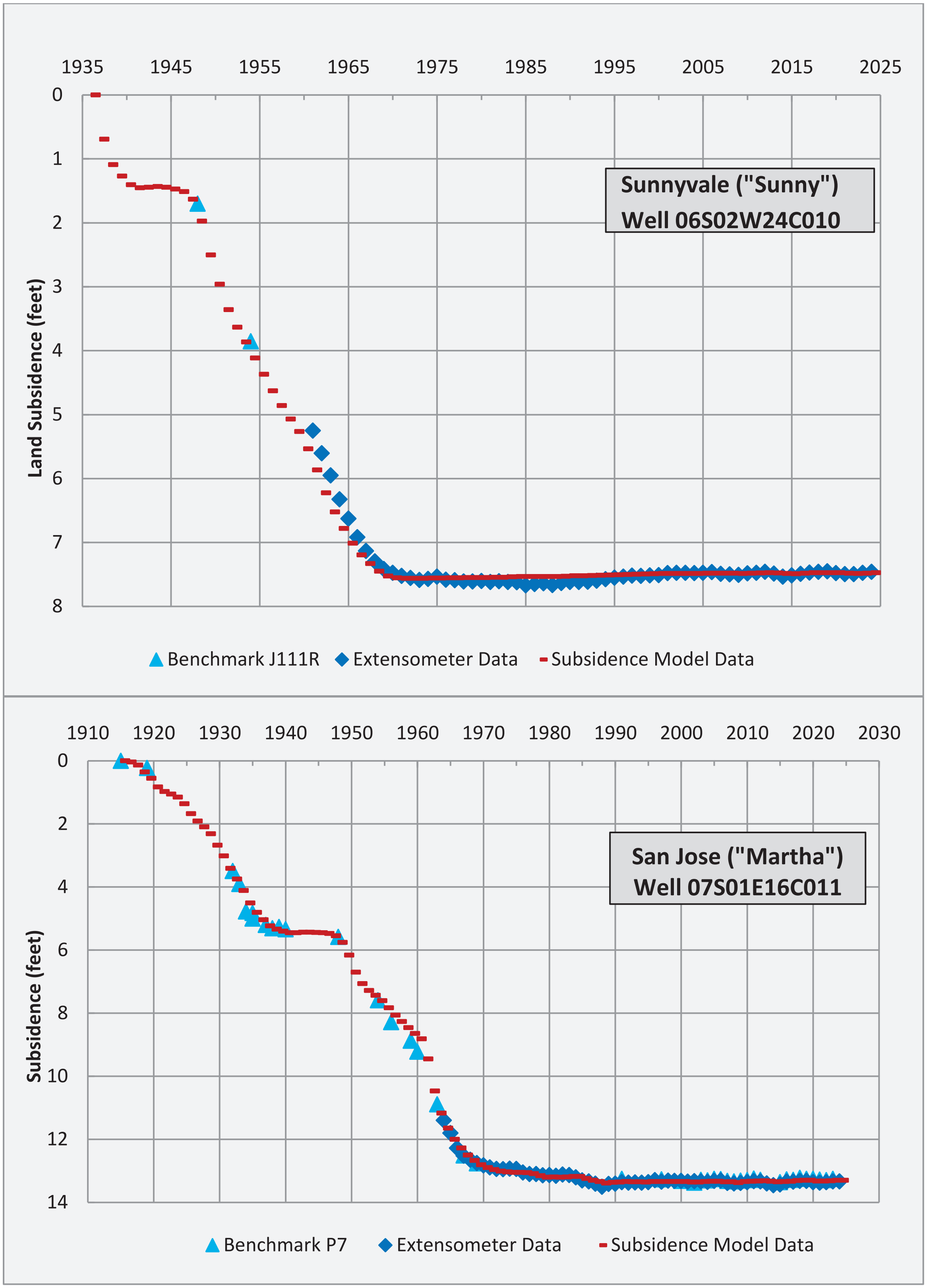
Daily aquifer compaction/expansion data measured at two extensometers and depth to water (DTW) measured at or near the extensometers were used for this analysis. An extensometer is a device used to continuously monitor aquifer compaction (subsidence) and expansion (uplift). The extensometers were installed in the early 1960s in Sunnyvale (Sunny) and San Jose (Martha) to measure the compaction or expansion of the first 1,000 feet of the aquifer system. The extensometer sites were selected in areas with high land subsidence between the 1930s and 1960s. These areas were also pumping centers during that period. Valley Water's goal is that the average value of subsidence measured at these two sites over the last 11 years does not exceed a tolerable subsidence rate of 0.01 feet/year (Geoscience, 1991).

Long- term extensometer data

Figure A-3 shows cumulative compaction measured at the extensometers for the period of record supplemented with nearby benchmark data, along with numerical model simulated results. Permanent (inelastic) land subsidence occurred mostly prior to the 1970s and has been negligible over the last several decades. There is close correlation between Valley Water's land subsidence model (PRESS model) output and observed compaction as shown in Figure A-3.

[6] Water level data is not available from other months in 2024.

Figure A-3. Cumulative compaction at extensometers



Permanent (inelastic) subsidence was essentially halted in the 1970s in the Santa Clara Plain (Figure A-3). Figure A-4 presents the cumulative aquifer compaction/expansion and DTW measured from 1970 to 2024 for the Sunny and Martha extensometers. In general, there was very little land subsidence at the extensometers between 1970 and 2024, with about 0.06 feet and 0.60 feet of residual compaction[7] at the Sunny and Martha extensometer, respectively (Figure A-4).

To better characterize periods of permanent (inelastic) versus elastic subsidence at the Sunny and Martha sites, stress-strain (i.e., depth to water and compaction) analyses (Figures A-4 to A-6) were conducted using measured depth to water and extensometer data from the late-1960s (1969 for Sunny and 1968 for Martha) to 2024, which was sub-divided based on depth to water data for historical wet and dry periods. Each sub-period extends from the end of the last wet period to the end of the current or more recent wet period and is defined based the highest groundwater level (Figure A-4) and minimum compaction (Figure A-5). Although these sub-periods are a function of groundwater pumping and rainfall variability, each sub-period generally corresponds to full wet and dry (drought) interannual hydrologic cycle. For example, the 2012-2019 sub-period includes the 2012-2016 drought and the subsequent wet hydrologic years of 2017-2019. The next sub-period begins at the end of 2019 and includes the 2020-2022 drought and the wet hydrologic years of 2023-2024. The stress-strain analysis is based on evaluation of the hysteresis loop during each time sub-period, as shown in Figures A-5 and A-6.

At the Sunny extensometer, groundwater levels have recovered since the 1960s, but land subsidence continued until around the mid-1980s, indicated as 9/30/1985 in Figure A-4. Over that same time for each hysteresis loop (Figure A-5a), strain (compaction) increase/decrease with increasing/decreasing stress (depth to water level). However, the stress-strain hysteresis loops from 1969 to 1985 generally move towards lower stress (depth to water) and greater strain (compaction) direction. This indicates that even though elastic land subsidence and uplift cycles occurred in each corresponding dry and wet period, delayed inelastic land subsidence was the dominant land deformation type at Sunny between 1969 and 1985 (Figures A-4 and A-5a).

After 9/30/1985 at Sunny, groundwater levels continued to recover and land uplift started to occur (Figure A-4). Figure A-5a shows that between 1985 and 2000, the hysteresis loops generally move toward lower stress (depth to water) and lower strain (compaction), which indicate elastic land uplift cycles are the dominant land deformation type. It should also be noted there is a data gap from 1993 to 2000 at Sunny (Figure A-4). Between 2000 and 2024, the long-term groundwater level trend at Sunny is relatively flat, with only seasonal and multiple-year wet-dry (drought) fluctuations (Figure A-4). Figures A-5a-c show that from 2000 to 2024, the hysteresis loops repeat increased/decreased strain (compaction) with increasing/decreasing stress (depth to water level) cycles, with no global movement in the hysteresis loops, which indicates that the deformation is elastic at Sunny since 2000 (Figures A-4 and A-5). Figure A-5c shows that the hysteresis loops for 2019 to 2024 are within the tracks of the hysteresis loops for the previous hydrologic period from 2012 to 2019, which indicates that the land deformation is elastic at Sunny from 2019 to 2024.

Somewhat similar to the Sunny site, groundwater levels at the Martha extensometer have recovered since 1960s but residual land subsidence continued until around the late-1980s, indicated as 9/8/1988 in Figure A-4. Over that same time for each hysteresis loop at Martha (Figure A-6a), strain (compaction) increase/decrease with increasing/decreasing stress (depth

[7] Residual compaction is calculated here from 1970 to 2024.

to water level). However, the stress-strain hysteresis loops from 1968 to 1983 generally move towards lower stress (depth to water) and greater strain (compaction) direction, while the stress-strain hysteresis loops from 1983 to 1988 move towards higher stress (depth to water) and greater strain (compaction) direction. This indicates that even though elastic land subsidence and uplift cycles occurred in corresponding dry and wet periods, delayed inelastic land subsidence is the dominant land deformation type at Martha from 1968 to 1983 and a small amount of residual inelastic land subsidence exists from 1983 to 1988 (Figures A-4 and A-6a).

After 9/8/1988 at Martha, groundwater levels continued to recover[8] and land uplift started to occur (Figure A-4). Figures A-6a-b shows that between 1988 and 1995, the hysteresis loops generally move toward lower stress (depth to water) and lower strain (compaction), which indicate elastic land uplift cycles are the dominant land deformation type. From 1995 to 2024, the general long-term groundwater level trend is relatively flat, with only seasonal and multiple-year wet-dry (drought) fluctuations (Figure A-4). Figures A-6a,c-e show that the hysteresis loops repeat increased/decreased strain (compaction) with increasing/decreasing stress (depth to water level) cycles, with essentially no global movement in the hysteresis loops, which means that the dominant deformation is elastic at Martha since 1995 (Figures A-4 and A-6). Figure A-6d-e shows that the hysteresis loops for 2019 to 2024 are within the tracks of the hysteresis loops for the previous hydrologic period from 2012 to 2019, which indicates that the land deformation is elastic at Martha from 2019 to 2024.

Although both extensometers recorded little permanent subsidence between 1970 and 2024, there are some notable differences in compaction/expansion and DTW at the two sites. First, the maximum compaction from 1970 to 1988 was 0.819 feet at Martha and 26% of it was recovered between 1988 and the end of 2024 (Figure A-4). In comparison, the maximum compaction from 1970 to 1985 was only 0.276 feet at Sunny and 79% of it was recovered between 1985 and the end of 2024 (Figure A-4). Second, the groundwater elevation at Sunny has been above the land surface (negative DTW) since 1993, while the groundwater elevation at Martha has consistently been below the land surface (positive DTW) (Figure A-4). Finally, the seasonal variability in water elevations at Sunny is relatively small compared to the seasonal variability in water elevations at Martha (Figure A-4). The dampened seasonal signal in the water elevations at Sunny indicates pumping activities nearby have decreased during the last forty years. The greater recovery of compaction at Sunny is attributed to relatively less pumping and associated greater artesian pressure at the Sunny site compared to Martha site from 1970 to 2024.

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[8] Groundwater pumping in the Santa Clara Plain decreased substantially after the Santa Teresa Water Treatment Plant came online in 1989, which helped contribute to the recovery of groundwater levels and subsequent land uplift in the Santa Clara Plain.

Figure A-4. Measured depth to water and cumulative compaction at extensometers

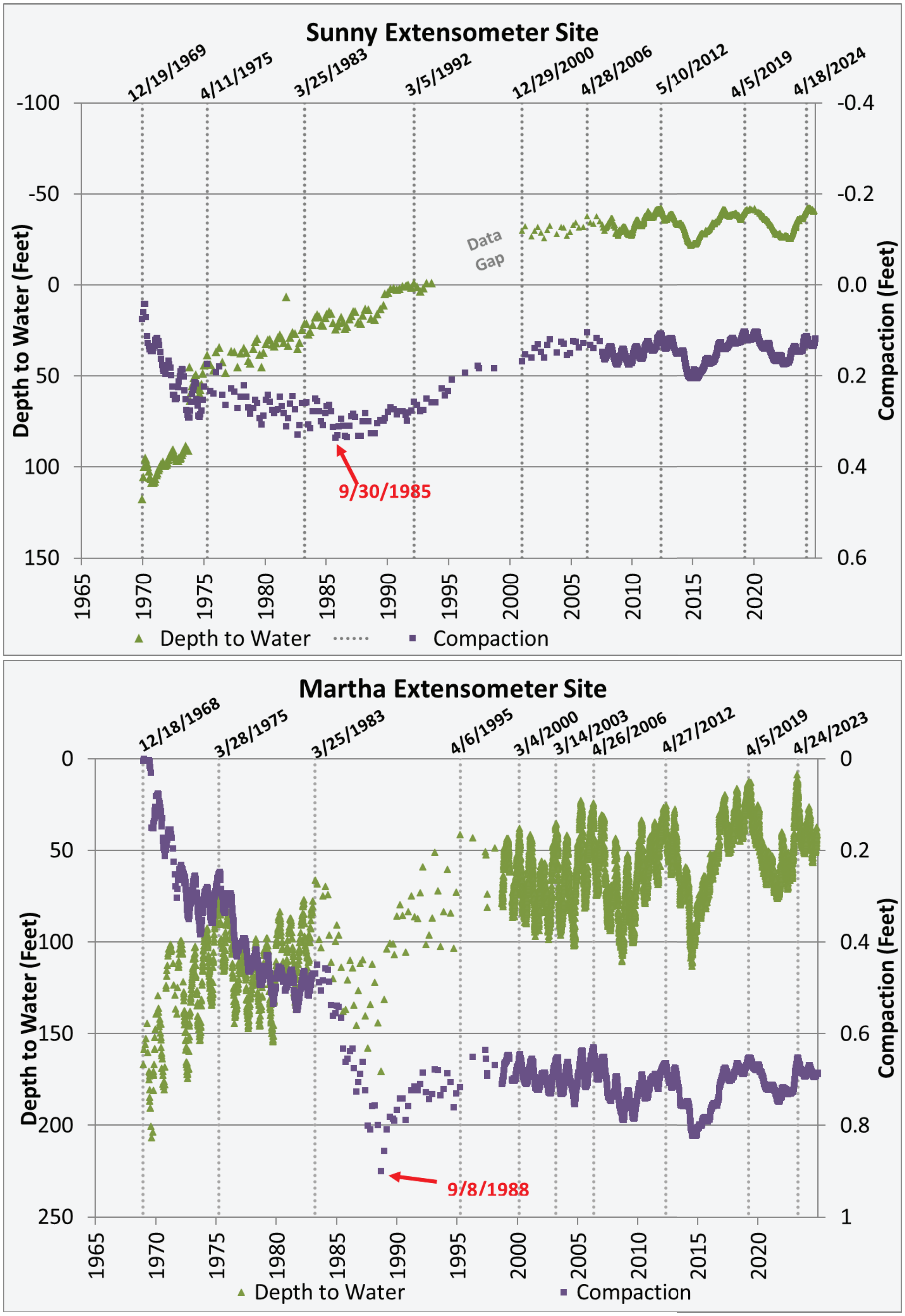
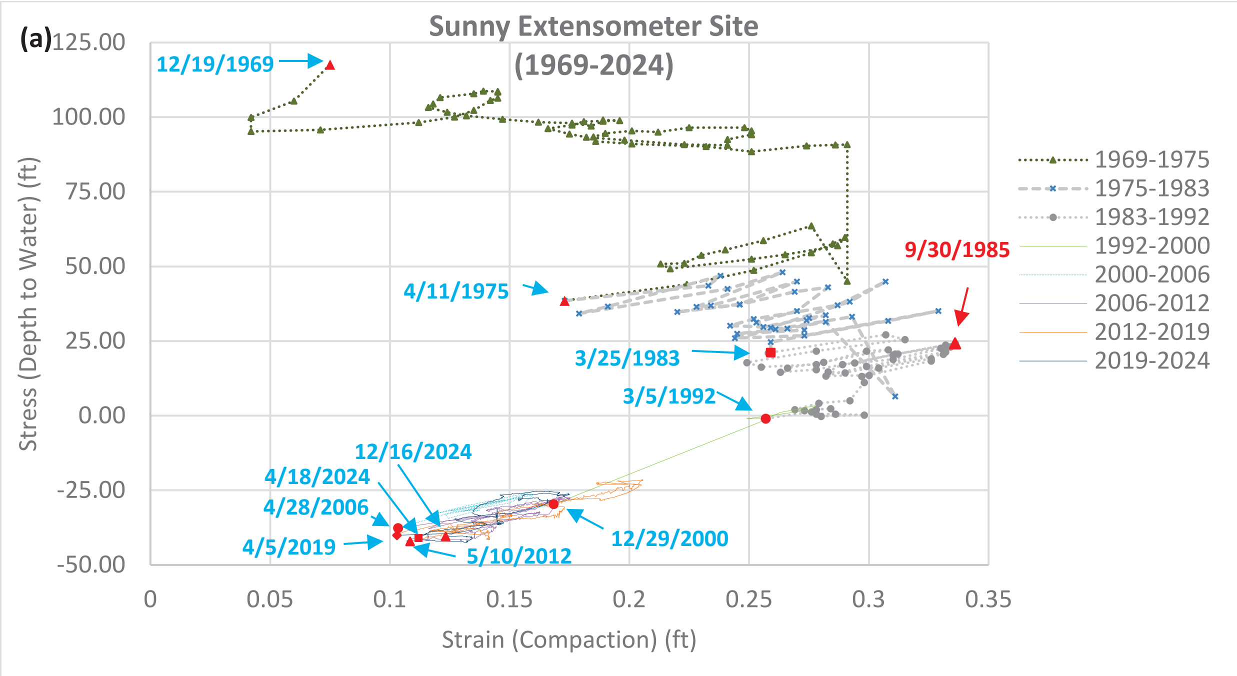


Figure A-5. Stress-strain (depth to water-compaction) analysis at Sunny for (a) 1969-2024, (b) 2000-2024, and (c) 2012-2024



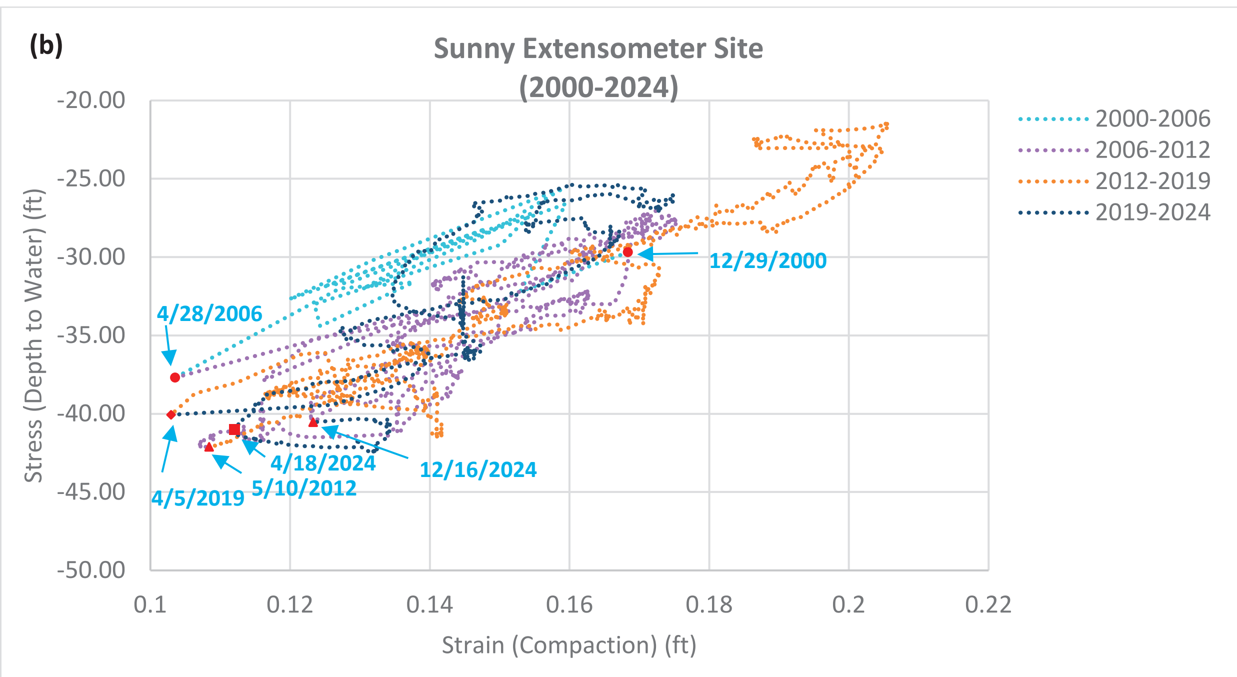


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Figure A-5. Stress-strain (depth to water-compaction) analysis at Sunny for (a) 1969-2024, (b) 2000-2024, and (c) 2012-2024 – Continued

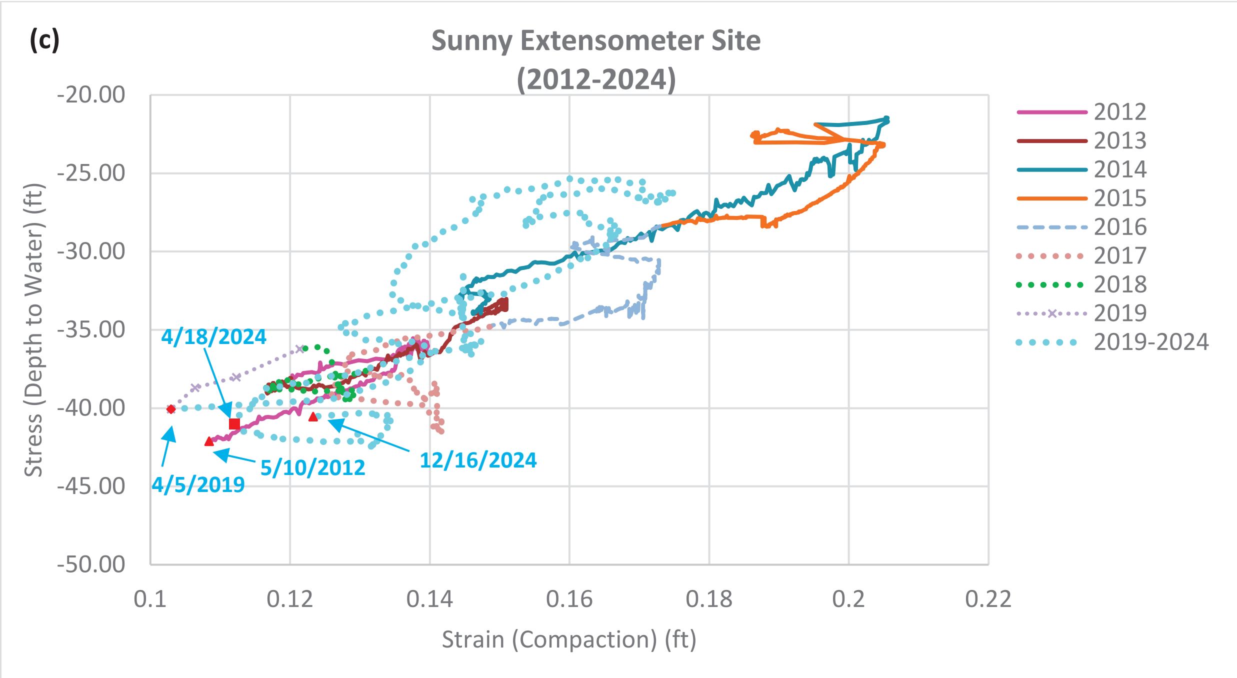

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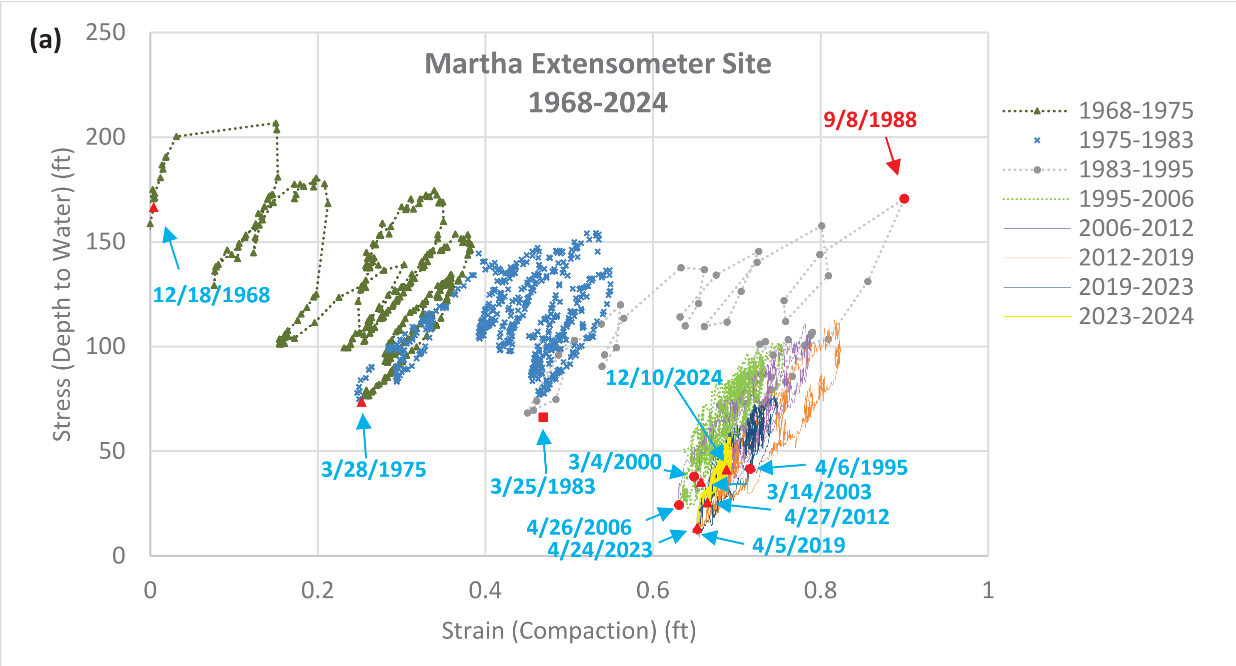
Figure A-6. Stress-strain (depth to water-compaction) analysis at Martha for (a) 1968-2024, (b) 1968-2006, (c) 1995-2024, (d) 2012-2024, and (e) 2019-2024



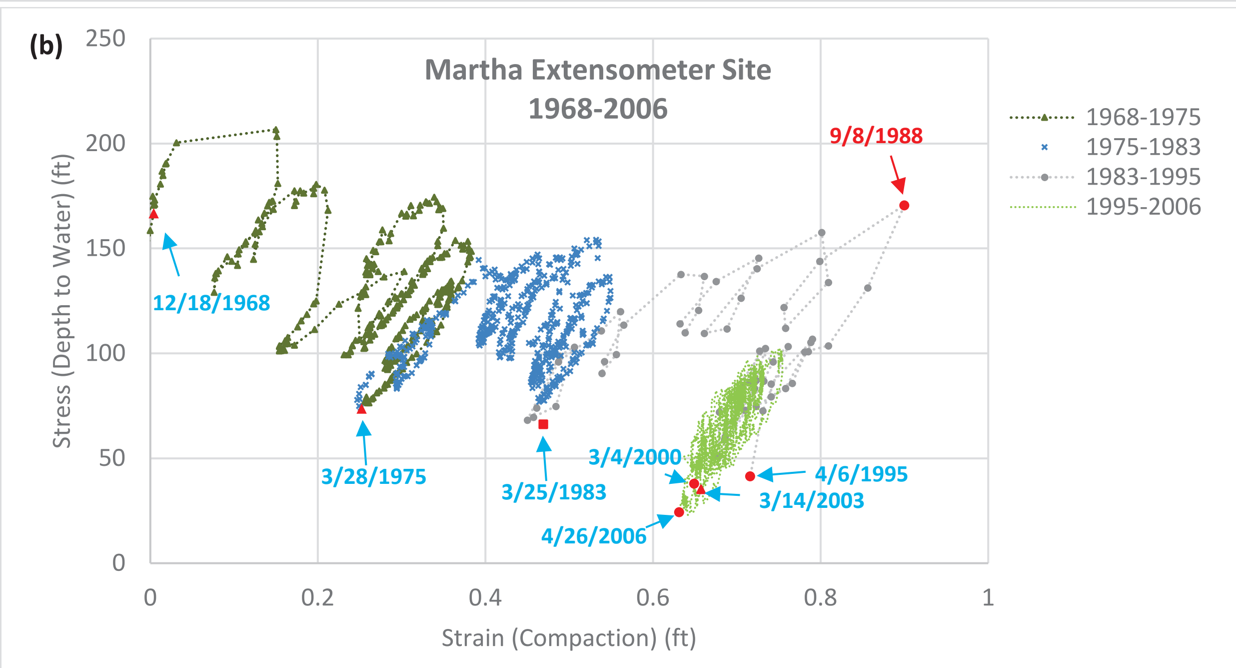


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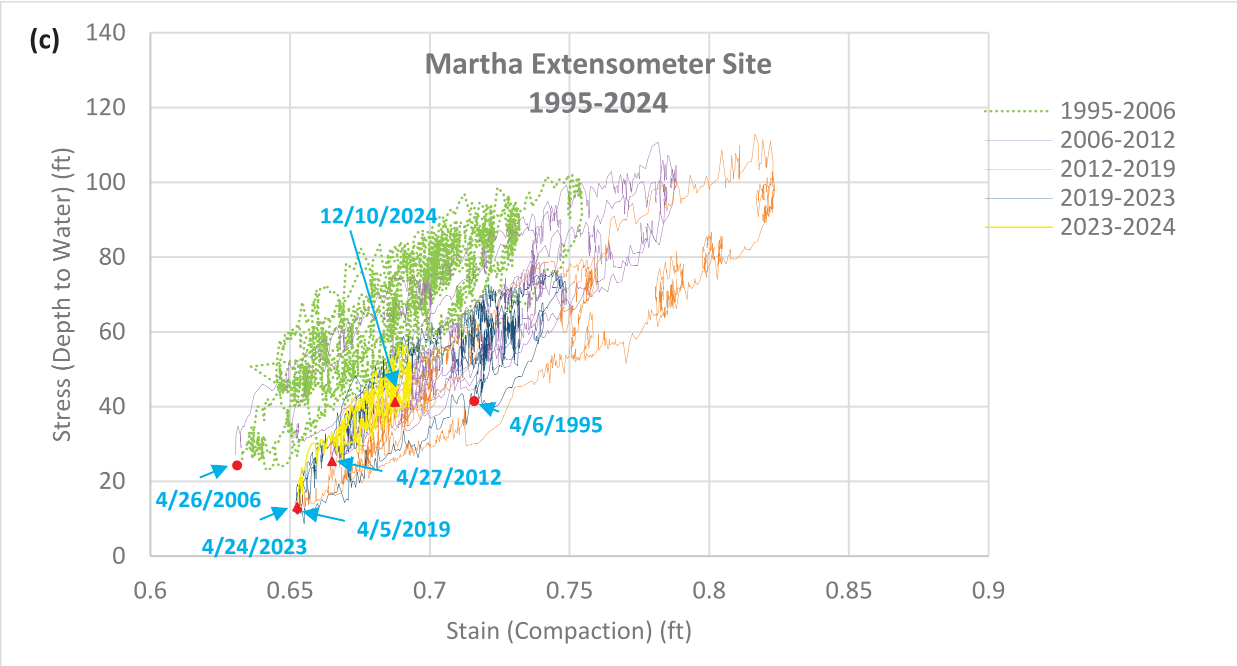
Figure A-6. Stress-strain (depth to water-compaction) analysis at Martha for (a) 1968-2024, (b) 1968-2006, (c) 1995-2024, (d) 2012-2024, and (e) 2019-2024 – Continued



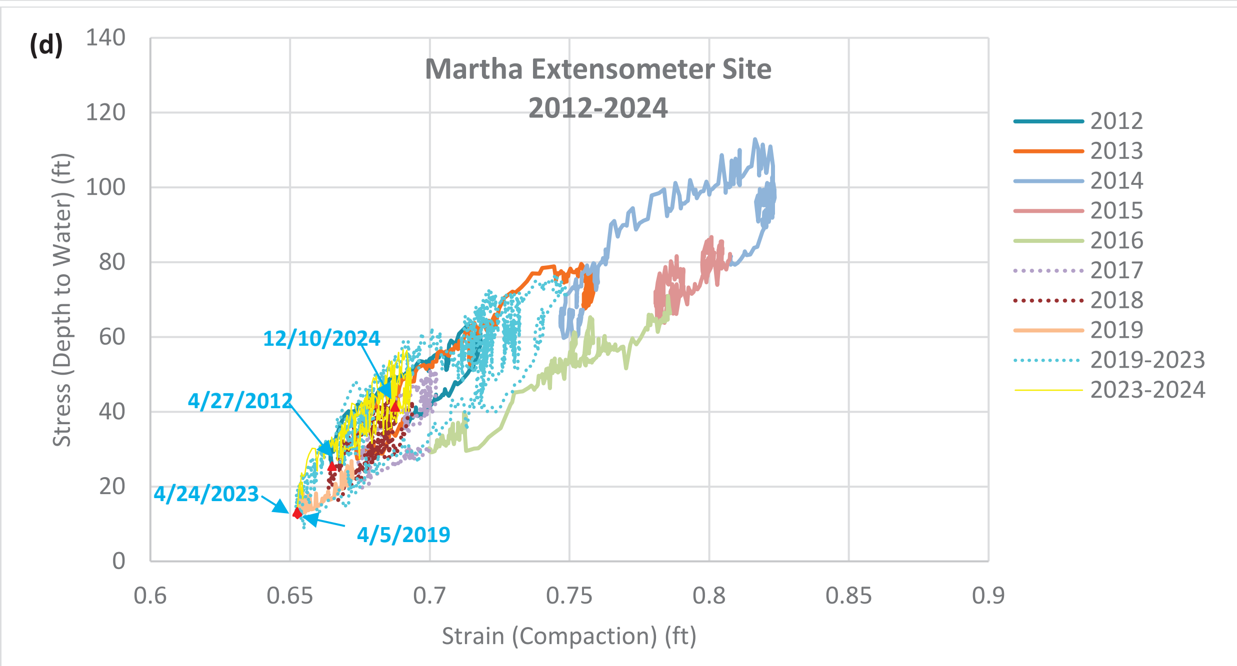


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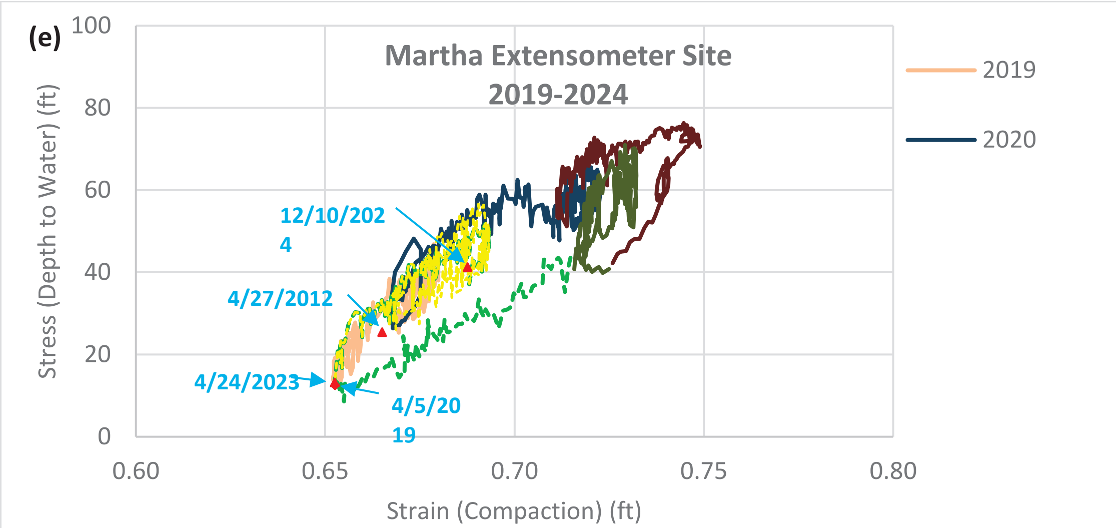
Figure A-6. Stress-strain (depth to water-compaction) analysis at Martha for (a) 1968-2024, (b) 1968-2006, (c) 1995-2024, (d) 2012-2024, and (e) 2019-2024 – Continued



Current extensometer data

Measured extensometer data are used to evaluate recent and current land subsidence conditions (Table A-1). The 2024 subsidence at Sunny and Martha are -0.018 feet (uplift) and -0.002 feet (uplift) respectively. The 11-year average of annual subsidence rate is -0.004 feet/year, with the negative value of extensometer data indicating aquifer expansion (or uplift). This value meets the Valley Water tolerable subsidence rate goal of not exceeding 0.01 feet/year over the last 11 years. The 11-year average value improved compared to what was reported in 2023 (0.001 feet/year) due to continued wet weather conditions.

Table A-1. Measured annual land subsidence at the Sunnyvale (Sunny) and San Jose (Martha) extensometers from 2014 to 2024

Year	Sunny (feet/year)	Martha (feet/year)	Average at Two Sites (feet/year)
2014	0.049	0.053	0.051
2015	-0.022	-0.021	-0.021
2016	-0.025	-0.087	-0.056
2017	-0.018	-0.007	-0.012
2018	-0.013	-0.020	-0.017
2019	-0.009	-0.005	-0.007
2020	0.028	0.046	0.037
2021	0.017	0.011	0.014
2022	0.003	-0.009	-0.003
2023	-0.020	-0.027	-0.024
2024	-0.018	-0.002	-0.010
Average from 2014 – 2024	-0.003	-0.006	-0.004

Notes: negative extensometer values indicate aquifer expansion and positive values indicate aquifer compaction.

Benchmark survey data analysis

The benchmark survey data along the Los Altos, Alum Rock, and Guadalupe CVLCs are used to study spatial land subsidence conditions and annual changes throughout the Santa Clara Plain. The benchmark survey is conducted in the fall of each year. Figure A-1 shows benchmark locations along the three CVLCs. Related analysis is summarized below.

Change in land surface elevation from 2023 to 2024

As discussed above, groundwater elevations were higher than 2023 at three of the ten subsidence index wells, but slightly lower at the other seven subsidence index wells. Figure A-7 shows the annual change in land surface elevation from 2023 to 2024 at benchmarks along the Los Altos, Alum Rock, and Guadalupe circuits. For benchmark survey data, a positive value indicates an increase in land surface elevation (uplift) and a negative value indicates a decrease in land surface elevation (subsidence); this is the opposite of the extensometer data (Table A-1).

The 2024 survey data showed a trend of positive land surface elevation change (land uplift) from 2023 at most benchmarks (Figure A-7). Only minor subsidence was observed at BM1147 along the Guadalupe circuit (Figure A-7). In general, the 2023 to 2024 land surface elevation change pattern is positive on both sides of the Silver Creek fault (Figure A-7), but for benchmarks that are on the east side of the fault, the benchmarks have greater land surface elevation change (uplift). The land surface elevation change differences on either side of the Silver Creek fault are consistent with a prior Interferometric Synthetic Aperture Radar (InSAR) study by Chaussard et al. (2014) and may reflect a combined response to spatial patterns of groundwater pumping and managed recharge and hydrogeologic control of groundwater across the fault.

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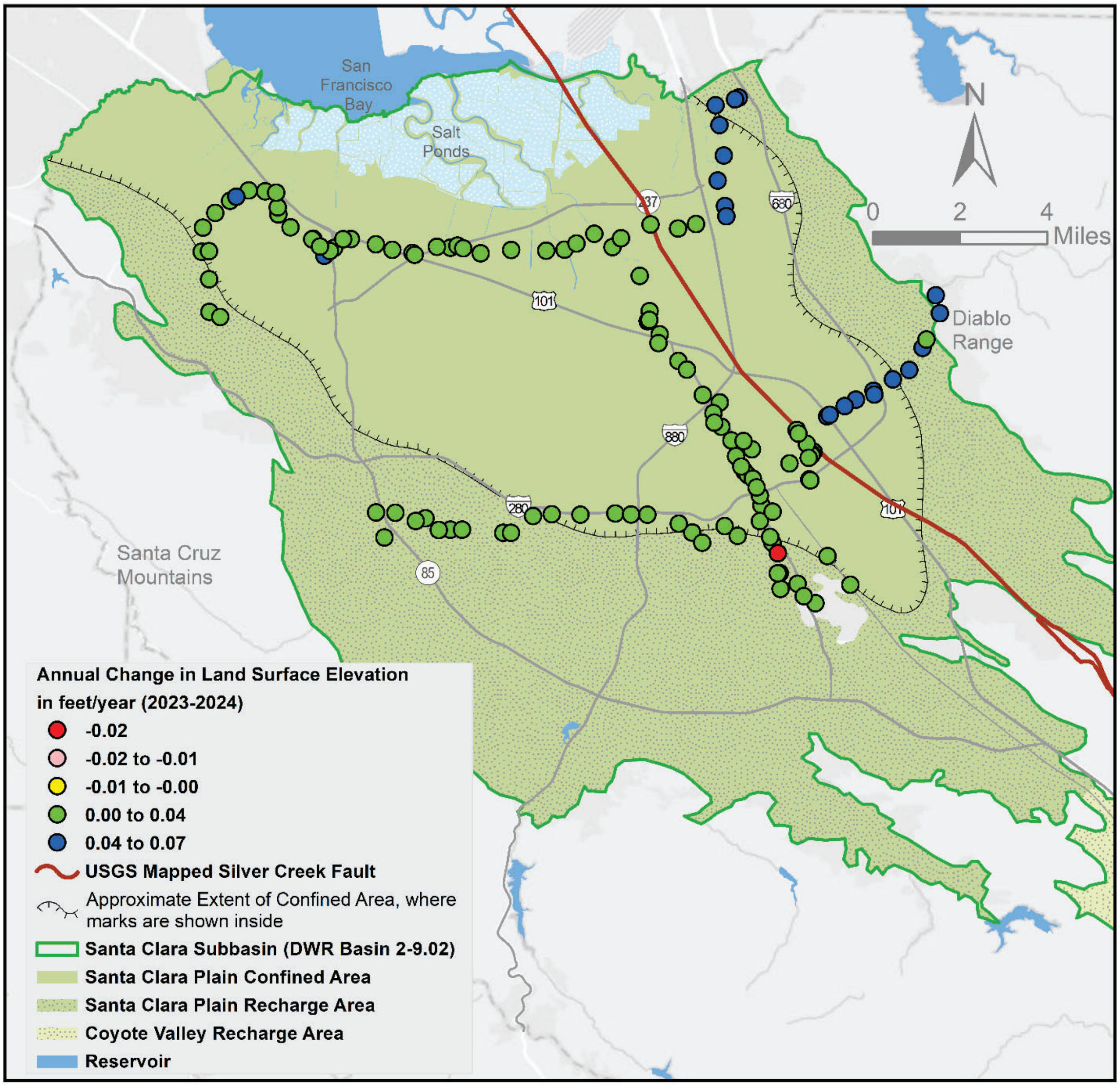
Figure A-7. Land surface elevation change at benchmarks between 2023 and 2024



Notes: positive benchmark values indicate land surface uplift and negative values indicate land surface subsidence in Figure A-7.

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Table A-2 summarizes the average and range of annual change of land surface elevation from 2023 to 2024. The average annual change of land surface elevation of all benchmarks in 2024 is 0.03 feet/year (uplift).

Table A-2. Fall 2024 change in land surface elevation for benchmark circuits compared to Fall 2023

Survey Circuit	Average Change (feet)	Range (feet)	Number of Benchmarks
Los Altos	0.02	0.00 to 0.06	39
Alum Rock	0.04	0.01 to 0.06	51
Guadalupe	0.03	-0.02 to 0.07	52

Long-term change in land surface elevation

The average annual change of land surface elevation over the last 11 years from 2014 to 2024 at individual benchmarks is presented in Figure A-8. Although land surface elevations at some benchmarks may increase or decrease at higher values in some years, all benchmarks had an average annual change less than -0.01 feet/year (Figure A-8)[9] except for one benchmark (BM1147) at Guadalupe run, which had an average annual change of -0.02 feet/year from 2014 to 2024.

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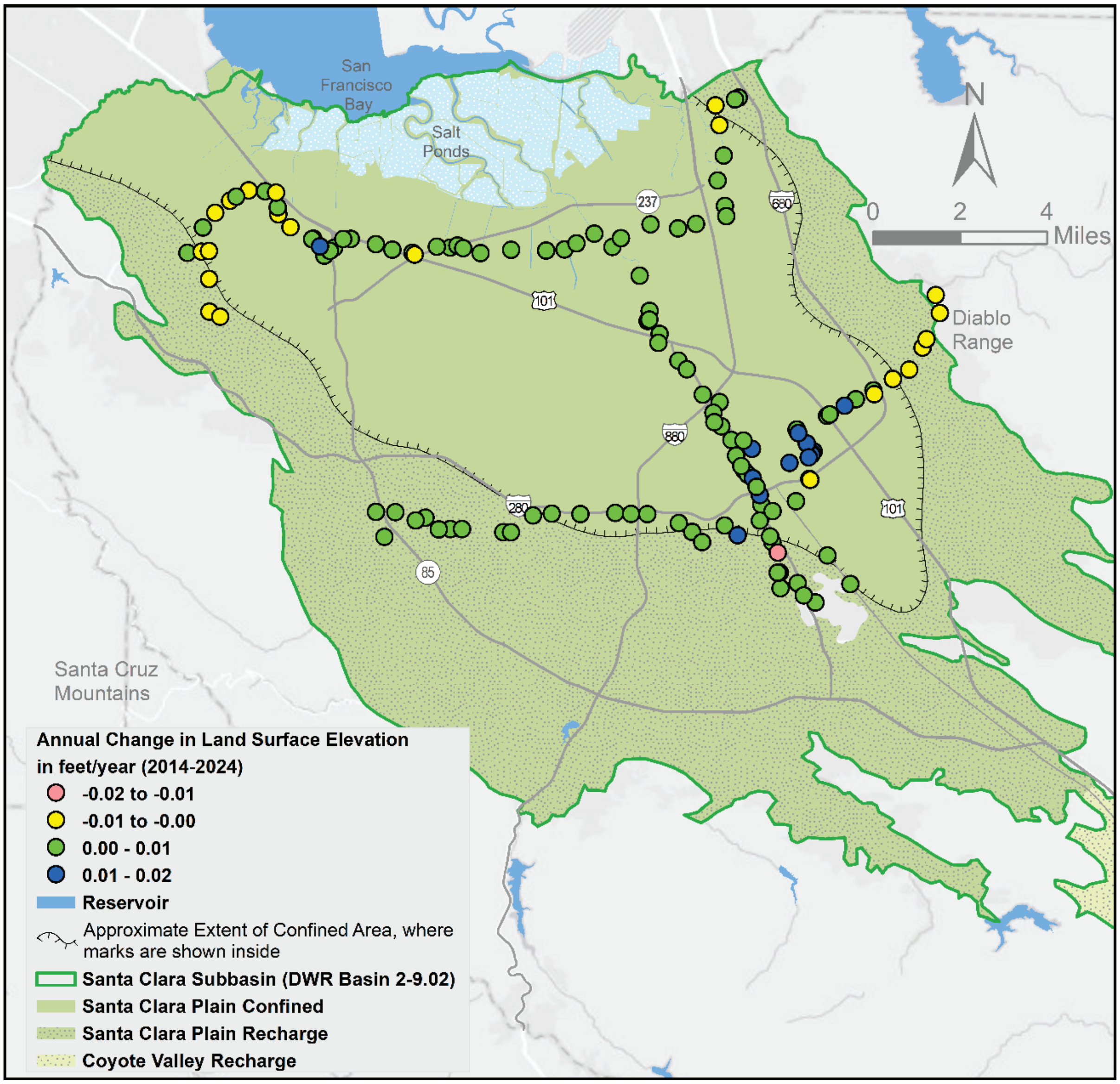
[9] The tolerable rate of 0.01 feet/year was used to establish the subsidence threshold water levels at the 10 PRESS index wells, including the two extensometers (Geoscience Support Services, 1991). While the rate applies to water levels, the average change in the benchmark land surface elevation is compared to this rate to provide context about basin-wide conditions.

Figure A-8. Average annual change in land surface elevation at benchmarks between 2014 and 2024

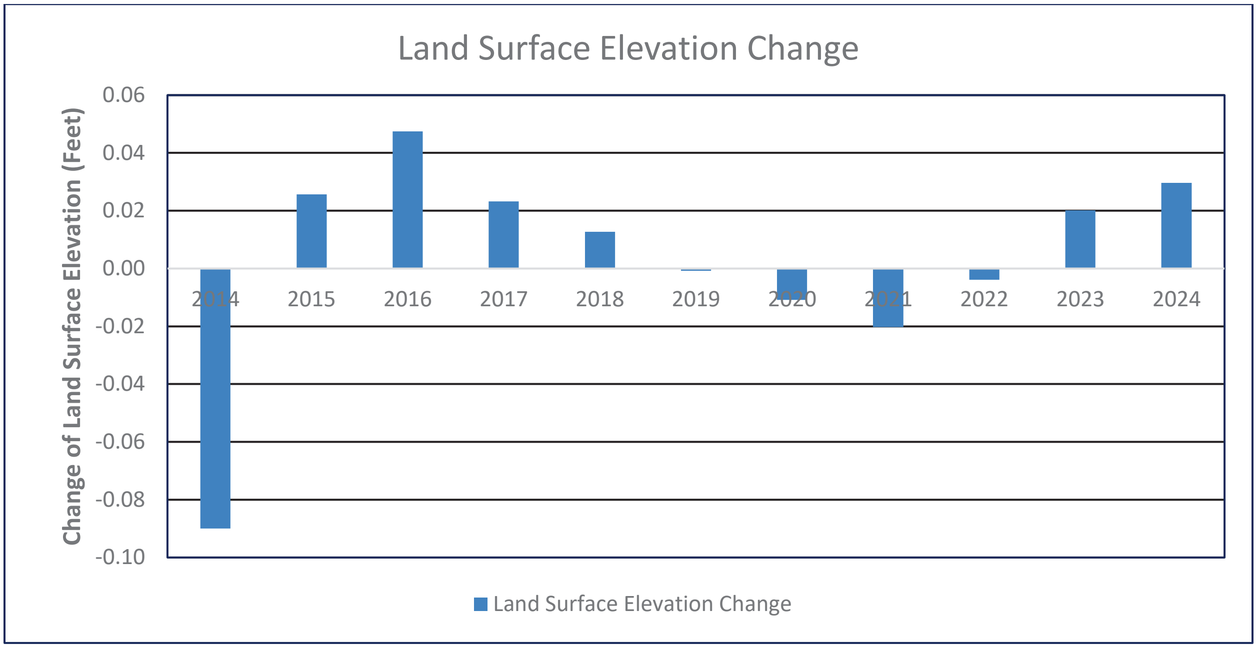


Notes: positive benchmark values indicate land surface uplift and negative values indicate land surface subsidence.

Figure A-9 shows the average annual change in land surface elevation at all benchmarks over the last 11 years from 2014 to 2024. During this 11-year period, there were six years with positive average values (uplift) and five years with negative average values (subsidence). The highest annual average subsidence was in 2014 and the highest annual average uplift was in 2016, prior to the drought-busting wet conditions in 2017. Uplift occurred in 2016 as a response to rising groundwater levels caused by large increases in Valley Water's managed recharge operations to recover groundwater conditions, reductions in groundwater pumping by retailers as they shifted sources, and conservation by the community. The average annual ground surface elevation change for all benchmarks over the last 11 years is 0.00 feet, indicating no net change.

In summary, the benchmark survey data show land surface uplift in nearly all benchmarks along the three CVLCs between 2023 and 2024, and no net change over the last 11 years. There remains a low risk of permanent land subsidence in 2024.

Figure A-9. Average annual change of land surface elevation of all benchmarks from 2014 to 2024



Notes: Although 2015 and 2016 were drought years, positive average annual change in land surface (uplift) occurred as a response to rising groundwater levels caused by Valley Water's drought response. This included increases in Valley Water's managed recharge operations to recover groundwater conditions, reductions in groundwater pumping by retailers as they shifted sources, and substantial water use reduction by the community. Change of land surface elevation in 2019 was -0.001 feet.

DISCUSSION

Valley Water's comprehensive land subsidence monitoring network consists of two extensometers, about 142 benchmarks along three CVLCs, and ten subsidence groundwater monitoring wells covering most of the Santa Clara Plain. The extensometers monitor subsidence conditions at two sites with high-quality subsidence and water elevation data. The annual survey provides data representing the subsidence condition at benchmarks along three CVLCs. The monitoring of water elevations at subsidence index wells does not provide data to quantify the subsidence condition directly, but the monitoring is straightforward and related data can be used as an indicator for subsidence condition. Since the index wells are located across the Santa Clara Plain, the monitoring data reflects regional conditions.

The current Valley Water practice of evaluating the land subsidence condition in the Santa Clara Plain is to calculate the average over an 11-year period using subsidence data collected at two extensometers (Sunny and Martha) and compare it with the established, tolerable rate of land subsidence. The tolerable subsidence rate of 0.01 feet/year is based on the arithmetic average of historic subsidence and rebound measured in the Sunny and Martha extensometers for the 11-year period from 1980 to 1990 (Geoscience, 1991).

The subsidence thresholds established at ten index wells are used as the minimum water elevations that should be maintained to avoid further permanent land subsidence. Although the thresholds were established over thirty years ago, they were based on a thorough study of historical data, subsidence modeling, and previous studies. It is recommended to continue to use these thresholds for groundwater operations and early indication of potential concerns. Because these thresholds are based on the 0.01 feet/year tolerable subsidence rate, they should be re-evaluated if the tolerable subsidence rate changes or if other information indicates a change is warranted.

The annual survey at benchmarks provides direct measurement of land surface changes along three CVLCs in the Santa Clara Plain. Valley Water will consider whether specific criteria should be developed to analyze survey data.

CONCLUSIONS

In summary, the data measured by each component of the subsidence monitoring network shows that:

- Groundwater elevations were higher than the subsidence thresholds at all ten index wells throughout 2024 in the Santa Clara Plain.
- In general, the 2024 average groundwater elevations were higher than 2023 in three index wells (P6, P7, and P8). The 2024 average groundwater elevation in well P5 was 23 feet lower than 2023. For the other six index wells there was only a minor decline in the groundwater elevations from 2023 to 2024.
- Net aquifer uplift was measured at both extensometer sites in 2024. The average annual subsidence rate over the last 11 years at the Martha and Sunny sites is -0.004 feet/year (net aquifer expansion or uplift), which meets Valley Water's tolerable rate of 0.01 feet/year.
- The benchmark survey data showed that the average land surface elevation of nearly all benchmarks in 2024 was higher than 2023, and the average annual change of land surface elevation over last 11 years was 0.00 feet (no net change).
- Stress-strain analysis indicated that the compaction observed in 2024 remains in the elastic range.

The analysis of the data from the Valley Water subsidence monitoring network indicates that the risk of permanent (inelastic) land subsidence in 2024 remains low. Continued monitoring of the subsidence network is recommended to detect early signs of inelastic land subsidence and to support continued sustainable groundwater supplies.

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3. Valley Water, 2020, 2019 Subsidence Data Analysis, Technical Memorandum (Memo).

4. Valley Water, 2021, Groundwater Management Plan for the Santa Clara and Llagas Subbasins, Santa Clara Valley Water District, San Jose, CA.
5. Chaussard, E., Bürgmann, R., Shirzaei, M., Fielding, E. J., & Baker, B. (2014). Predictability of hydraulic head changes and characterization of aquifer-system and fault properties from InSAR-derived ground deformation. Journal of Geophysical Research: Solid Earth, 119(8), 6572-6590.

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APPENDIX B

CY 2024 Groundwater Supply

APPENDIX B – CY 2024 GROUNDWATER SUPPLY

This appendix summarizes calendar year (CY) 2024 groundwater supply conditions and trends, including groundwater pumping, countywide water use, managed and natural recharge, and groundwater level monitoring locations in the Santa Clara and Llagas subbasins. These CY 2024 data help support Valley Water's water supply operations and related planning that are done on a calendar year basis.

Groundwater Pumping – CY 2024

Approximately 127,000 AF of groundwater was pumped in CY 2024 (Table B-1). The locations and volumes of groundwater pumping in the Santa Clara and Llagas subbasins, respectively, are shown in Figures 4 and 5 (Chapter 2). While those figures are based on water year, the locations and volumes remain largely consistent for either year type.

Table B-1. CY 2024 Groundwater Pumping by Use (AF)

Water Use Sector	Santa Clara Subbasin		Llagas Subbasin (Zones W-5 & W-8)	Total
	Santa Clara Plain (Zone W-2)	Coyote Valley (Zone W-7)		
M&I	68,000	10,800	19,000	97,800
Domestic	100	200	1,600	1,900
Agricultural	800	3,000	23,500	27,300
Total	**68,900**	**14,000**	**44,100**	**127,000**

Notes:

- M&I, municipal and industrial
- Large volume pumpers are metered and report groundwater production to Valley Water monthly. Pumping for wells reporting semi-annually or annually (primarily agricultural and domestic) was estimated based on available and/or prior year data as validated data was not available by the date of publication of this report.
- Valley Water's groundwater benefit zones largely align with the groundwater subbasins as shown above. Additional information about the groundwater benefit zones can be found here: https://www.valleywater.org/your-water/groundwater/groundwater-benefit-zones
- All values are rounded to the nearest hundred.

Groundwater Pumping Trends – CY 2024

Groundwater pumping is largely offset by Valley Water's managed recharge of local and imported surface water. In most years, managed recharge typically averages about two-thirds of the pumping (Figure B-1), with natural recharge balancing the remaining pumping. However, in 2023, Valley Water's managed recharge was greater than pumping to help recover groundwater following the recent (2020–2022) drought. This groundwater management operation was similar to 2016 when managed recharge was greater than pumping to help recover groundwater from the 2012–2016 drought (Figure B-1).

Groundwater pumping increased in 2024 compared to 2023 (Figure B-1), reflecting an increase in countywide water use and increasing demand after the 2020–2022 drought. Although greater than 2023, groundwater pumping in 2024 was less than pumping from 2020 to 2022 (Figure B-1). Because groundwater conditions generally recovered in 2023, managed recharge was reduced in 2024 but remained at a relatively high level compared to groundwater pumping (Figure B-1) to maintain healthy groundwater supply conditions.

Figure B-1. Countywide Groundwater Pumping and Managed Recharge

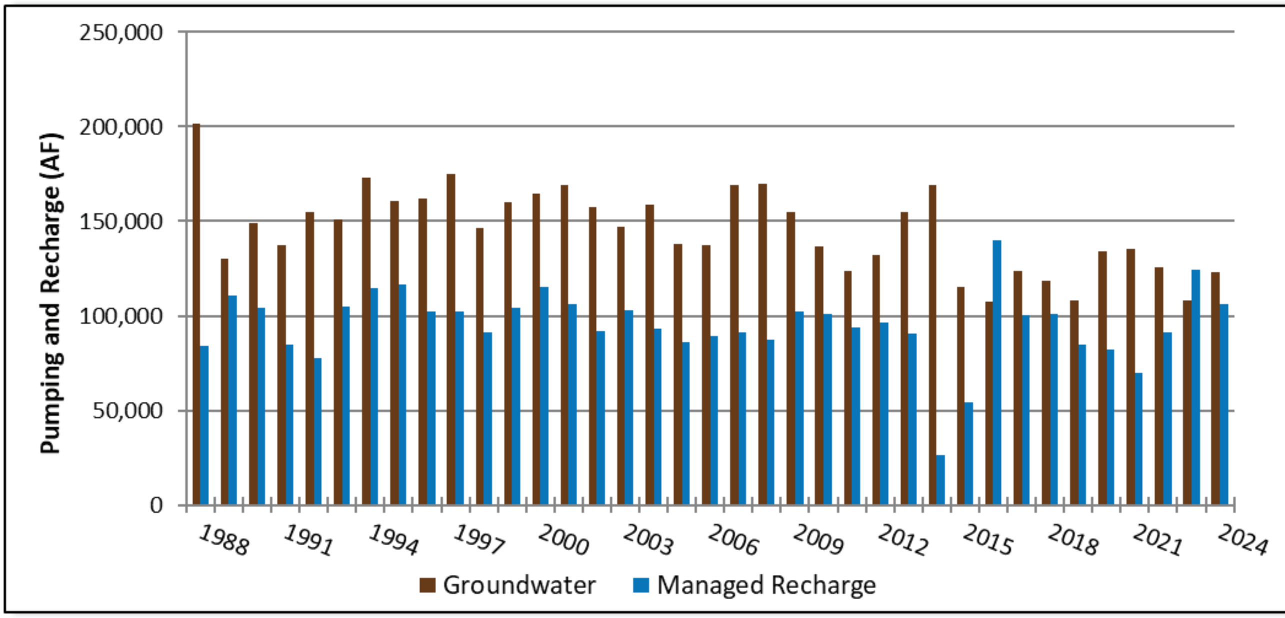
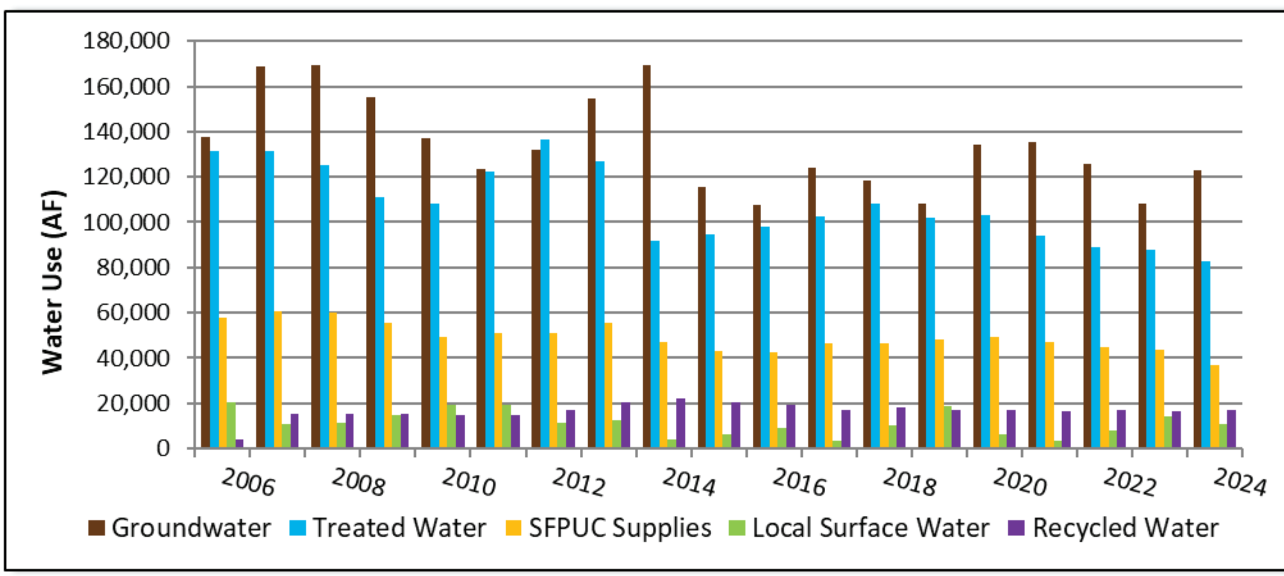


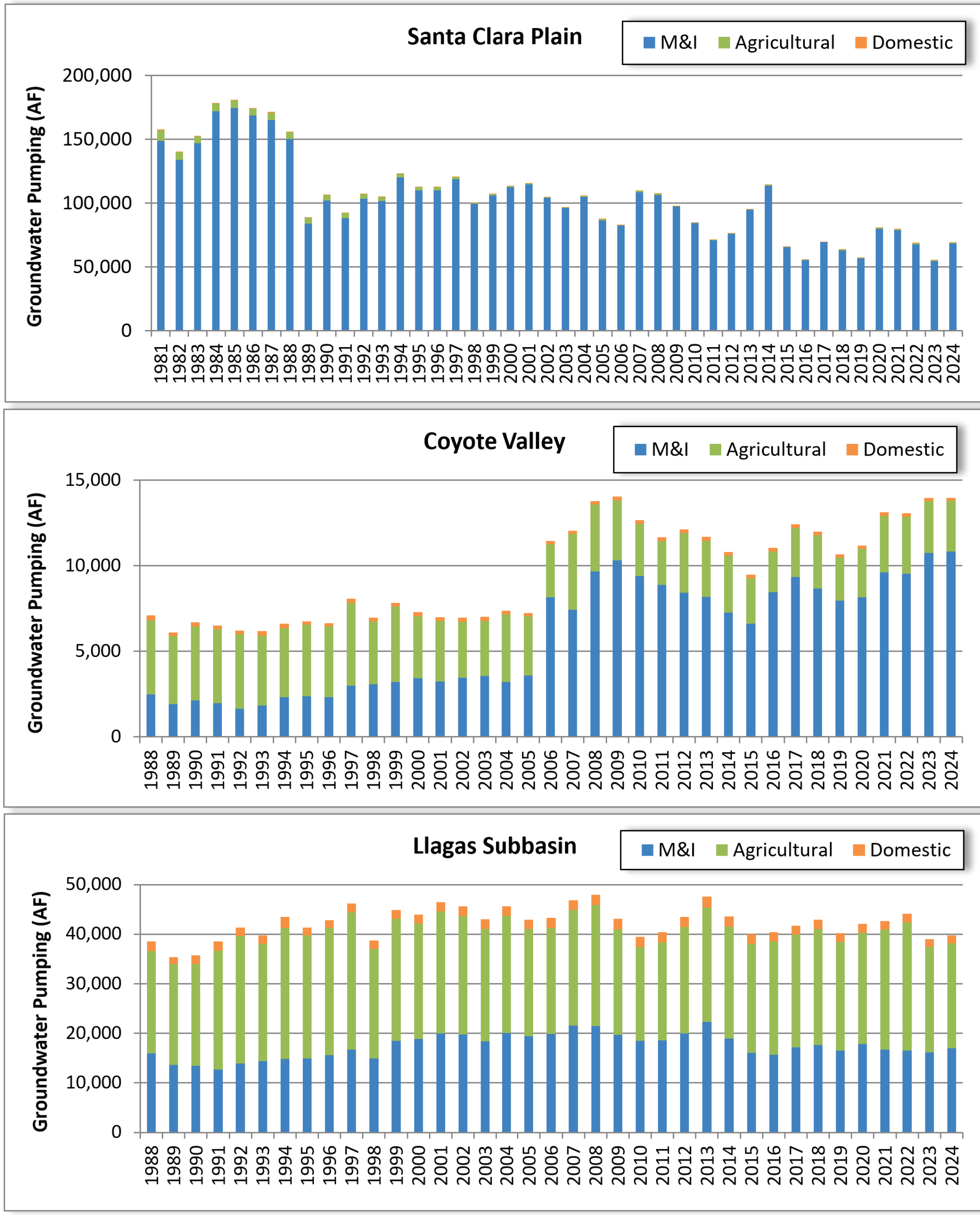
Figure B-2 shows the countywide water use by source, including groundwater, Valley Water treated water, San Francisco Public Utility Commission (SFPUC) supplies, local surface water, and recycled water. Groundwater provided about 45% of the total water used countywide in 2024.

Figure B-2. Countywide Water Use



Groundwater pumping and use patterns over time are shown in Figure B-3 for each groundwater management area. In the Santa Clara Plain, pumping dropped significantly in the late 1980s following completion of Valley Water's Santa Teresa Water Treatment Plant (WTP). Since then, pumping has averaged 94,000 AF per year but with significant variation based on hydrology and demands. Pumping spiked in the middle of the 2012–2016 drought to 115,000 AF in 2014. However, the water retailers and community responded to the Valley Water Board's calls for water use reduction, and pumping decreased significantly during the past nine years, averaging 66,100 AF per year. A notable increase in pumping in the Coyote Valley occurred in 2006 when a water retailer installed new wells and began extracting water to serve customers in the Santa Clara Plain. This increased the average annual pumping volume in Coyote Valley after 2006 by about 4,800 AF (Figure B-3). Since 2019, there has been a notable increasing pumping trend in Coyote Valley (Figure B-3). Pumping in the Llagas Subbasin has remained relatively stable over the period of record (Figure B-3).

Figure B-3. Groundwater Pumping by Use Category



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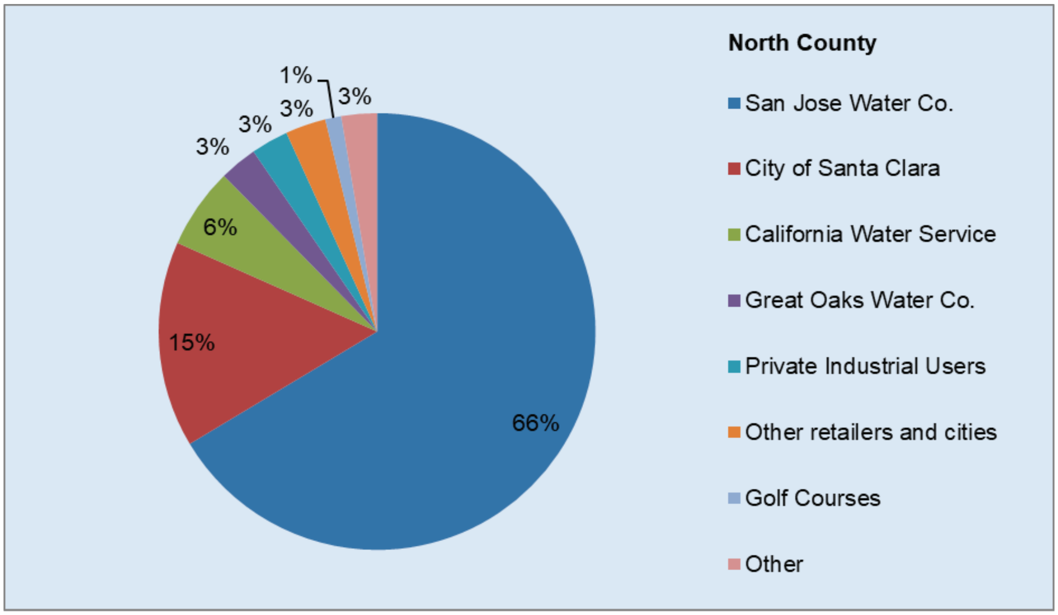
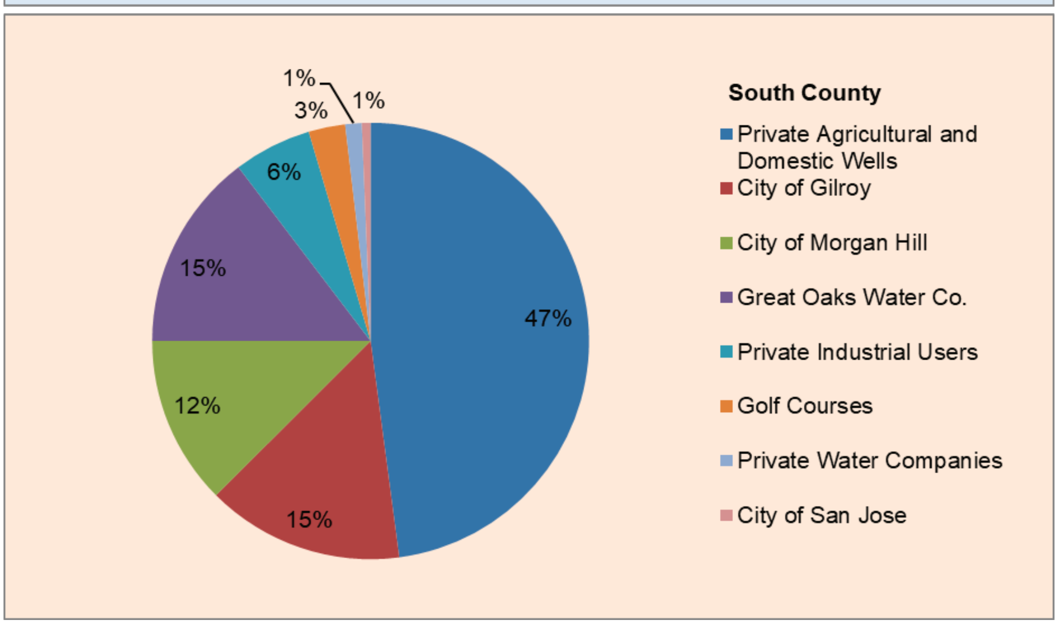
Major Groundwater Users – CY 2024

The largest groundwater users in North and South County are shown in Figure B-4. Water retailers are the primary users in North County, accounting for over 93% of all pumping in 2024. San Jose Water Company is the largest individual user, accounting for 66% of total North County pumping, followed by other retailers and a few large industrial users. Unlike North County, about 47% of pumping in South County was from thousands of individual pumpers including agricultural and domestic users. In South County, pumping by water retailers and water companies accounted for about 43% of groundwater use. Other large users include golf courses and industrial facilities.

Figure B-4. Percent of Total Pumping by Major Groundwater Users in 2024



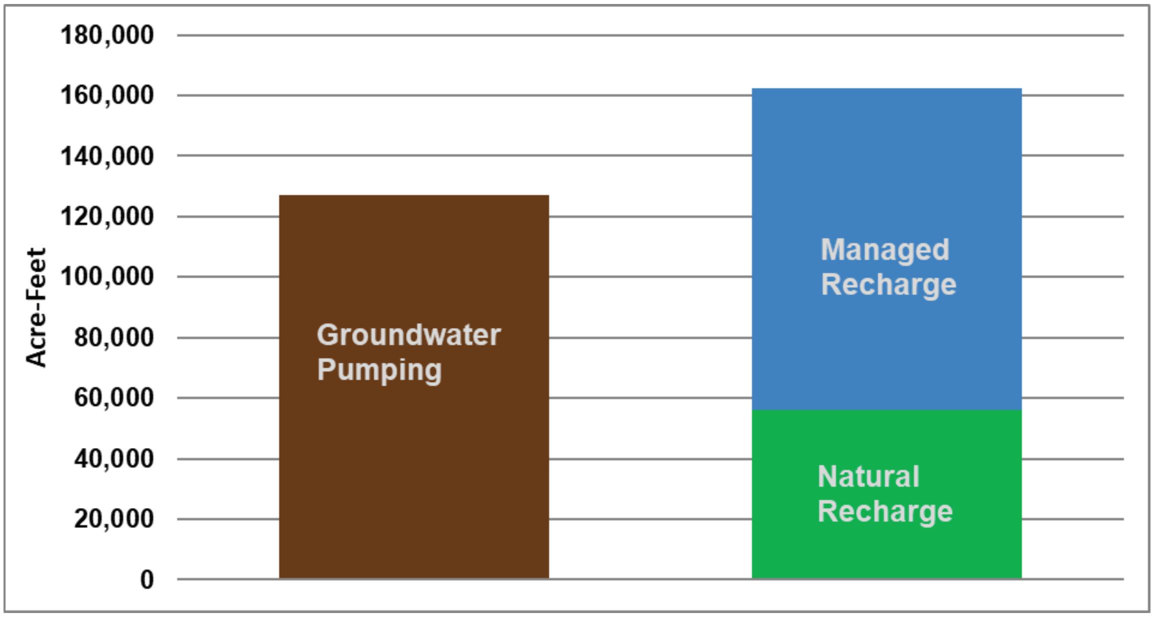


Notes: North County includes the Santa Clara Plain and South County includes Coyote Valley and the Llagas Subbasin.

Managed Recharge – CY 2024

Total recharge exceeded groundwater pumping in CY 2024 (Figure B-5) due to the recent below average pumping, above average rainfall, and availability of surface water for managed recharge. Managed recharge is greater than natural recharge to compensate for groundwater pumping exceeding natural recharge on an annual basis.

Figure B-5. Countywide Groundwater Pumping and Recharge in CY 2024



Valley Water recharged 106,400 AF of local and imported surface water in 2024 (Table B-2), which is about 15% less than 2023 (124,600 AF), 12% more than the five-year (2020-2024) average (94,900 AF), and 12% more than the long-term average (1988-2023) of 95,000 AF. Valley Water operated an above-average managed recharge program in 2024 to help maintain healthy groundwater storage. Robust recharge was possible because of the above normal hydrologic conditions resulting in availability of substantial local surface water and imported water supplies[1]. Countywide, most of the managed recharge (60%) occurred in-stream, with the remainder (40%) through percolation ponds (Table B-2).

Table B-2 CY 2024 Managed Recharge (AF)

Zone	In-Stream Recharge (Creeks/Coyote Pond)	Off-Stream Recharge (Recharge Ponds)	Total
North County	23,900	40,000	63,900
South County	39,500	2,900	42,500
Total	**63,400**	**42,900**	**106,400**

Notes: North County includes the Santa Clara Plain and South County includes Coyote Valley and the Llagas Subbasin.

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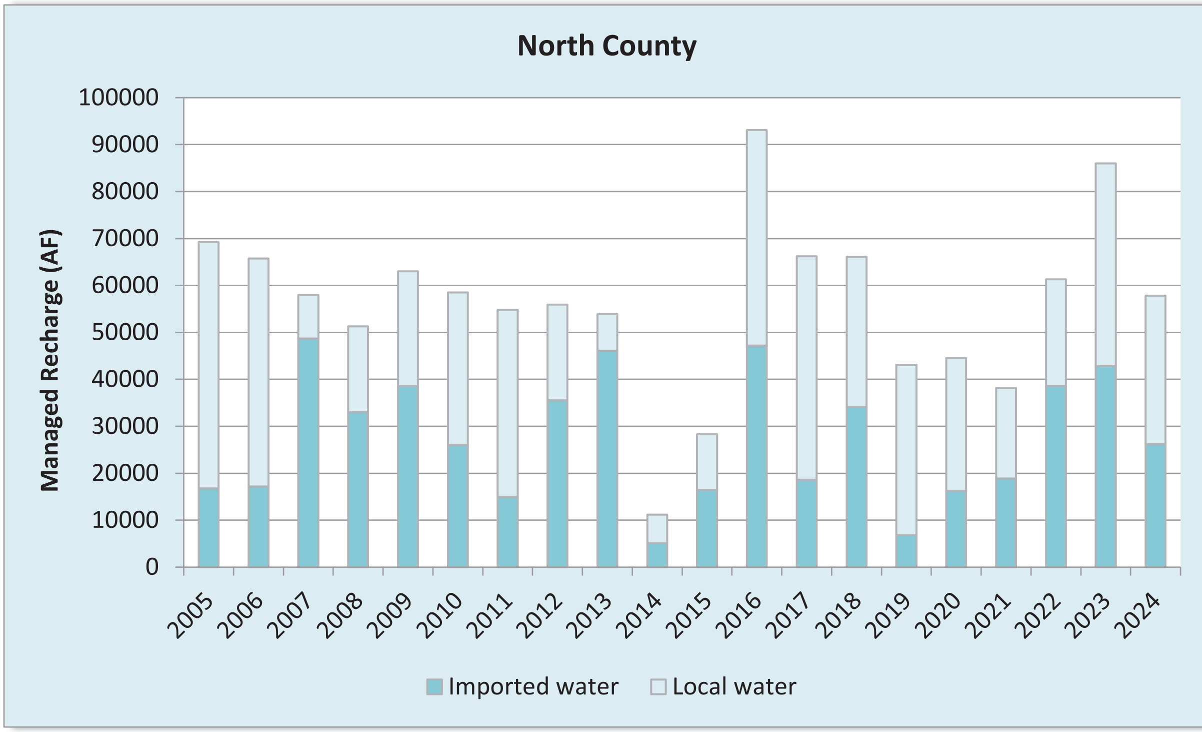
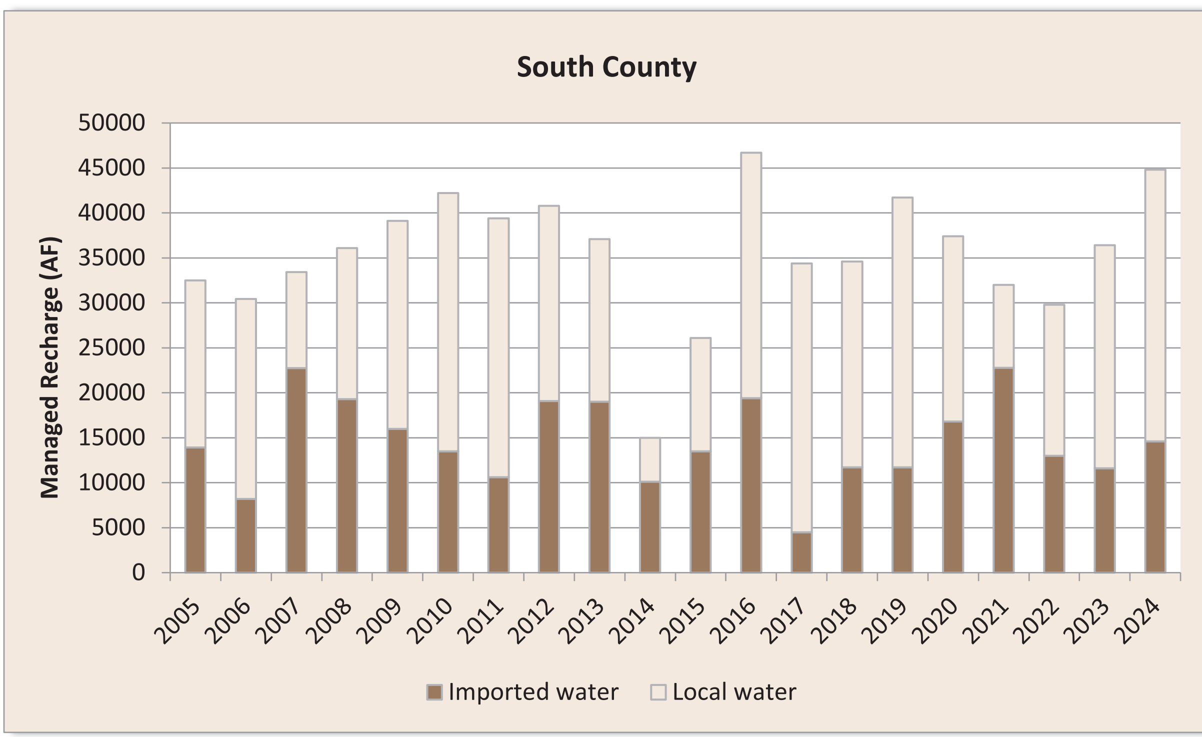
[1] The final allocations to Valley Water as percentage of contract amounts were 75% Municipal & Industrial and 50% Agricultural from CVP and 40% from SWP.

Countywide, imported water contributed 40% and local sources contributed 60% to total managed recharge in CY 2024 (Figure B-6). Local water sources account for 55% of managed recharge in North County and 67% of managed recharge in South County (Figure B-6).

Figure B-6. Managed Recharge by Source – North County and South County

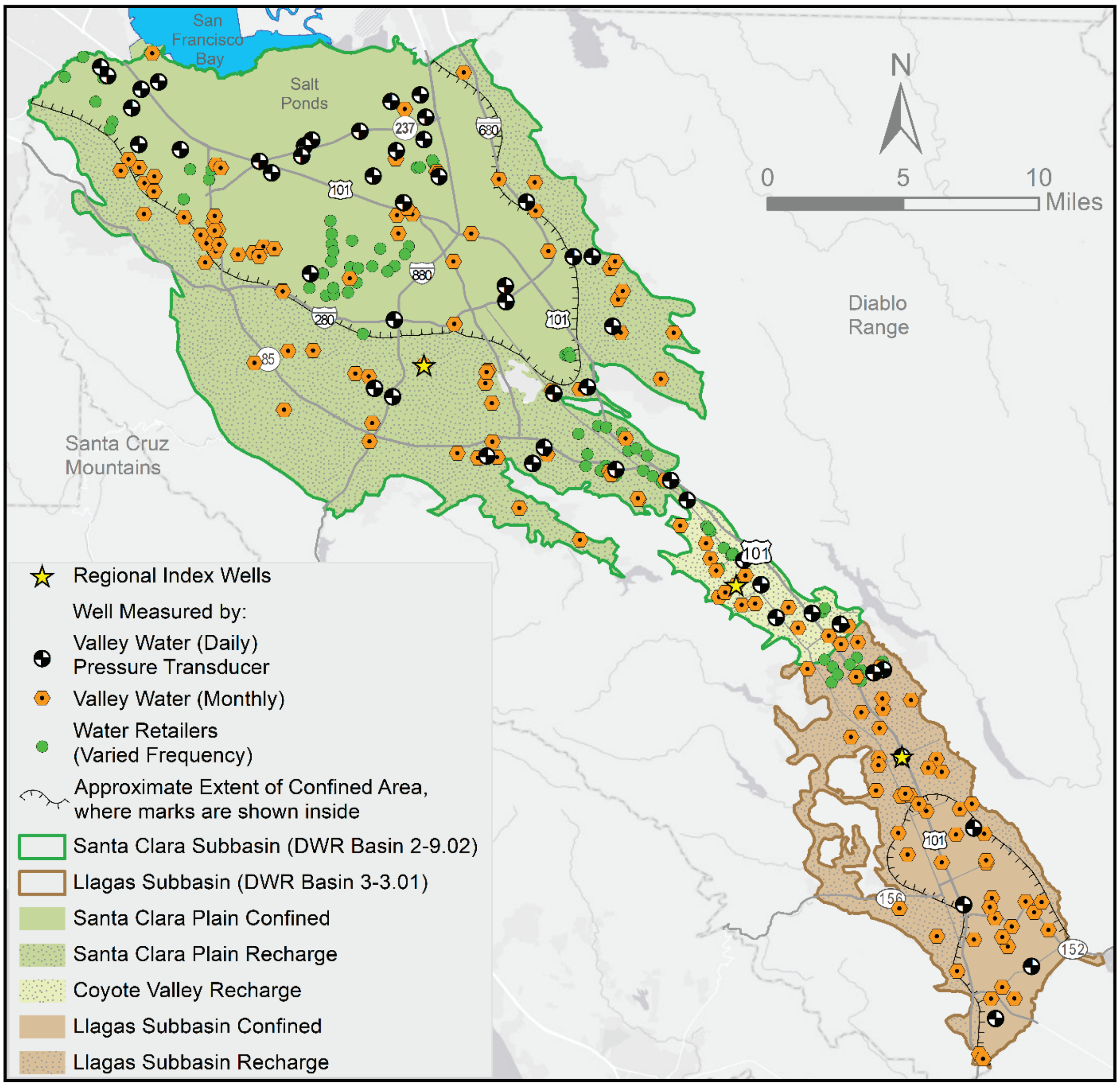




Groundwater Levels – CY 2024

Comprehensive and accurate groundwater level data allows Valley Water to evaluate storage conditions and supports sound operational decisions and water supply planning. In 2024, Valley Water measured depth to water at 252 wells on a daily to monthly basis and obtained similar data from 85 water retailer wells (Figure B-7). The wells that Valley Water monitors represent all critical areas and aquifers in each of the two subbasins. As the GSA for the Santa Clara and Llagas subbasins under SGMA, Valley Water has transferred all historical groundwater elevation data from the California Statewide Groundwater Elevation Monitoring (CASGEM) website to the Monitoring Network Module (MNM) on the DWR SGMA portal[2], including uploading 2024 groundwater elevation measurements to MNM.

Figure B-7. CY 2024 Groundwater Level Monitoring



[2] https://sgma.water.ca.gov/portal/

APPENDIX C
WY 2024 Regional Groundwater Quality Results

Table C-1a Summary of WY 2024 Water Quality Indicator Data for the Santa Clara Subbasin

Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain								Santa Clara Subbasin, Coyote Valley				Maximum Contaminant Level	
		Shallow Zone[2]				Principal Zone[3]									
		n[4]	Min[5]	Median[6]	Max	n	Min	Median	Max	n	Min	Median	Max	MCL[7]	SMCL[8]
Aggressive Index (Corrosivity)	INDEX	--	--	--	--	41	11.2	12.2	13.2	2	11.9	11.9	11.9	--	--
Bicarbonate (as HCO3)	mg/L	5	217	326	386	70	120	246	440	7	140	237	353	--	--
Bicarbonate Alkalinity (as CaCO3)	mg/L	5	178	267	317	17	135	226	360	5	159	196	289	--	--
Carbonate (as CO3)	mg/L	5	<5	<5	<5	70	<3	<5	18	7	<5	<5	<5	--	--
Carbonate Alkalinity (as CaCO3)	mg/L	5	<5	<5	<5	17	<5	<5	<5	5	<5	<5	<5	--	--
Color	Color Units	--	--	--	--	53	<1	<5	10	2	<5	<5	<5	--	15
Dissolved Oxygen	mg/L	6	3.1	5.6	9.5	20	0.66	4.0	8.2	5	3.4	3.7	6.6	--	--
Foaming Agents (MBAS)	µg/L					53	<0.05	<50	<100	2	<50	<50	<50	--	500
Hardness, Total (as CaCO3)	mg/L	6	243	343	482	73	15	290	476	32	<10	266	594	--	--
Hydroxide (as OH)	mg/L	5	<5	<5	<5	70	<3	<5	<20	7	<5	<5	<5	--	--
Hydroxide Alkalinity (as CaCO3)	mg/L	5	<5	<5	<5	17	<5	<5	<5	5	<5	<5	<5	--	--
Langelier Index @ 60 C	INDEX	--	--	--	--	18	-0.38	0.16	1.0	--	--	--	--	--	--
Langelier Index at Source Temp	INDEX	--	--	--	--	18	-0.93	0.21	0.92	--	--	--	--	--	--
Odor Threshold @ 60 C	TON	--	--	--	--	52	<1	<1	1	2	<1	<1	<1	--	3
Oxidation Reduction Potential (ORP)	mV	7	121	306	407	20	-162	212	396	5	209	299	386	--	--
pH	pH Units	7	7.2	7.5	7.6	71	6.7	7.6	8.3	7	7.0	7.7	9.1	--	--
Source Temperature	C	7	19.3	19.8	20.6	20	17.7	19.7	22.4	5	18.4	19.3	21.3	--	--
Specific Conductance	µS/cm	12	338	772	803	106	393	674	971	13	541	611	936	--	(900)
Total Alkalinity (as CaCO3)	mg/L	5	178	267	317	70	120	240	380	7	140	196	289	--	--
Turbidity	NTU	12	0.2	0.89	5.1	89	<0.1	0.34	15	12	<0.1	0.37	0.96	--	5
E. Coli (P/A)	P/A	1	0	Present	1 Absent	3	0	Present	3 Absent	26	0	Present	26 Absent	--	--
Total Coliform (P/A)[9]	P/A	1	0	Present	1 Absent	3	0	Present	3 Absent	26	8	Present	18 Absent	--	--

Table C-1a Summary of WY 2024 Water Quality Indicator Data (Notes)

Table includes data for wells monitored by Valley Water (annual monitoring network wells and water supply wells) and public water system data reported to the CA Division of Drinking Water (DDW).

Only wells with known construction information are presented in this table. Public water system wells are assumed to represent the principal zone if no construction information is available, as these are typically deep wells.

1. CFU/mL = colony-forming unit per milliliter; µg/L = micrograms per liter; mg/L = milligrams per liter; P/A = present/absent per 100 ml; µS/cm = microSiemens per centimeter; MPN/100 mL = most probable number per 100 milliliters; NTU = Nephelometric Turbidity Units; TON = Threshold Odor Number.

2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.

3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.

4. n = number of results for each parameter. Some parameters may have been analyzed more than once at a particular well.

5. The minimum shown is the lowest detected value. The lowest reporting limit (e.g., <5) is shown when there are no quantified values at the lowest reporting limit.

6. For parameters with results reported at multiple reporting limits, the median was computed using the Maximum Likelihood Estimate (MLE) method.

7. MCL = Maximum Contaminant Level specified in the Code of Federal Regulations 40CFR141 and/or Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.

8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per DDW or US EPA. For SMCLs having a range, the lower, recommended threshold is listed in parentheses.

9. Total coliform and e. coli bacteria are regulated under the US EPA Total Coliform Rule, which identifies sampling requirements and compliance criteria based on the type of public water system. All wells with data in bacteria results in this table are private, domestic wells that are not subject to federal or state drinking water requirements.

Table C-1b Summary of WY 2024 Water Quality Indicator Data for the Llagas Subbasin

Parameter	Units[1]	Llagas Subbasin								Maximum Contaminant Level	
		Shallow Zone[2]				Principal Zone[3]					
		n[4]	Min[5]	Median[6]	Max	n	Min	Median	Max	MCL[7]	SMCL[8]
Aggressive Index (Corrosivity)	INDEX	--	--	--	--	11	11.9	12.2	12.6	--	--
Bicarbonate (as HCO3)	mg/L	19	124	251	420	27	120	245	423.0	--	--
Bicarbonate Alkalinity (as CaCO3)	mg/L	19	102	205	344	16	98	229	347	--	--
Carbonate (as CO3)	mg/L	19	<5	<5	<5	27	<3	<5	<10	--	--
Carbonate Alkalinity (as CaCO3)	mg/L	19	<5	<5	<5	16	<5	<5	<5	--	--
Color	Color Units	--	--	--	--	11	<3	3	7	--	15
Dissolved Oxygen	mg/L	18	2.0	6.4	11	16	3.0	6.1	9.1	--	--
E. Coli (MPN)	MPN/100 ML	1	<1	<1	<1	1	<1	<1	<1	--	--
Foaming Agents (MBAS)	µg/L	1	<0.1	<0.1	<0.1	12	<0.05	<0.1	<50	--	500
Hardness, Total (as CaCO3)	mg/L	48	66	264	584	63	<10	268	579	--	--
Heterotrophic Plate Count	CFU/ml	1	340	340	340	1	1,500	1,500	1,500	--	--
Hydroxide (as OH)	mg/L	19	<5	<5	<5	27	<3	<5	<10	--	--
Hydroxide Alkalinity (as CaCO3)	mg/L	19	<5	<5	<5	16	<5	<5	<5	--	--
Langelier Index @ 60 C	INDEX	--	--	--	--	11	<0.057	0.91	1.23	--	--
Langelier Index at Source Temp	INDEX	--	--	--	--	10	<0.08	0.1	0.4	--	--
Odor Threshold @ 60 C	TON	--	--	--	--	11	<1	<1	<1	--	3
Oxidation Reduction Potential (ORP)	mV	20	124	373	432	19	<13	268	404	--	--
pH	pH Units	20	6.61	7.27	7.85	31	6.87	7.52	8.09	--	--
Source Temperature	C	20	17.0	18.9	23.3	19	17.3	18.8	20.5	--	--
Specific Conductance	µS/cm	39	377	731	1,222	54	412	722	1,643	--	(900)
Total Alkalinity (as CaCO3)	mg/L	19	102	205	344	27	98	202	347	--	--
Total Coliform (MPN)	MPN/100mL	1	<1	<1	<1	1	<1	<1	<1	--	--
Turbidity	NTU	38	0.2	0.8	35	45	<0.1	0.8	12	--	5
E. Coli (P/A)	P/A	35		0 Present	35 Absent	48		1 Present	47 Absent	--	--
Total Coliform (P/A)[9]	P/A	35		13 Present	22 Absent	48		10 Present	38 Absent	--	--

Tables C-1b Summary of WY 2024 Water Quality Indicator Data (Notes)

Table includes data for wells monitored by Valley Water (annual monitoring network wells and water supply wells) and public water system data reported to the CA Division of Drinking Water (DDW).

Only wells with known construction information are presented in this table. Public water system wells are assumed to represent the principal zone if no construction information is available, as these are typically deep wells.

1. CFU/mL = colony-forming unit per milliliter; µg/L = micrograms per liter; mg/L = milligrams per liter; P/A = present/absent per 100 ml; µS/cm = microSiemens per centimeter; MPN/100 mL = most probable number per 100 milliliters; NTU = Nephelometric Turbidity Units; TON = Threshold Odor Number.

2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.

3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.

4. n = number of results for each parameter. Some parameters may have been analyzed more than once at a particular well.

5. The minimum shown is the lowest detected value. The lowest reporting limit (e.g., <5) is shown when there are no quantified values at the lowest reporting limit.

6. For parameters with results reported at multiple reporting limits, the median was computed using the Maximum Likelihood Estimate (MLE) method.

7. MCL = Maximum Contaminant Level specified in the Code of Federal Regulations 40CFR141 and/or Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.

8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per DDW or US EPA. For SMCLs having a range, the lower, recommended threshold is listed in parentheses.

9. Total coliform and e. coli bacteria are regulated under the US EPA Total Coliform Rule, which identifies sampling requirements and compliance criteria based on the type of public water system. All wells with data in bacteria results in this table are private, domestic wells that are not subject to federal or state drinking water requirements.

Table C-2a Summary of WY 2024 Inorganic Data for the Santa Clara Subbasin

Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain								Santa Clara Subbasin, Coyote Valley				Maximum Contaminant Level	
		Shallow Zone[2]				Principal Zone[3]									
		n[4]	Min[5]	Median[6]	Max	n	Min	Median	Max	n	Min	Median	Max	MCL[7]	SMCL[8]
Major and Minor Ions															
Bromide	mg/L	6	0.11	0.17	0.23	23	<0.1	0.15	0.29	30	<0.1	0.14	0.55	--	--
Calcium	mg/L	5	40	60	66	74	17	71	120	7	7.7	51	60	--	--
Calcium (as CaCO3)	mg/L	5	99	149	165	17	41	144	300	5	19	131	149	--	--
Carbon Dioxide	µg/L	--	--	--	--	18	4,300	15,000	100,000	--	--	--	--	--	--
Chloride	mg/L	6	35	46	64	73	6	49	120	32	14	41	164	--	(250)
Cyanide	µg/L	--	--	--	--	54	<1	<5	8	6	<1	<100	<100	150	--
Fluoride (natural source)	mg/L	6	<1	0.27	0.40	97	<0.1	0.12	0.68	36	<0.1	0.14	0.37	2	--
Magnesium	mg/L	5	35	40	51	74	8.8	26	60	7	24	30	60	--	--
Perchlorate	µg/L	6	<1	<2	<2	92	<0.5	<2	3	11	<1	<2	2	6	--
Potassium	mg/L	5	<1	<1	1.4	74	<1	1.3	4.4	7	<1	1.4	1.8	--	--
Sodium	mg/L	5	30	36	60	80	17	33	114	7	26	27	104	--	--
Sulfate	mg/L	6	29	57	81	73	4.0	43	120	32	<0.5	48	111	--	(250)
Total Dissolved Solids (TDS)	mg/L	6	328	483	672	73	44	420	2,320	38	256	401	910	--	(500)
Nutrients															
Nitrate (as N)	mg/L	11	<0.4	1.5	6.6	259	<0.1	2.3	8.6	59	<0.1	5.3	19	10	--
Nitrate + Nitrite (as N)	mg/L	--	--	--	--	53	0.76	3.4	7.3	7.0	<0.23	4.6	12	10	--
Nitrite (as N)	mg/L	7	<0.05	<0.05	<0.4	96	<0.05	<0.5	0.2	37	<0.05	<0.1	<0.4	1	--
Orthophosphate (as PO4)	mg/L	6	<0.1	<0.1	0.18	41	<0.1	0.05	1.9	30	<0.1	<0.1	0.47	--	--
Trace Elements															
Aluminum	µg/L	6	<20	<20	<50	74	<20	<50	160	11	<20	<20	31	1,000	200
Antimony	µg/L	6	<1	<1	<6	72	<1	<6	<6	11	<1	<2	<6	6	--
Arsenic	µg/L	6	<2	<2	6.9	82	<1	<2	8.1	11	<2	<2	5.2	10	--
Asbestos	MFL	--	--	--	--	14	<2	<2	<2	--	--	--	--	--	--
Barium	µg/L	5	84	140	170	75	<50	120	300	11	<100	100	260	1,000	--
Beryllium	µg/L	6	<1	<1	<1	72	<1	<1	<1	11	<1	<1	<1	4	--
Boron	µg/L	5	121	148	225	32	<50	114	291	5	<100	110	137	--	--
Cadmium	µg/L	6	<1	<1	<1	72	<1	<1	<1	11	<1	<1	<1	5	--
Chromium	µg/L	5	<1	2.0	4.2	74	<1	<1	8.7	11	<1	1.8	3.1	50	--
Chromium 6 (Hexavalent)	µg/L	5	<1	1.7	4.4	32	<1	0.75	9.1	5	<1	1.6	3.0	10 [9]	--
Copper[10]	µg/L	5	<1	<1	7.1	68	<1	<1	6	7	<1	<1	<50	1,300	1,000
Iron	µg/L	5	<20	<20	77	96	<20	7	1,200	8	<20	<20	2,300	--	300
Lead[10]	µg/L	5	<1	<1	<1	63	<1	<1	<5	8	<1	<1	<5	15	--
Lithium	µg/L	--	--	--	--	11	<9	<9	<9	--	--	--	--	--	--
Manganese	µg/L	5	<1	<1	189	79	<1	1.71	144	7	<1	<20	111	--	50
Mercury	µg/L	5	<1	<1	<1	81	<0.2	<1	<1	11	<0.2	<1	<1	2	--
Nickel	µg/L	5	<1	<1	1.9	72	<1	<10	1.3	11	<1	<10	<10	100	--
Selenium	µg/L	6	<5	<5	<5	72	<1	<2	3.8	11	<2	<5	<5	50	--
Silica	mg/L	5	22	29	31	20	22	29	34	5	20	23	38	--	--
Silicon	mg/L	5	11	14	15	17	10	13	16	5	9.4	11	18	--	--
Silver	µg/L	5	<1	<1	<1	70	<1	<10	<10	7	<1	<1	<10	--	100
Strontium	µg/L	--	--	--	--	11	240	430	590	--	--	--	--	--	--
Thallium, Total	µg/L	6	<1	<1	<1	72	<1	<1	<1	11	<0.5	<1	<1	2	--
Vanadium, Total	µg/L	5	<1	1.7	2.7	23	<1	2.1	8.9	5	1.0	1.3	9.4	--	--
Zinc	µg/L	5	<10	<10	100	75	<10	<50	70	7	<10	<10	<50	--	5,000

See summary notes and descriptions at the end of Table C-2.

Table C-2b Summary of WY 2024 Inorganic Data for the Llagas Subbasin

Parameter	Units[1]	Llagas Subbasin								Maximum Contaminant Level	
		Shallow Zone[2]				Principal Zone[3]					
		n[4]	Min[5]	Median[6]	Max	n	Min	Median	Max	MCL[7]	SMCL[8]
Major and Minor Ions											
Bromate	µg/L	1	<1	<1	<1	1	<1	<1	<1	10	--
Bromide	mg/L	48	<0.1	0.15	0.45	62	<0.1	0.20	0.54	--	--
Calcium	mg/L	19	37	60	103	27	34	54	106	--	--
Calcium (as CaCO3)	mg/L	19	91	150	257	16	85	153	264	--	--
Chloride	mg/L	48	4.0	41	70	65	8.0	55	179	--	(250)
Cyanide	mg/L	1	<0.005	<0.005	<0.005	17	<0.005	<4	<5	150	--
Fluoride (natural source)	mg/L	48	<0.1	0.11	0.35	68	<0.1	0.12	0.35	2	--
Magnesium	mg/L	19	22	42.6	79.3	27	14.4	30.3	63.1	--	--
Perchlorate	µg/L	19	<2	<2	3.7	37	<0.5	0.71	3.8	6	--
Potassium	mg/L	19	<1	1.1	1.8	27	<0.5	1.3	2.2	--	--
Sodium	mg/L	19	12	26	71	29	9	26	113	--	--
Sulfate	mg/L	48	13	38	157	65	4.4	40	117	--	(250)
Total Dissolved Solids (TDS)	mg/L	48	224	392	810	64	240	407	848	--	(500)
Nutrients										--	--
Nitrate (as N)	mg/L	54	0.17	5.6	40	214	<0.1	5.2	46	10	--
Nitrate + Nitrite (as N)	mg/L	--	--	--	--	17	0.31	4.8	41	10	--
Nitrite (as N)	mg/L	48	<0.05	<0.1	<0.1	83	<0.05	<0.05	0.06	1	--
Orthophosphate (as PO4)	mg/L	48	<0.1	<0.1	0.19	53	<0.1	<0.1	0.46	--	--
Total Kjeldahl Nitrogen (as N)	mg/L	--	--	--	--	9	<0.5	<0.5	<0.5	--	--
Total Nitrogen (as N)	mg/L	--	--	--	--	10	<0.5	0.5	1.3	--	--
Trace Elements										--	--
Aluminum	µg/L	19	<20	<20	59	32	<15	<20	46	1,000	200
Antimony	µg/L	19	<1	<1	<1	32	<0.5	<0.5	0.9	6	--
Arsenic	µg/L	19	<2	<2	<2	32	<1	<2	3	10	--
Asbestos	MFL	--	--	--	--	4	<0.2	0.15	1.4	7	--
Barium	µg/L	19	14	110	310	32	15	133	470	1,000	--
Beryllium	µg/L	19	<1	<1	<1	32	<0.5	<1	<1	4	--
Boron	µg/L	19	<100	114	183	22	<100	<100	2,000	--	--
Cadmium	µg/L	19	<1	<1	<1	32	<0.25	<1	<1	5	--
Chromium	µg/L	19	<1	1.3	4.8	32	<1	1.1	3.3	50	--
Chromium 6 (Hexavalent)	µg/L	18	<1	0.78	4.6	15	<1	1.2	2.3	10 [9]	--
Copper[10]	µg/L	19	<1	<1	6.2	31	<1	2.0	15	1,300	1,000
Iron	µg/L	19	<20	<20	110	30	<20	14.5	849	--	300
Lead[10]	µg/L	19	<1	<1	1.6	34	<1	<1	1.4	15	--
Manganese	µg/L	19	<1	<1	14	28	<1	0.61	130	--	50
Mercury	µg/L	19	<1	<1	<1	32	<0.2	<1	<1	2	--
Nickel	µg/L	19	<1	<1	2.9	32	<1	<1	4.6	100	--
Selenium	µg/L	19	<5	<5	6	32	<1	0.9	6	50	--

See summary notes and descriptions at the end of Table C-2.

Table C-2b Summary of WY 2024 Inorganic Data for the Llagas Subbasin

Parameter	Units[1]	Llagas Subbasin								Maximum Contaminant Level	
		Shallow Zone[2]				Principal Zone[3]					
		n[4]	Min[5]	Median[6]	Max	n	Min	Median	Max	MCL[7]	SMCL[8]
Silica	mg/L	19	21	29	41	16	22	27	45	--	--
Silicon	mg/L	19	9.8	14	19	16	11	13	21	--	--
Silver	µg/L	19	<1	<1	<1	27	<1	<1	<10	--	100
Thallium, Total	µg/L	19	<1	<1	<1	32	<0.5	<1	<1	2	--
Vanadium, Total	µg/L	19	<1	2	13	16	<1	2	13	--	--
Zinc	µg/L	19	<10	<10	150	27	<10	7.3	260	--	5,000

Table C-2 Summary of WY 2024 Inorganic Data (Notes)

Table includes data for wells monitored by the Valley Water (annual monitoring network wells and water supply wells) and public water system data reported to the CA Division of Drinking Water (DDW).

Only wells with known construction information are presented in this table. Public water system wells are assumed to represent the principal zone if no construction information is available, as these are typically deep wells.

1. mg/L = milligrams per liter; µg/L = micrograms per liter; MFL = million fibers per liter.

2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.

3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.

4. n = number of results for each parameter. Some parameters may have been analyzed more than once at a particular well.

5. The minimum shown is the lowest detected value. The lowest reporting limit (e.g., <5) is shown when there are no quantified values at the lowest reporting limit.

6. For parameters with results with multiple reporting limits, the median was computed using the Maximum Likelihood Estimate (MLE) method.

7. MCL = Maximum Contaminant Level specified in the Code of Federal Regulations 40CFR141 and/or Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.

8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per DDW or US EPA. For SMCLs having a range, the lower, recommended threshold is listed in parentheses.

9. In October 2024, an MCL of 10 parts per billion (ppb) (equivalent to 10 µg/L) for hexavalent chromium (chromium-6) in drinking water took effect.

10. Lead and copper do not have primary MCLs but have "action levels" of 15 and 1,300 µg/L, respectively. These substances are regulated by the state for public water systems since they can adversely affect public health.

Table C-3a Summary of WY 2024 Volatile Organic Compound (VOC) Data (Detect/Non-Detect) for the Santa Clara Subbasin

Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain						Santa Clara Subbasin, Coyote Valley			Maximum Contaminant Level	
		Shallow Zone[2]			Principal Zone[3]							
		n[4]	Result[5]	RL[6]	n	Result	RL	n	Result	RL	MCL[7]	SMCL[8]
1,1,1,2-Tetrachloroethane	µg/L	--	--	--	39	ND	0.5	--	--	--	--	--
1,1,1-Trichloroethane	µg/L	2	ND	0.5	63	**D**	0.5	6	ND	0.5	200	--
1,1,2,2-Tetrachloroethane	µg/L	2	ND	0.5	63	ND	0.5	6	ND	0.5	1	--
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	µg/L	2	ND	10	63	**D**	NA	6	ND	10	1,200	--
1,1,2-Trichloroethane	µg/L	2	ND	0.5	63	ND	0.5	6	ND	0.5	5	--
1,1-Dichloroethane	µg/L	2	ND	0.5	63	ND	0.5	6	ND	0.5	5	--
1,1-Dichloroethene	µg/L	2	ND	1	63	**D**	0.5	6	ND	1	6	--
1,1-Dichloropropene	µg/L	--	--	--	39	ND	0.5	--	--	--	--	--
1,2,3-Trichlorobenzene	µg/L	--	--	--	39	ND	0.5	--	--	--	--	--
1,2,3-Trichloropropane	µg/L	5	ND	0.005	62	ND	0.005	5	ND	0.01	0.005	--
1,2,4-Trichlorobenzene	µg/L	2	ND	0.5	63	ND	0.5	6	ND	0.5	5	--
1,2,4-Trimethylbenzene	µg/L	--	--	--	39	ND	0.5	--	--	--	--	--
1,2-Dichlorobenzene	µg/L	2	ND	0.5	63	ND	0.5	6	ND	0.5	600	--
1,2-Dichloroethane	µg/L	2	ND	0.5	63	ND	0.5	6	ND	0.5	0.5	--
1,2-Dichloropropane	µg/L	2	ND	0.5	63	ND	0.5	6	ND	0.5	5	--
1,3,5-Trimethylbenzene	µg/L	--	--	--	39	ND	0.5	--	--	--	--	--
1,3-Dichlorobenzene	µg/L	--	--	--	39	ND	0.5	2	ND	0.4	--	--
1,3-Dichloropropane	µg/L	--	--	--	30	ND	0.5	2	ND	0.4	--	--
1,3-Dichloropropene (Total)	µg/L	2	ND	0.5	63	ND	0.5	6	ND	0.5	0.5	--
1,4-Dichlorobenzene	µg/L	2	ND	0.5	63	ND	0.5	6	ND	0.5	5	--
1-Phenylpropane (n-Propylbenzene)	µg/L	--	--	--	39	ND	0.5	--	--	--	--	--
2,2-Dichloropropane	µg/L	--	--	--	20	ND	0.5	--	--	--	--	--
2-Chlorotoluene	µg/L	--	--	--	39	ND	0.5	--	--	--	--	--
4-Chlorotoluene	µg/L	--	--	--	39	ND	0.5	--	--	--	--	--
4-Methyl-2-Pentanone	µg/L	--	--	--	30	ND	5	--	--	--	--	--
Acetone	µg/L	--	--	--	11	**D**	NA	--	--	--	--	--
Benzene	µg/L	2	ND	0.5	63	ND	0.5	6	ND	0.5	1	--
Benzo (a) Pyrene	µg/L	--	--	--	50	ND	0.1	4	ND	0.01	--	--
Bromobenzene	µg/L	--	--	--	39	ND	0.5	--	--	--	--	--
Bromochloromethane	µg/L	--	--	--	39	ND	0.5	--	--	--	--	--
Bromodichloromethane (THM)	µg/L	--	--	--	40	**D**	1	--	--	--	--	--
Bromoform (THM)	µg/L	--	--	--	40	ND	1	--	--	--	--	--
Bromomethane	µg/L	--	--	--	27	ND	0.5	--	--	--	--	--
Carbon Disulfide	µg/L	--	--	--	10	ND	0.5	--	--	--	--	--
Carbon Tetrachloride	µg/L	2	ND	0.5	63	ND	0.5	6	ND	0.5	0.5	--
Chlorobenzene	µg/L	2	ND	0.5	63	ND	0.5	6	ND	0.5	70	--
Chloroethane	µg/L	--	--	--	20	ND	0.5	--	--	--	--	--
Chloroform (THM)	µg/L	--	--	--	40	**D**	1	--	--	--	--	--
Chloromethane	µg/L	--	--	--	27	ND	0.5	--	--	--	--	--
cis-1,2-Dichloroethene	µg/L	2	ND	0.5	63	ND	0.5	6	ND	0.5	6	--
cis-1,3-Dichloropropene	µg/L	--	--	--	27	ND	0.5	2	ND	0.5	--	--
Di(2-Ethylhexyl) Adipate	µg/L	--	--	--	53	ND	5	4	ND	1	400	--
Di(2-Ethylhexyl) Phthalate	µg/L	--	--	--	54	**D**	3	4	ND	0.5	4	--
Dibromoacetic Acid (DBAA)	µg/L	--	--	--	1	ND	1	--	--	--	--	--
Dibromochloromethane (THM)	µg/L	--	--	--	40	ND	1	--	--	--	--	--
Dibromochloropropane (DBCP)	µg/L	--	--	--	41	ND	0.01	4	ND	0.01	--	--
Dibromomethane	µg/L	--	--	--	39	ND	0.5	--	--	--	--	--

See summary notes and descriptions at the end of Table C-3.

Table C-3a Summary of WY 2024 Volatile Organic Compound (VOC) Data (Detect/Non-Detect) for the Santa Clara Subbasin

Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain						Santa Clara Subbasin, Coyote Valley			Maximum Contaminant Level	
		Shallow Zone[2]			Principal Zone[3]							
		n[4]	Result[5]	RL[6]	n	Result	RL	n	Result	RL	MCL[7]	SMCL[8]
Dichloroacetic Acid (DCAA)	µg/L	--	--	--	1	**D**	NA	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	µg/L	--	--	--	37	ND	0.5	--	--	--	--	--
Diisopropyl Ether	µg/L	--	--	--	31	ND	2	--	--	--	--	--
Ethylbenzene	µg/L	2	ND	0.5	63	ND	0.5	6	ND	0.5	300	--
Ethylene Dibromide (EDB)	µg/L	--	--	--	41	ND	0.02	4	ND	0.02	--	--
Ethyl-Tert-Butyl Ether	µg/L	--	--	--	39	ND	2	--	--	--	--	--
Haloacetic Acids (HAA5)	µg/L	--	--	--	1	**D**	NA	--	--	--	60	--
Hexachlorobutadiene	µg/L	--	--	--	39	ND	0.5	--	--	--	--	--
Isopropylbenzene	µg/L	--	--	--	39	ND	0.5	--	--	--	--	--
m,p-Xylene	µg/L	--	--	--	39	ND	0.8	2	ND	0.5	--	--
Methyl Ethyl Ketone (MEK, Butanone)	µg/L	--	--	--	18	ND	5	--	--	--	--	--
Methyl Tert-Butyl Ether (MTBE)	µg/L	2	ND	3	66	ND	3	6	ND	3	13	5
Methylene Chloride	µg/L	2	ND	0.5	56	ND	0.5	6	ND	0.5	5	--
Monobromoacetic Acid (MBAA)	µg/L	--	--	--	1	ND	1	--	--	--	--	--
Monochloroacetic Acid (MCAA)	µg/L	--	--	--	1	ND	2	--	--	--	--	--
Naphthalene	µg/L	--	--	--	39	ND	1	--	--	--	--	--
n-Butylbenzene	µg/L	--	--	--	39	ND	0.5	--	--	--	--	--
n-Nitrosodiethylamine (NDEA)	µg/L	--	--	--	3	ND	0.002	--	--	--	--	--
n-Nitrosodimethylamine (NDMA)	µg/L	--	--	--	3	ND	0.002	--	--	--	--	--
n-Nitrosodi-n-Propylamine (NDPA)	µg/L	--	--	--	3	ND	0.002	--	--	--	--	--
o-Xylene	µg/L	--	--	--	39	ND	0.5	2	ND	0.5	--	--
PCB-1016	µg/L	--	--	--	13	ND	0.5	--	--	--	--	--
PCB-1221	µg/L	--	--	--	13	ND	0.5	--	--	--	--	--
PCB-1232	µg/L	--	--	--	13	ND	0.5	--	--	--	--	--
PCB-1242	µg/L	--	--	--	13	ND	0.5	--	--	--	--	--
PCB-1248	µg/L	--	--	--	13	ND	0.5	--	--	--	--	--
PCB-1254	µg/L	--	--	--	13	ND	0.5	--	--	--	--	--
PCB-1260	µg/L	--	--	--	13	ND	0.5	--	--	--	--	--
p-Isopropyltoluene	µg/L	--	--	--	39	ND	0.5	--	--	--	--	--
sec-Butylbenzene	µg/L	--	--	--	39	ND	0.5	--	--	--	--	--
Styrene	µg/L	2	ND	0.5	63	ND	0.5	6	ND	0.5	100	--
Tert-Amyl Methyl Ether (TAME)	µg/L	--	--	--	39	ND	3	--	--	--	--	--
Tert-Butylbenzene	µg/L	--	--	--	39	ND	0.5	--	--	--	--	--
Tertiary Butyl Alcohol (TBA)	µg/L	--	--	--	26	ND	4	--	--	--	--	--
Tetrachloroethene	µg/L	2	ND	0.5	63	ND	0.5	6	ND	0.5	5	--
Toluene	µg/L	2	ND	0.5	63	**D**	0.5	6	ND	0.5	150	--
Total polychlorinated biphenyls (pcb)	µg/L	--	--	--	43	ND	0.5	4	ND	0.01	0.5	--
Total Trihalomethanes	µg/L	--	--	--	30	**D**	NA	--	--	--	80	--
trans-1,2-Dichloroethene	µg/L	2	ND	0.5	63	ND	0.5	6	ND	0.5	10	--
trans-1,3-Dichloropropene	µg/L	--	--	--	27	ND	0.5	2	ND	0.5	--	--
Trichloroacetic Acid (TCAA)	µg/L	--	--	--	1	**D**	NA	--	--	--	--	--
Trichloroethene	µg/L	2	ND	0.5	63	ND	0.5	6	ND	0.5	5	--
Trichlorofluoromethane (Freon 11)	µg/L	2	ND	5	63	ND	5	6	ND	5	150	--
Vinyl Chloride	µg/L	2	ND	0.5	63	ND	0.5	6	ND	0.5	0.5	--
Xylenes, Total	µg/L	2	ND	0.5	56	ND	0.5	6	ND	0.5	1,750	--

See summary notes and descriptions at the end of Table C-3.

Table C-3b Summary of WY 2024 Volatile Organic Compound (VOC) Data (Detect/Non-Detect) for the Llagas Subbasin

Parameter	Units[1]	Llagas Subbasin						Maximum Contaminant Level	
		Shallow Zone[2]			Principal Zone[3]				
		n[4]	Result[5]	RL[6]	n	Result	RL	MCL[7]	SMCL[8]
1,1,1,2-Tetrachloroethane	µg/L	1	ND	0.5	13	ND	0.5	--	--
1,1,1-Trichloroethane	µg/L	2	ND	0.5	35	ND	0.5	200	--
1,1,2,2-Tetrachloroethane	µg/L	2	ND	0.5	36	ND	0.5	1	--
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	µg/L	2	ND	10	37	ND	10	1,200	--
1,1,2-Trichloroethane	µg/L	2	ND	0.5	36	ND	0.5	5	--
1,1-Dichloroethane	µg/L	2	ND	0.5	36	ND	0.5	5	--
1,1-Dichloroethene	µg/L	2	ND	1	36	ND	1	6	--
1,1-Dichloropropene	µg/L	1	ND	0.5	13	ND	0.5	--	--
1,2,3-Trichlorobenzene	µg/L	1	ND	0.5	13	ND	0.5	--	--
1,2,3-Trichloropropane	µg/L	--	--	--	17	ND	0.005	0.005	--
1,2,4-Trichlorobenzene	µg/L	2	ND	0.5	35	ND	0.5	5	--
1,2,4-Trimethylbenzene	µg/L	1	ND	0.5	13	ND	0.5	--	--
1,2-Dichlorobenzene	µg/L	2	ND	0.5	35	ND	0.5	600	--
1,2-Dichloroethane	µg/L	2	ND	0.5	35	ND	0.5	0.5	--
1,2-Dichloropropane	µg/L	2	ND	0.5	35	ND	0.5	5	--
1,3,5-Trimethylbenzene	µg/L	1	ND	0.5	13	ND	0.5	--	--
1,3-Dichlorobenzene	µg/L	1	ND	0.5	13	ND	0.5	--	--
1,3-Dichloropropane	µg/L	1	ND	0.5	13	ND	0.5	--	--
1,3-Dichloropropene (Total)	µg/L	2	ND	0.5	35	ND	0.5	0.5	--
1,4-Dichlorobenzene	µg/L	2	ND	0.5	36	ND	0.5	5	--
1-Phenylpropane (n-Propylbenzene)	µg/L	1	ND	0.5	13	ND	0.5	--	--
2,2-Dichloropropane	µg/L	1	ND	0.5	13	ND	0.5	--	--
2,4-Dinitrotoluene	µg/L	--	--	--	7	ND	0.099	--	--
2-Chlorotoluene	µg/L	1	ND	0.5	13	ND	0.5	--	--
4-Chlorotoluene	µg/L	1	ND	0.5	13	ND	0.5	--	--
4-Methyl-2-Pentanone	µg/L	--	--	--	12	ND	5	--	--
Acenaphthylene	µg/L	--	--	--	7	ND	0.099	--	--
Anthracene	µg/L	--	--	--	7	ND	0.02	--	--
Benzene	µg/L	2	ND	0.5	35	ND	0.5	1	--
Benzo (a) Anthracene	µg/L	--	--	--	7	ND	0.05	--	--
Benzo (a) Pyrene	µg/L	--	--	--	12	ND	0.1	--	--
Benzo (b) Fluoranthene	µg/L	--	--	--	7	ND	0.02	--	--
Benzo (ghi) Perylene	µg/L	--	--	--	7	ND	0.05	--	--
Benzo (k) Fluoranthene	µg/L	--	--	--	7	ND	0.02	--	--
Benzyl Butyl Phthalate	µg/L	--	--	--	7	ND	0.5	--	--
Bromobenzene	µg/L	1	ND	0.5	13	ND	0.5	--	--
Bromochloroacetic Acid (BCAA)	µg/L	1	ND	1	1	ND	1	--	--
Bromochloromethane	µg/L	1	ND	0.5	13	ND	0.5	--	--
Bromodichloroacetic Acid (BDCAA)	µg/L	1	ND	1	1	ND	1	--	--

See summary notes and descriptions at the end of Table C-3.

Table C-3b Summary of WY 2024 Volatile Organic Compound (VOC) Data (Detect/Non-Detect) for the Llagas Subbasin

Parameter	Units[1]	Llagas Subbasin						Maximum Contaminant Level	
		Shallow Zone[2]			Principal Zone[3]				
		n[4]	Result[5]	RL[6]	n	Result	RL	MCL[7]	SMCL[8]
Bromodichloromethane (THM)	µg/L	1	ND	0.5	13	ND	1	--	--
Bromoform (THM)	µg/L	1	ND	0.5	13	ND	1	--	--
Bromomethane	µg/L	1	ND	0.5	13	ND	0.5	--	--
Carbon Disulfide	µg/L	--	--	--	12	ND	0.5	--	--
Carbon Tetrachloride	µg/L	2	ND	0.5	36	ND	0.5	0.5	--
Chlorobenzene	µg/L	2	ND	0.5	36	ND	0.5	70	--
Chlorodibromoacetic Acid	µg/L	1	ND	2	1	ND	2	--	--
Chloroethane	µg/L	1	ND	0.5	13	ND	0.5	--	--
Chloroform (THM)	µg/L	1	D	NA	13	ND	1	--	--
Chloromethane	µg/L	1	ND	0.5	13	ND	0.5	--	--
Chrysene	µg/L	--	--	--	7	ND	0.02	--	--
cis-1,2-Dichloroethene	µg/L	2	ND	0.5	36	ND	0.5	6	--
cis-1,3-Dichloropropene	µg/L	2	ND	0.5	35	ND	0.5	--	--
Di(2-Ethylhexyl) Adipate	µg/L	--	--	--	12	ND	5	400	--
Di(2-Ethylhexyl) Phthalate	µg/L	--	--	--	12	ND	3	4	--
Dibenzo (a,h) Anthracene	µg/L	--	--	--	7	ND	0.05	--	--
Dibromoacetic Acid (DBAA)	µg/L	1	ND	1	1	ND	1	--	--
Dibromochloromethane (THM)	µg/L	1	ND	0.5	13	ND	1	--	--
Dibromochloropropane (DBCP)	µg/L	--	--	--	11	ND	0.01	0.2	--
Dibromomethane	µg/L	1	ND	0.5	13	ND	0.50	--	--
Dichloroacetic Acid (DCAA)	µg/L	1	ND	1	1	ND	1	--	--
Dichlorodifluoromethane (Freon 12)	µg/L	1	ND	0.5	13	ND	0.5	--	--
Diethyl Phthalate	µg/L	--	--	--	7	ND	0.5	--	--
Diisopropyl Ether	µg/L	1	ND	2	13	ND	3	--	--
Dimethyl Phthalate	µg/L	--	--	--	7	ND	0.5	--	--
Di-n-butyl phthalate	µg/L	--	--	--	7	ND	0.99	--	--
Ethylbenzene	µg/L	2	ND	0.5	37	ND	0.5	300	--
Ethylene Dibromide (EDB)	µg/L	--	--	--	11	ND	0.02	0.05	--
Ethylenediamine Tetra-Acetic Acid (EDTA)	µg/L	1	ND	0.1	1	ND	0.1	--	--
Ethyl-Tert-Butyl Ether	µg/L	1	ND	2	13	ND	3	--	--
Fluoranthene	µg/L	--	--	--	7	ND	0.099	--	--
Fluorene	µg/L	--	--	--	7	ND	0.05	--	--
Formaldehyde	mg/L	--	--	--	8	D	0.002	--	--
Haloacetic Acids (HAA5)	µg/L	1	ND	1	1	ND	1	60	--
Hexachlorobutadiene	µg/L	1	ND	0.5	13	ND	0.5	--	--
Indeno (1,2,3-Cd) Pyrene	µg/L	--	--	--	7	ND	0.05	--	--
Isophorone	µg/L	--	--	--	7	ND	0.49	--	--
Isopropylbenzene	µg/L	1	ND	0.5	13	ND	0.5	--	--
m,p-Xylene	µg/L	2	ND	0.5	36	ND	0.5	--	--

See summary notes and descriptions at the end of Table C-3.

Table C-3b Summary of WY 2024 Volatile Organic Compound (VOC) Data (Detect/Non-Detect) for the Llagas Subbasin

Parameter	Units[1]	Llagas Subbasin						Maximum Contaminant Level	
		Shallow Zone[2]			Principal Zone[3]				
		n[4]	Result[5]	RL[6]	n	Result	RL	MCL[7]	SMCL[8]
Methyl Ethyl Ketone (MEK, Butanone)	µg/L	--	--	--	12	ND	5	--	--
Methyl Tert-Butyl Ether (MTBE)	µg/L	2	ND	2	36	ND	3	13	5
Methylene Chloride	µg/L	2	ND	0.5	36	ND	0.5	5	--
Monobromoacetic Acid (MBAA)	µg/L	1	ND	1	1	ND	1	--	--
Monochloroacetic Acid (MCAA)	µg/L	1	ND	2	1	ND	2	--	--
Naphthalene	µg/L	1	ND	0.5	13	ND	0.5	--	--
n-Butylbenzene	µg/L	1	ND	0.5	13	ND	0.5	--	--
Nitrilotriacetic Acid (NTA)	mg/L	1	ND	0.1	1	ND	0.1	--	--
n-Nitrosodiethylamine (NDEA)	µg/L	1	ND	2	1	ND	2	--	--
n-Nitrosodimethylamine (NDMA)	µg/L	1	ND	2	1	ND	2	--	--
n-Nitrosodi-n-Butylamine (NDBA)	µg/L	1	ND	2	1	ND	2	--	--
n-Nitrosodi-n-Propylamine (NDPA)	µg/L	1	ND	2	1	ND	2	--	--
n-Nitrosomethylethylamine (NMEA)	µg/L	1	ND	2	1	ND	2	--	--
n-Nitrosopiperidine (NPIP)	µg/L	1	ND	2	1	ND	2	--	--
n-Nitrosopyrrolidine (NPYR)	µg/L	1	ND	2	1	ND	2	--	--
o-Xylene	µg/L	2	ND	0.5	35	ND	0.5	--	--
PCB-1016	µg/L	--	--	--	7	ND	0.071	--	--
PCB-1221	µg/L	--	--	--	7	ND	0.1	--	--
PCB-1232	µg/L	--	--	--	7	ND	0.1	--	--
PCB-1242	µg/L	--	--	--	7	ND	0.1	--	--
PCB-1248	µg/L	--	--	--	7	ND	0.1	--	--
PCB-1254	µg/L	--	--	--	7	ND	0.1	--	--
PCB-1260	µg/L	--	--	--	7	ND	0.071	--	--
Phenanthrene	µg/L	--	--	--	7	ND	0.04	--	--
p-Isopropyltoluene	µg/L	1	ND	0.5	13	ND	0.5	--	--
Pyrene	µg/L	--	--	--	7	ND	0.05	--	--
sec-Butylbenzene	µg/L	1	ND	0.5	13	ND	0.5	--	--
Styrene	µg/L	2	ND	0.5	36	ND	0.5	100	--
Tert-Amyl Methyl Ether (TAME)	µg/L	1	ND	2	13	ND	3	--	--
Tert-Butylbenzene	µg/L	1	ND	0.5	13	ND	0.5	--	--
Tertiary Butyl Alcohol (TBA)	µg/L	1	ND	2	1	ND	2	--	--
Tetrachloroethene	µg/L	2	ND	0.5	36	**D**	0.5	5	--
Toluene	µg/L	2	ND	0.5	35	ND	0.5	150	--
Total polychlorinated biphenyls (pcb)	µg/L	--	--	--	11	ND	0.5	0.5	--
Total Trihalomethanes	µg/L	1	**D**	NA	2	ND	4	80	--
trans-1,2-Dichloroethene	µg/L	2	ND	0.5	35	ND	0.5	10	--
trans-1,3-Dichloropropene	µg/L	2	ND	0.5	35	ND	0.5	--	--
Tribromoacetic Acid (TBAA)	µg/L	1	ND	4	1	ND	4	--	--
Trichloroacetic Acid (TCAA)	µg/L	1	ND	1	1	ND	1	--	--

See summary notes and descriptions at the end of Table C-3.

Table C-3b Summary of WY 2024 Volatile Organic Compound (VOC) Data (Detect/Non-Detect) for the Llagas Subbasin

Parameter	Units[1]	Llagas Subbasin						Maximum Contaminant Level	
		Shallow Zone[2]			Principal Zone[3]				
		n[4]	Result[5]	RL[6]	n	Result	RL	MCL[7]	SMCL[8]
Trichloroethene	µg/L	2	ND	0.5	36	ND	0.5	5	--
Trichlorofluoromethane (Freon 11)	µg/L	2	ND	5	36	ND	5	150	--
Vinyl Chloride	µg/L	2	ND	0.5	36	ND	0.5	0.5	--
Xylenes, Total	µg/L	2	ND	0.5	36	ND	0.5	1,750	--

Table C-3 Summary of WY 2024 Volatile Organic Compound (VOC) Data (Detect/Non-Detect) (Notes)

Table includes data for wells monitored by Valley Water (annual monitoring network wells and water supply wells) and public water system data reported to the CA Division of Drinking Water (DDW).

Only wells with known construction information are presented. Unless construction is known, public water system wells are assumed to represent the principal zone, as these are typically deep wells.

1. µg/L = micrograms per liter ; mg/L = milligrams per liter.

2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.

3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.

4. n = number of results for each parameter. Some parameters may have been analyzed more than once at a particular well.

5. ND= not detected above laboratory reporting limit in any samples. D = detection above reporting limit in one or more samples (see Table C-4 for detection results).

6. RL = Laboratory reporting limit. In the case of multiple reporting limits, the highest limit is shown. NA is shown if the reporting limit is not available.

7. MCL = Maximum Contaminant Level specified in the Code of Federal Regulations 40CFR141 and/or Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.

8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per DDW or US EPA.

Table C-4a Summary of WY 2024 Volatile Organic Compounds (VOCs) Detections for the Santa Clara Subbasin

Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain								Santa Clara Subbasin, Coyote Valley				Maximum Contaminant Level	
		Shallow Zone[2]				Principal Zone[3]									
		n[4]	Min[5]	Median[6]	Max	n	Min	Median	Max	n	Min	Median	Max	MCL[7]	SMCL[8]
1,1,1-Trichloroethane	µg/L	--	--	--	--	63	<0.4	<0.5	1.1	--	--	--	--	200	--
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	µg/L	--	--	--	--	63	<0.4	<10	0.5	--	--	--	--	1,200	--
1,1-Dichloroethene	µg/L	--	--	--	--	63	<0.4	<0.5	0.67	--	--	--	--	6	--
Acetone	µg/L	--	--	--	--	11	<10	<10	45	--	--	--	--	--	--
Bromodichloromethane (THM)	µg/L	--	--	--	--	40	<0.4	<0.5	1.8	--	--	--	--	--	--
Chloroform (THM)	µg/L	--	--	--	--	40	<0.4	<0.5	36	--	--	--	--	--	--
Di(2-Ethylhexyl) Phthalate	µg/L	--	--	--	--	54	<0.2	<3	0.25	--	--	--	--	4	--
Dichloroacetic Acid (DCAA)	µg/L	--	--	--	--	1	17	17.0	17	--	--	--	--	--	--
Haloacetic Acids (HAA5)	µg/L	--	--	--	--	1	32	32	32	--	--	--	--	60	--
Toluene	µg/L	--	--	--	--	63	<0.4	<0.5	4.3	--	--	--	--	150	--
Total Trihalomethanes	µg/L	--	--	--	--	30	<0.5	<0.5	38	--	--	--	--	80	--
Trichloroacetic Acid (TCAA)	µg/L	--	--	--	--	1	15	15	15	--	--	--	--	--	--

Table C-4a Summary of WY 2024 Volatile Organic Compounds (VOCs) Detections (Notes)

Table includes data for wells monitored by Valley Water (annual monitoring network wells and water supply wells) and public water system data reported to the CA Division of Drinking Water (DDW).

Only wells with known construction information are presented in this table. Public water system wells are assumed to represent the principal zone if no construction information is available, as these are typically deep wells.

1. µg/L = micrograms per liter.

2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.

3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.

4. n = number of results for each parameter. Some parameters may have been analyzed more than once at a particular well.

5. The minimum shown is the lowest detected value. The lowest reporting limit (e.g., <5) is shown when there are no quantified values at the lowest reporting limit.

6. For parameters with results with multiple reporting limits, the median was computed using the Maximum Likelihood Estimate method.

7. MCL = Maximum Contaminant Level specified in the Code of Federal Regulations 40CFR141 and/or Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.

8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per DDW or US EPA.

Table C-4b   Summary of WY 2024 Volatile Organic Compounds (VOCs) Detections for the Llagas Subbasin

Parameter	Units[1]	Llagas Subbasin								Maximum Contaminant Level	
		Shallow Zone[2]				Principal Zone[3]					
		n[4]	Min[5]	Median[6]	Max	n	Min	Median	Max	MCL[7]	SMCL[8]
Chloroform (THM)	µg/L	1	0.66	0.66	0.66	--	--	--	--	--	--
Formaldehyde	mg/L	--	--	--	--	8	<0.002	<0.002	0.005	--	--
Tetrachloroethene	µg/L	--	--	--	--	36	<0.5	<0.5	1.1	5	--
Total Trihalomethanes	µg/L	1	0.66	0.66	0.66	--	--	--	--	80	--

Table C-4b   Summary of WY 2024 Volatile Organic Compounds (VOCs) Detections (Notes)

Table includes data for wells monitored by Valley Water (annual monitoring network wells and water supply wells) and public water system data reported to the CA Division of Drinking Water (DDW).

Only wells with known construction information are presented in this table. Public water system wells are assumed to represent the principal zone if no construction information is available, as these are typically deep wells.

1. µg/L = micrograms per liter; mg/L = milligrams per liter.

2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.

3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.

4. n = number of results for each parameter. Some parameters may have been analyzed more than once at a particular well.

5. The minimum shown is the lowest detected value. The lowest reporting limit (e.g., <5) is shown when there are no quantified values at the lowest reporting limit.

6. For parameters with results with multiple reporting limits, the median was computed using the Maximum Likelihood Estimate method.

7. MCL = Maximum Contaminant Level specified in the Code of Federal Regulations 40CFR141 and/or Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.

8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per DDW or US EPA.

Table C-5a Summary of WY 2024 Pesticide Data (Detect/Non-Detect) for the Santa Clara Subbasin

Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain						Santa Clara Subbasin, Coyote Valley			Maximum Contaminant Level	
		Shallow Zone[2]			Principal Zone[3]							
		n[4]	Result[5]	RL[6]	n	Result	RL	n	Result	RL	MCL[7]	SMCL[8]
2,3,7,8-TCDD (Dioxin)	µg/L	--	--	--	33	ND	0.005	4	ND	5E-06	0.00003	--
2,4,5-T	µg/L	--	--	--	24	ND	1	--	--	--	--	--
2,4,5-TP (Silvex)	µg/L	--	--	--	40	ND	1	4	ND	1	50	--
2,4-D	µg/L	--	--	--	46	ND	10	7	ND	10	70	--
2,4-DB	µg/L	--	--	--	7	ND	1	--	--	--	--	--
3-Hydroxycarbofuran	µg/L	--	--	--	38	ND	3	2	ND	2	--	--
4,4-DDD	µg/L	--	--	--	9	ND	0.005	--	--	--	--	--
4,4-DDE	µg/L	--	--	--	9	ND	0.005	--	--	--	--	--
4,4-DDT	µg/L	--	--	--	9	ND	0.005	--	--	--	--	--
Alachlor	µg/L	--	--	--	54	ND	1	4	ND	0.05	2	--
Aldicarb	µg/L	--	--	--	37	ND	3	2	ND	2	--	--
Aldicarb Sulfone	µg/L	--	--	--	38	ND	2	2	ND	2	--	--
Aldicarb Sulfoxide	µg/L	--	--	--	37	ND	3	2	ND	2	--	--
Aldrin	µg/L	--	--	--	38	ND	0.075	4	ND	0.01	--	--
alpha-BHC	µg/L	--	--	--	9	ND	0.005	--	--	--	--	--
Atrazine	µg/L	--	--	--	59	ND	0.5	5	ND	0.25	1	--
Bentazon	µg/L	--	--	--	40	ND	2	4	ND	2	18	--
Beta-BHC	µg/L	--	--	--	9	ND	0.005	--	--	--	--	--
Bromacil	µg/L	--	--	--	43	ND	10	--	--	--	--	--
Butachlor	µg/L	--	--	--	43	ND	0.38	--	--	--	--	--
Carbaryl	µg/L	--	--	--	37	ND	5	2	ND	2	--	--
Carbofuran	µg/L	--	--	--	39	ND	5	4	ND	2	18	--
Chlordane	µg/L	--	--	--	42	ND	0.1	4	ND	0.1	0.1	--
Dalapon	µg/L	--	--	--	40	ND	10	4	ND	10	200	--
DCPA (Total Di & Mono Acid Degradates)	µg/L	--	--	--	9	ND	1	--	--	--	--	--
Delta-BHC	µg/L	--	--	--	9	ND	0.005	--	--	--	--	--
Diazinon	µg/L	--	--	--	44	ND	0.3	--	--	--	--	--
Dicamba	µg/L	--	--	--	33	ND	1.5	--	--	--	--	--
Dieldrin	µg/L	--	--	--	30	ND	0.02	--	--	--	--	--
Dimethoate	µg/L	--	--	--	34	ND	10	--	--	--	--	--
Dinoseb	µg/L	--	--	--	41	ND	2	4	ND	2	7	--
Diquat	µg/L	--	--	--	39	ND	4	4	ND	4	20	--
Endosulfan I	µg/L	--	--	--	9	ND	0.005	--	--	--	--	--
Endosulfan II	µg/L	--	--	--	9	ND	0.005	--	--	--	--	--
Endosulfan Sulfate	µg/L	--	--	--	9	ND	0.005	--	--	--	--	--
Endothall	µg/L	--	--	--	40	ND	45	4	ND	45	100	--
Endrin	µg/L	--	--	--	42	ND	0.1	4	ND	0.05	2	--
Endrin Aldehyde	µg/L	--	--	--	11	ND	0.05	--	--	--	--	--
gamma-BHC (lindane)	µg/L	--	--	--	45	ND	0.2	4	ND	0.01	0.2	--
Glyphosate	µg/L	--	--	--	38	ND	25	4	ND	5	700	--
Heptachlor	µg/L	--	--	--	42	ND	0.01	4	ND	0.01	0.01	--
Heptachlor Epoxide	µg/L	--	--	--	43	ND	0.01	4	ND	0.01	0.01	--
Hexachlorobenzene	µg/L	--	--	--	43	ND	0.5	4	ND	0.01	1	--
Hexachlorocyclopentadiene	µg/L	--	--	--	41	ND	1	4	ND	0.5	50	--
Methiocarb	µg/L	--	--	--	13	ND	2	2	ND	2	--	--
Methomyl	µg/L	--	--	--	37	ND	2	2	ND	2	--	--
Methoxychlor	µg/L	--	--	--	45	ND	10	4	ND	0.1	30	--
Metolachlor	µg/L	--	--	--	43	ND	0.5	--	--	--	--	--

See summary notes and descriptions at the end of Table C-5a.

Table C-5a   Summary of WY 2024 Pesticide Data (Detect/Non-Detect) for the Santa Clara Subbasin

Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain						Santa Clara Subbasin, Coyote Valley			Maximum Contaminant Level	
		Shallow Zone[2]			Principal Zone[3]							
		n[4]	Result[5]	RL[6]	n	Result	RL	n	Result	RL	MCL[7]	SMCL[8]
Metribuzin	µg/L	--	--	--	43	ND	0.5	--	--	--	--	--
Molinate	µg/L	--	--	--	53	ND	2	4	ND	0.05	20	--
Oxamyl	µg/L	--	--	--	39	ND	20	4	ND	2	50	--
Pentachlorophenol	µg/L	--	--	--	41	ND	0.2	4	ND	0.2	1	--
Picloram	µg/L	--	--	--	40	ND	1	4	ND	1	500	--
Propachlor	µg/L	--	--	--	43	ND	0.5	--	--	--	--	--
Propoxur	µg/L	--	--	--	13	ND	2	2	ND	2	--	--
Simazine	µg/L	--	--	--	59	ND	1	5	ND	0.25	4	--
Thiobencarb (BOLERO)	µg/L	--	--	--	53	ND	1	4	ND	0.1	70	1
Toxaphene	µg/L	--	--	--	42	ND	1	4	ND	0.962	3	--

Table C-5a   Summary of WY 2024 Pesticide Data (Detect/Non-Detect) (Notes)

Table includes data for wells monitored by Valley Water (annual monitoring network wells and water supply wells) and public water system data reported to the CA Division of Drinking Water (DDW).

Only wells with known construction information are presented in this table. Public water system wells are assumed to represent the principal zone if no construction information is available, as these are typically deep wells.

1. µg/L = micrograms per liter.

2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.

3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.

4. n = number of results for each parameter. Some parameters may have been analyzed more than once at a particular well.

5. ND= not detected above laboratory reporting limit in any samples.

6. RL = Laboratory reporting limit. In the case of multiple reporting limits, the highest limit is shown. NA is shown if the reporting limit is not available.

7. MCL = Maximum Contaminant Level specified in the Code of Federal Regulations 40CFR141 and/or Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.

8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per DDW or US EPA.

Table C-5b   Summary of WY 2024 Pesticide Data (Detect/Non-Detect) for the Llagas Subbasin

Parameter	Units[1]	Llagas Subbasin						Maximum Contaminant Level	
		Shallow Zone[2]			Principal Zone[3]				
		n[4]	Result[5]	RL[6]	n	Result	RL	MCL[7]	SMCL[8]
2,3,7,8-TCDD (Dioxin)	µg/L	--	--	--	11	ND	0.005	0.00003	--
2,4,5-T	µg/L	--	--	--	8	ND	1	--	--
2,4,5-TP (Silvex)	µg/L	--	--	--	12	ND	1	50	--
2,4-D	µg/L	--	--	--	14	ND	10	70	--
2,4-DB	µg/L	--	--	--	7	ND	2	--	--
3,5-Dichlorobenzoic Acid	µg/L	--	--	--	2	ND	0.5	--	--
3-Hydroxycarbofuran	µg/L	--	--	--	7	ND	0.5	--	--
Aciflurfen	µg/L	--	--	--	7	ND	1	--	--
Alachlor	µg/L	--	--	--	14	ND	1	2	--
Aldicarb	µg/L	--	--	--	7	ND	0.5	--	--
Aldicarb Sulfone	µg/L	--	--	--	7	ND	0.5	--	--
Aldicarb Sulfoxide	µg/L	--	--	--	7	ND	0.5	--	--
Aldrin	µg/L	--	--	--	4	ND	0.01	--	--
alpha-Chlordane	µg/L	--	--	--	7	ND	0.05	--	--
Atrazine	µg/L	--	--	--	14	ND	0.5	1	--
Bentazon	µg/L	--	--	--	12	ND	2	18	--
Bromacil	µg/L	--	--	--	8	ND	10	--	--
Butachlor	µg/L	--	--	--	8	ND	0.38	--	--
Carbaryl	µg/L	--	--	--	7	ND	0.5	--	--
Carbofuran	µg/L	--	--	--	11	ND	5	18	--
Chlordane	µg/L	--	--	--	11	ND	0.1	0.1	--
Dalapon	µg/L	--	--	--	12	ND	10	200	--
Diazinon	µg/L	--	--	--	1	ND	0.25	--	--
Dicamba	µg/L	--	--	--	8	ND	1.5	--	--
Dichlorprop	µg/L	--	--	--	7	ND	2	--	--
Dieldrin	µg/L	--	--	--	7	ND	0.2	--	--
Dimethoate	µg/L	--	--	--	8	ND	10	--	--
Dinoseb	µg/L	--	--	--	12	ND	2	7	--
Diquat	µg/L	--	--	--	11	ND	4	20	--
Endothall	µg/L	--	--	--	11	ND	45	100	--
Endrin	µg/L	--	--	--	11	ND	0.1	2	--
gamma-BHC (lindane)	µg/L	--	--	--	11	ND	0.2	0.2	--
gamma-Chlordane	µg/L	--	--	--	7	ND	0.05	--	--
Glyphosate	µg/L	--	--	--	11	ND	25	700	--
Heptachlor	µg/L	--	--	--	11	ND	0.01	0.01	--

See summary notes and descriptions at the end of Table C-5b.

Table C-5b Summary of WY 2024 Pesticide Data (Detect/Non-Detect) for the Llagas Subbasin

Parameter	Units[1]	Llagas Subbasin						Maximum Contaminant Level	
		Shallow Zone[2]			Principal Zone[3]				
		n[4]	Result[5]	RL[6]	n	Result	RL	MCL[7]	SMCL[8]
Heptachlor Epoxide	µg/L	--	--	--	11	ND	0.01	0.01	--
Hexachlorobenzene	µg/L	--	--	--	11	ND	0.5	1	--
Hexachlorocyclopentadiene	µg/L	--	--	--	11	ND	1	50	--
Methiocarb	µg/L	--	--	--	7	ND	0.5	--	--
Methomyl	µg/L	--	--	--	7	ND	0.5	--	--
Methoxychlor	µg/L	--	--	--	11	ND	10	30	--
Metolachlor	µg/L	--	--	--	8	ND	0.5	--	--
Metribuzin	µg/L	--	--	--	8	ND	0.5	--	--
Molinate	µg/L	--	--	--	12	ND	2	20	--
Oxamyl	µg/L	--	--	--	11	ND	20	50	--
Paraquat	µg/L	--	--	--	7	ND	2	--	--
Pentachlorophenol	µg/L	--	--	--	12	ND	0.2	1	--
Picloram	µg/L	--	--	--	12	ND	1	500	--
Propachlor	µg/L	--	--	--	1	ND	0.5	--	--
Propoxur	µg/L	--	--	--	7	ND	0.5	--	--
Simazine	µg/L	--	--	--	14	ND	1	4	--
Terbuthylazine	µg/L	1	ND	0.1	1	ND	0.1	--	--
Thiobencarb (BOLERO)	µg/L	--	--	--	12	ND	1	70	1
Toxaphene	µg/L	--	--	--	11	ND	1	3	--
trans-Nonachlor	µg/L	--	--	--	7	ND	0.05	--	--
Trifluralin	µg/L	--	--	--	7	ND	0.099	--	--

Table C-5b Summary of WY 2024 Pesticide Data (Detect/Non-Detect) (Notes)

Table includes data for wells monitored by Valley Water (annual monitoring network wells and water supply wells) and public water system data reported to the CA Division of Drinking Water (DDW).

Only wells with known construction information are presented in this table. Public water system wells are assumed to represent the principal zone if no construction information is available, as these are typically deep wells.

1. µg/L = micrograms per liter.

2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.

3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.

4. n = number of results for each parameter. Some parameters may have been analyzed more than once at a particular well.

5. ND= not detected above laboratory reporting limit in any samples.

6. RL = Laboratory reporting limit. In the case of multiple reporting limits, the highest limit is shown. NA is shown if the reporting limit is not available.

7. MCL = Maximum Contaminant Level specified in the Code of Federal Regulations 40CFR141 and/or Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.

8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per DDW or US EPA.

Table C-6a Summary of WY 2024 Radioactive Data for the Santa Clara Subbasin

Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain								Santa Clara Subbasin, Coyote Valley				Maximum Contaminant Level	
		Shallow Zone[2]				Principal Zone[3]									
		n[4]	Min[5]	Median[6]	Max	n	Min	Median	Max	n	Min	Median	Max	MCL[7]	SMCL[8]
Combined Radium (-226 & -228)	pCi/L	--	--	--	--	2	<0.424	<0.661	<0.661	--	--	--	--	--	--
Combined Uranium	pCi/L	--	--	--	--	5	<1	<1	1	--	--	--	--	20	--
Gross Alpha Particle Activity	pCi/L	--	--	--	--	16	<0.68	<2.94	5.66	4	<2.54	<2.95	<3.48	15	--
Gross Beta Particle Activity	pCi/L	--	--	--	--	1	<1.22	<1.22	<1.22	--	--	--	--	50	--
Radium-226	pCi/L	--	--	--	--	3	<0.167	<0.287	<0.41	--	--	--	--	--	--
Radium-228	pCi/L	--	--	--	--	4	<0.424	<0.661	1.83	--	--	--	--	--	--

Table C-6a Summary of WY 2024 Radioactive Data (Notes)

Table includes data for wells monitored by Valley Water (annual monitoring network wells and water supply wells) and public water system data reported to the CA Division of Drinking Water (DDW).

Only wells with known construction information are presented in this table. Public water system wells are assumed to represent the principal zone if no construction information is available, as these are typically deep wells.

1. pCi/L = picocuries per liter.

2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.

3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.

4. n = number of results for each parameter. Some parameters may have been analyzed more than once at a particular well.

5. The minimum shown is the lowest detected value. The lowest reporting limit (e.g., <5) is shown when there are no quantified values at the lowest reporting limit.

6. For parameters with results with multiple reporting limits, the median was computed using the Maximum Likelihood Estimate (MLE) method.

7. MCL = Maximum Contaminant Level specified in the Code of Federal Regulations 40CFR141 and/or Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.

8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per DDW or US EPA.

Table C-7a Summary of WY 2024 Per- and Polyfluoroalkyl Substances (PFAS) Data in Santa Clara Subbasin Water Supply Wells

Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain								Santa Clara Subbasin, Coyote Valley				Maximum Contaminant Level
		Shallow Zone[2]				Principal Zone[3]								
		n[4]	Min[5]	Median[6]	Max	n	Min	Median	Max	n	Min	Median	Max	MCL[7]
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ng/L	1	<1.9	<1.9	<1.9	337	<1.7	<2	<2	1	<2	<2	<2	--
4,8-Dioxa-3H-Perfluorononanoic Acid (ADONA)	ng/L	1	<1.9	<1.9	<1.9	337	<1.7	<2	<2	1	<2	<2	<2	--
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ng/L	1	<1.9	<1.9	<1.9	337	<1.7	<2	<2	1	<2	<2	<2	--
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ng/L	1	<1.9	<1.9	<1.9	337	<1.7	<2	<2	1	<2	<2	<2	10
N-ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ng/L	1	<1.9	<1.9	<1.9	87	<1.9	<3	<3	1	<2	<2	<2	--
N-methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ng/L	1	<1.9	<1.9	<1.9	87	<1.9	<3	<3	1	<2	<2	<2	--
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	ng/L	--	--	--	--	254	<1.7	<2	<2	--	--	--	--	--
Perfluoro (2-ethoxyethane) Sulfonic Acid (PFEESA)	ng/L	--	--	--	--	253	<1.7	<2	<2	--	--	--	--	--
Perfluoro Butanoic Acid (PFBA)	ng/L	--	--	--	--	254	<1.7	<2	5.1	--	--	--	--	--
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	ng/L	--	--	--	--	253	<1.7	<2	<2	--	--	--	--	--
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	ng/L	--	--	--	--	253	<1.7	<2	<2	--	--	--	--	--
Perfluorobutanesulfonic Acid (PFBS)	ng/L	1	<1.9	<1.9	<1.9	338	<1.7	<2	3.9	1	<2	<2	<2	--
Perfluorodecane Sulfonic Acid 8:2 FTS	ng/L	--	--	--	--	253	<2	<4.5	<5	--	--	--	--	--
Perfluorodecanoic Acid (PFDA)	ng/L	1	<1.9	<1.9	<1.9	337	<1.7	<2	<2	1	<2	<2	<2	--
Perfluorododecanoic Acid (PFDoA)	ng/L	1	<1.9	<1.9	<1.9	337	<1.7	<2	<2	1	<2	<2	<2	--
Perfluoroheptanesulfonic Acid (PFHPS)	ng/L	--	--	--	--	254	<1.7	<2	<2	--	--	--	--	--
Perfluoroheptanoic Acid (PFHPA)	ng/L	1	<1.9	<1.9	<1.9	337	<1.7	<2	<2	1	<2	<2	<2	--
Perfluorohexane Sulfonic Acid (PFHxS)	ng/L	1	<1.9	<1.9	<1.9	339	<1.7	2.2	7.5	1	<2	<2	<2	10
Perfluorohexane Sulfonic Acid 4:2 FTS	ng/L	--	--	--	--	253	<1.7	<2	<2	--	--	--	--	--
Perfluorohexanoic Acid (PFHxA)	ng/L	1	<1.9	<1.9	<1.9	339	<1.7	<2	3.3	1	<2	<2	<2	--
Perfluorononanoic Acid (PFNA)	ng/L	1	<1.9	<1.9	<1.9	338	<1.7	<2	5	1	<2	<2	<2	10
Perfluorooctane Sulfonic Acid (PFOS)	ng/L	1	<1.9	<1.9	<1.9	338	<1.7	0.46	9.2	1	<2	<2	<2	4
Perfluorooctane Sulfonic Acid 6:2 FTS	ng/L	--	--	--	--	254	<2	<5	6.8	--	--	--	--	--
Perfluorooctanoic Acid (PFOA)	ng/L	1	<1.9	<1.9	<1.9	337	<1.7	<2	3.1	1	<2	<2	<2	4
Perfluoropentanesulfonic Acid (PFPES)	ng/L	--	--	--	--	253	<1.7	<2	<2	--	--	--	--	--
Perfluoropentanoic Acid (PFPEA)	ng/L	--	--	--	--	254	<1.7	<2	3.1	--	--	--	--	--
Perfluorotetradecanoic Acid (PFTA,PFTeDA)	ng/L	1	<1.9	<1.9	<1.9	87	<1.9	<2	<2	1	<2	<2	<2	--
Perfluorotridecanoic Acid (PFTrDA)	ng/L	1	<1.9	<1.9	<1.9	87	<1.9	<2	<2	1	<2	<2	<2	--
Perfluoroundecanoic Acid (PFUnA)	ng/L	1	<1.9	<1.9	<1.9	337	<1.7	<2	<2	1	<2	<2	<2	--

Table C-7a Summary of WY 2024 Per- and Polyfluoroalkyl Substances (PFAS) Data in Santa Clara Subbasin Water Supply Wells (Notes) Table includes data for wells monitored by Valley Water including water supply wells and public water system data reported to the CA Division of Drinking Water (DDW).

1. ng/L = nanograms per liter.

2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.

3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.

4. n = number of results for each parameter. Some parameters may have been analyzed more than once at a particular well.

5. The minimum shown is the lowest detected value. The lowest reporting limit (e.g., <5) is shown when there are no quantified values at the lowest reporting limit.

6. For parameters with results with multiple reporting limits, the median was computed using the Maximum Likelihood Estimate (MLE) method.

7. MCL = Maximum Contaminant Level specified in Title 22 of the California Code of Regulations or US EPA. The MCL is a health-based drinking water standard. In April 2024, the US EPA established MCLs for PFOA, PFOS, PFNA, and PFHxS as shown, as well as a hazard index of 1.0 for the mixture of two or more of PFHxS, HFPO-DA, PFBS, and PFNA. Public water systems have three years to complete initial PFAS monitoring and up to five years to implement solutions (if needed) to ensure water delivered to customers does not exceed these limits. Currently, there are no state MCLs for any PFAS.

Table C-7b Summary of WY 2024 Per- and Polyfluoroalkyl Substances (PFAS) Data in Llagas Subbasin Water Supply Wells

Parameter	Units[1]	Llagas Subbasin								Maximum Contaminant Level
		Shallow Zone[2]				Principal Zone[3]				
		n[4]	Min[5]	Median[6]	Max	n	Min	Median	Max	MCL[7]
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ng/L	7	<2	<2	<2	24	<2	<2	<2	--
4,8-Dioxa-3H-Perfluorononanoic Acid (ADONA)	ng/L	7	<2	<2	<2	25	<2	<2	<2	--
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ng/L	7	<2	<2	<2	24	<2	<2	<2	--
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ng/L	7	<2	<2	<2	24	<2	<2	<2	10
N-ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ng/L	6	<2	<2	<2	12	<2	<2	<2	--
N-methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ng/L	6	<2	<2	<2	12	<2	<2	<2	--
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	ng/L	1	<2	<2	<2	13	<2	<2	<2	--
Perfluoro (2-ethoxyethane) Sulfonic Acid (PFEESA)	ng/L	1	<2	<2	<2	12	<2	<2	<2	--
Perfluoro Butanoic Acid (PFBA)	ng/L	1	<2	<2	<2	13	<2	3.4	7.2	--
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	ng/L	1	<2	<2	<2	12	<2	<2	<2	--
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	ng/L	1	<2	<2	<2	12	<2	<2	<2	--
Perfluorobutanesulfonic Acid (PFBS)	ng/L	7	<2	1.8	4.6	24	<2	<2	11	--
Perfluorodecane Sulfonic Acid 8:2 FTS	ng/L	1	<2	<2	<2	12	<2	<2	<2	--
Perfluorodecanoic Acid (PFDA)	ng/L	7	<2	<2	<2	24	<2	<2	<2	--
Perfluorododecanoic Acid (PFDoA)	ng/L	7	<2	<2	<2	25	<2	<2	<2	--
Perfluoroheptanesulfonic Acid (PFHPS)	ng/L	1	<2	<2	<2	13	<2	<2	<2	--
Perfluoroheptanoic Acid (PFHPA)	ng/L	7	<2	<2	2.6	25	<2	<2	5.6	--
Perfluorohexane Sulfonic Acid (PFHxS)	ng/L	7	<2	<2	3.2	25	<2	<2	6.2	10
Perfluorohexane Sulfonic Acid 4:2 FTS	ng/L	1	<2	<2	<2	12	<2	<2	<2	--
Perfluorohexanoic Acid (PFHxA)	ng/L	7	<2	<2	7.5	24	<2	<2	24	--
Perfluorononanoic Acid (PFNA)	ng/L	7	<2	<2	<2	26	<2	<2	2.9	10
Perfluorooctane Sulfonic Acid (PFOS)	ng/L	7	<2	2.5	4.3	25	<2	<2	31	4
Perfluorooctane Sulfonic Acid 6:2 FTS	ng/L	1	<2	<2	<2	13	<2	<2	<2	--
Perfluorooctanoic Acid (PFOA)	ng/L	7	<2	<2	6.4	25	<2	<2	29	4
Perfluoropentanesulfonic Acid (PFPES)	ng/L	1	<2	<2	<2	14	<2	<2	<2	--
Perfluoropentanoic Acid (PFPEA)	ng/L	1	<2	<2	<2	12	<2	5.1	35	--
Perfluorotetradecanoic Acid (PFTA,PFTeDA)	ng/L	6	<2	<2	<2	12	<2	<2	<2	--
Perfluorotridecanoic Acid (PFTrDA)	ng/L	6	<2	<2	<2	12	<2	<2	<2	--
Perfluoroundecanoic Acid (PFUnA)	ng/L	7	<2	<2	<2	25	<2	<2	<2	--

Table C-7b Summary of WY 2024 Per- and Polyfluoroalkyl Substances (PFAS) Data in Llagas Subbasin Water Supply Wells (Notes)

Table includes data for wells monitored by Valley Water including water supply wells and public water system data reported to the CA Division of Drinking Water (DDW).

1. ng/L = nanograms per liter.

2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.

3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.

4. n = number of results for each parameter. Some parameters may have been analyzed more than once at a particular well.

5. The minimum shown is the lowest detected value. The lowest reporting limit (e.g., <5) is shown when there are no quantified values at the lowest reporting limit.

6. For parameters with results with multiple reporting limits, the median was computed using the Maximum Likelihood Estimate (MLE) method.

7. MCL = Maximum Contaminant Level specified in Title 22 of the California Code of Regulations or US EPA. The MCL is a health-based drinking water standard. In April 2024, the US EPA established MCLs for PFOA, PFOS, PFNA, and PFHxS as shown, as well as a hazard index of 1.0 for the mixture of two or more of PFHxS, HFPO-DA, PFBS, and PFNA. Public water systems have three years to complete initial PFAS monitoring and up to five years to implement solutions (if needed) to ensure water delivered to customers does not exceed these limits. Currently, there are no state MCLs for any PFAS.

Figure C-1. WY 2024 Water Supply Wells Sampled for PFAS

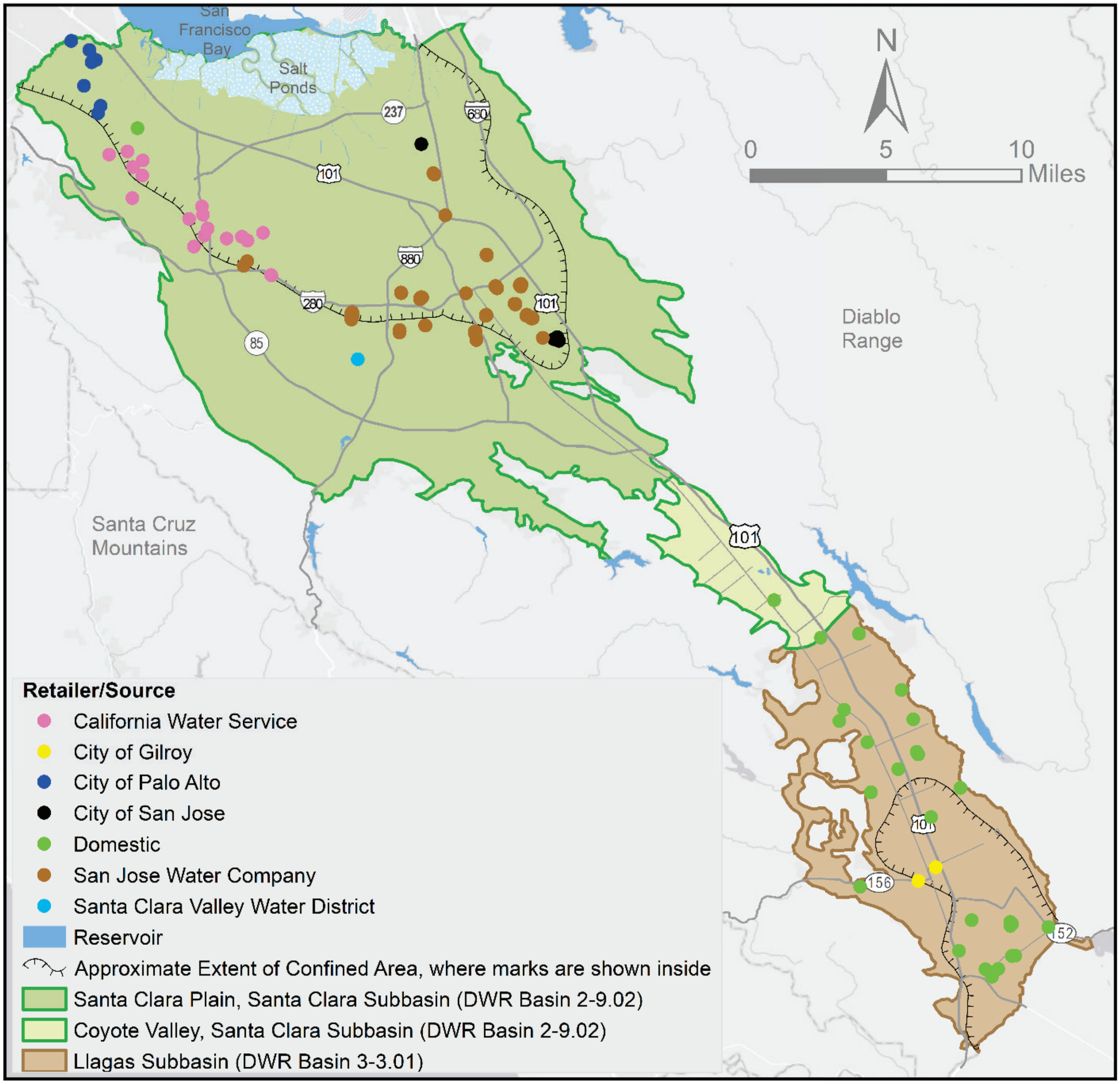
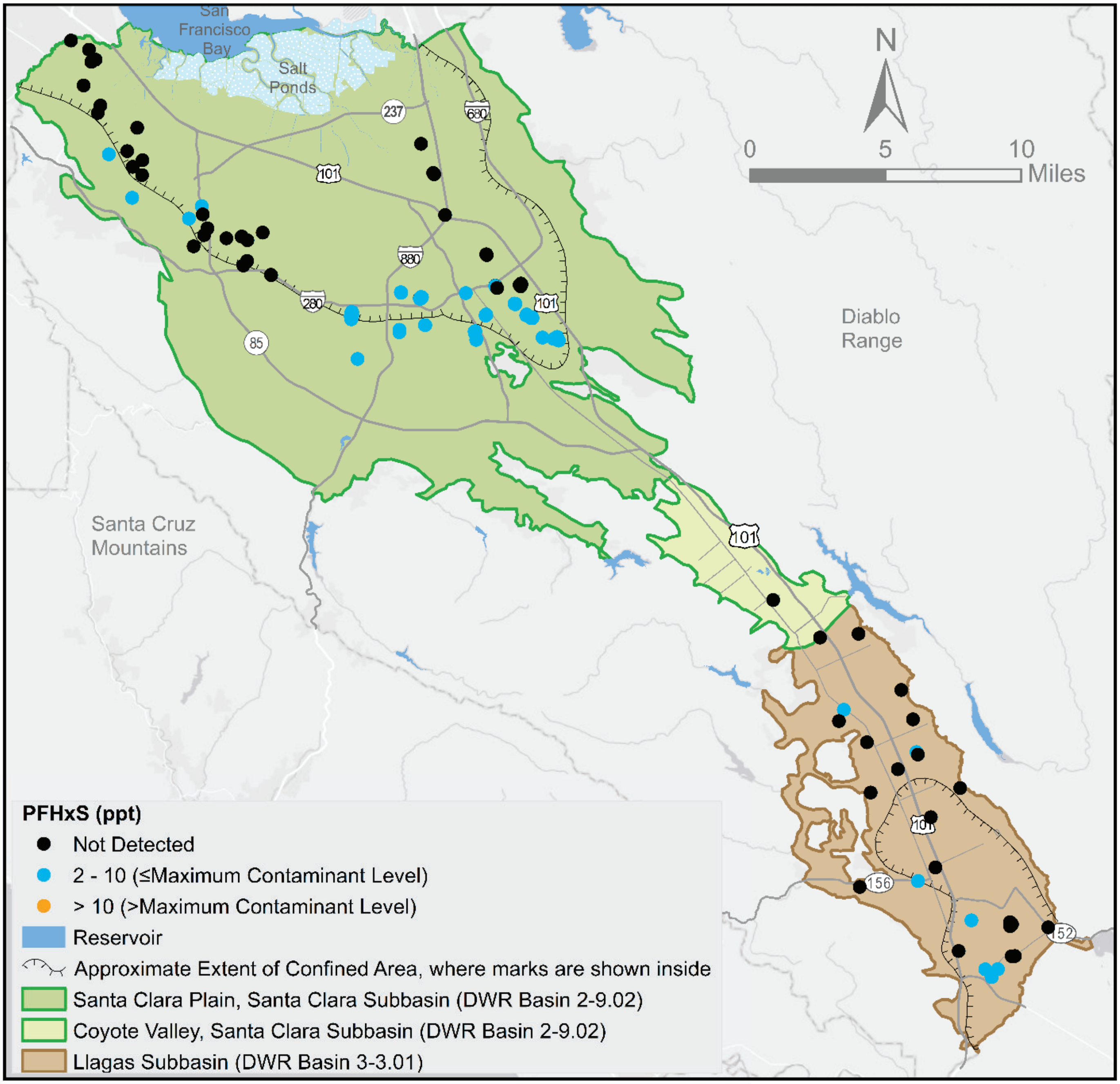
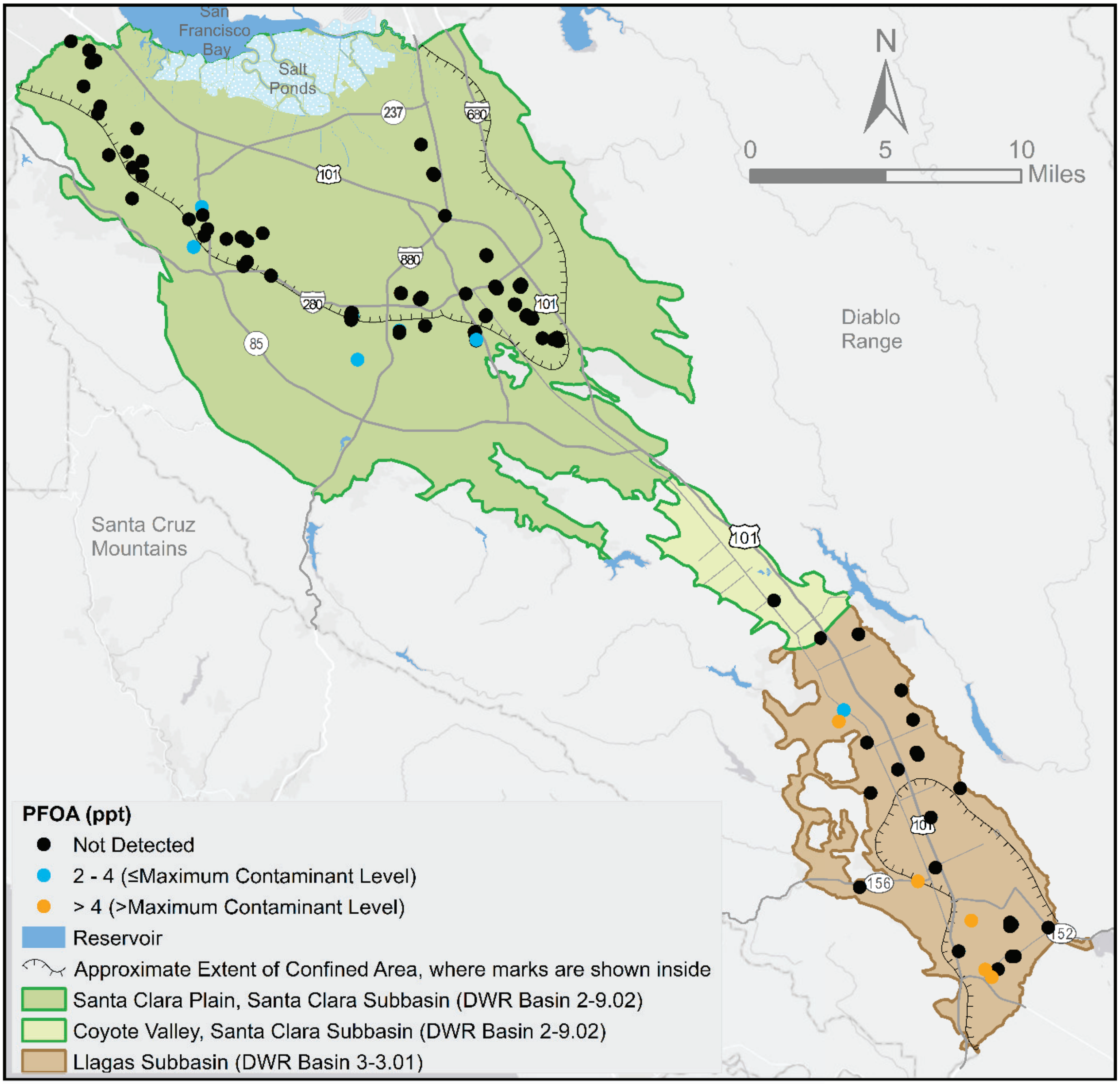


Figure C-2. WY 2024 PFHxS Results in Water Supply Wells



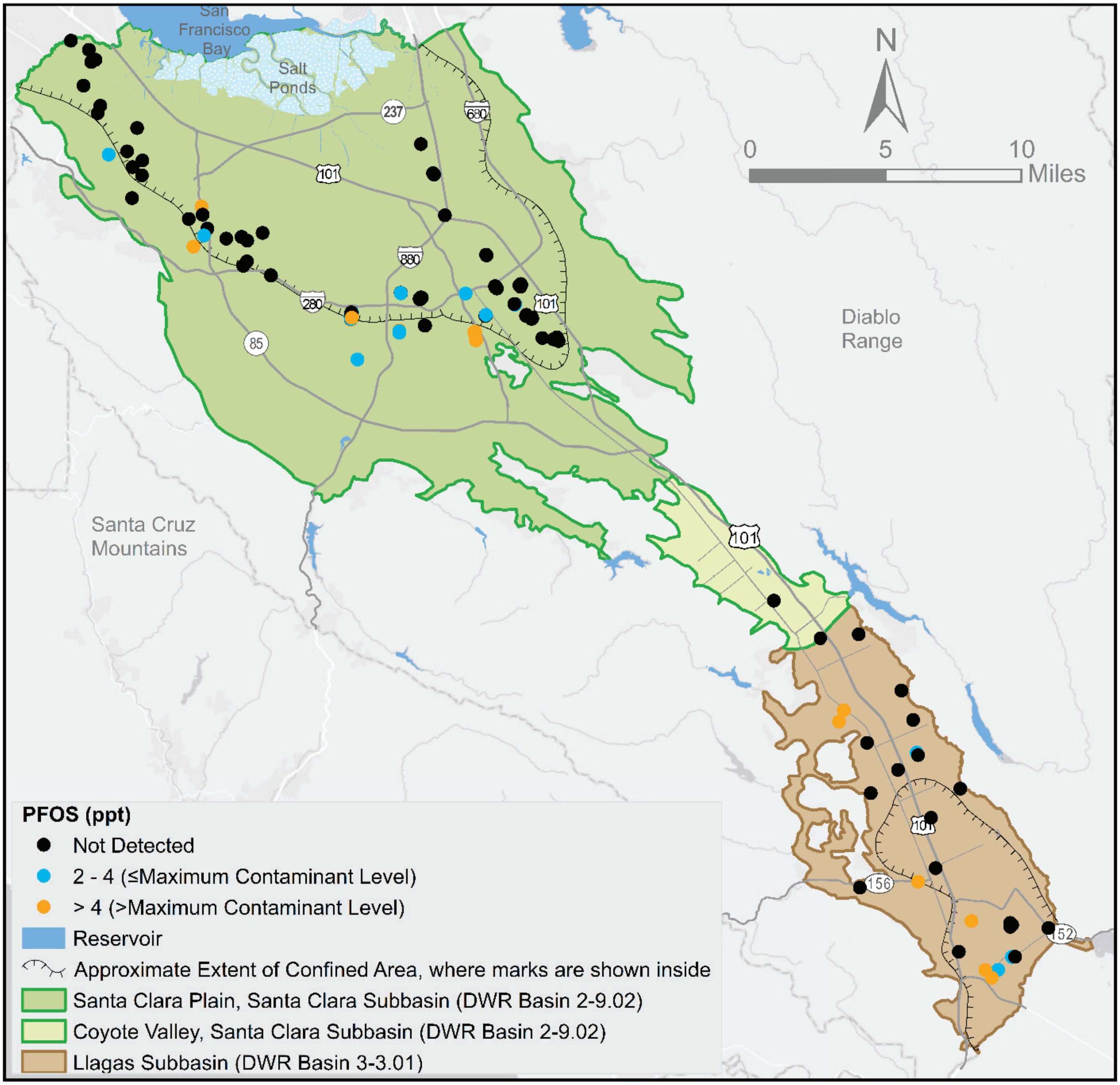
Note: For wells with more than one result, the maximum value is shown. Based on drinking water regulations and follow-up sampling, a single detection above an MCL may not constitute a violation of a drinking water standard. Public water systems are required to meet all drinking water standards for water delivered to customers.

Figure C-3. WY 2024 PFOA Results in Water Supply Wells



Note: For wells with more than one result, the maximum value is shown. Based on drinking water regulations and follow-up sampling, a single detection above an MCL may not constitute a violation of a drinking water standard. Public water systems are required to meet all drinking water standards for water delivered to customers.

Figure C-4. WY 2024 PFOS Results in Water Supply Wells



Note: For wells with more than one result, the maximum value is shown. Based on drinking water regulations and follow-up sampling, a single detection above an MCL may not constitute a violation of a drinking water standard. Public water systems are required to meet all drinking water standards for water delivered to customers.

Table C-8a Summary of WY 2024 Recycled Water Irrigation Site Monitoring Data for the Santa Clara Subbasin

Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain				Maximum Contaminant Level	
		n[2]	Min[3]	Median[4]	Max	MCL[5]	SMCL[6]
Major and Minor Ions							
Bicarbonate Alkalinity (as CaCO3)	mg/L	11	160	300	680	--	--
Calcium	mg/L	11	42	81	350	--	--
Chloride	mg/L	11	22	99	270	--	(250)
Magnesium	mg/L	11	14	50	120	--	--
Potassium	mg/L	11	<1	1.4	4.6	--	--
Sodium	mg/L	11	35	61	280	--	--
Sulfate	mg/L	11	<10	55	820	--	(250)
Total Dissolved Solids (TDS)	mg/L	11	280	550	2,100	--	(500)
Trace Elements							
Boron	mg/L	11	<0.2	<0.2	0.78	--	--

Table C-8a Summary of WY 2024 Recycled Water Irrigation Site Monitoring Data (Notes)

Table includes data for wells sampled by South Bay Water Recycling (SBWR) near areas irrigated with water from (SBWR).

1. mg/L = milligrams per liter; µg/L = micrograms per liter; ng/L = nanograms per liter.

2. n = number of results for each parameter. Some parameters may have been analyzed more than once at a particular well.

3. The minimum shown is the lowest detected value. The lowest reporting limit (e.g., <0.2) is shown when there are no quantified values at the lowest reporting limit.

4. For parameters with results with multiple reporting limits, the median was computed using the Maximum Likelihood Estimate (MLE) method.

5. MCL = Maximum Contaminant Level specified in the Code of Federal Regulations 40CFR141 and/or Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.

6. SMCL = Secondary Maximum Contaminant Level or aesthetic-based standard per DDW or US EPA. For SMCLs having a range, the lower, recommended threshold is listed in parentheses.

Table C-8b Summary of WY 2024 Recycled Water Irrigation Site Monitoring Data for the Llagas Subbasin

Parameter	Units[1]	Llagas Subbasin				Maximum Contaminant Level	
		n[2]	Min[3]	Median[4]	Max	MCL[5]	SMCL[6]
Major and Minor Ions							
Bromide	mg/L	20	<0.1	<0.1	0.17	--	--
Calcium	mg/L	20	7.6	48	105	--	--
Calcium (as CaCO3)	mg/L	20	18.9	119	262	--	--
Chloride	mg/L	20	5	29	195	--	(250)
Cyanide	mg/L	20	<0.005	<0.005	<0.01	0.15	--
Fluoride (natural source)	mg/L	20	<0.1	<0.1	0.43	2	--
Magnesium	mg/L	20	2.8	25	69	--	--
Perchlorate	µg/L	20	<2	<2	<2	6	--
Potassium	mg/L	20	<1	0.8	3.1	--	--
Silica	mg/L	20	9.8	25	33	--	--
Sodium	mg/L	20	3.2	26	135	--	--
Sulfate	mg/L	20	3	40	117	--	(250)
Total Dissolved Solids (TDS)	mg/L	20	62	322	750	--	(500)
Nutrients							
Nitrate (as N)	mg/L	20	<0.1	1.43	24.1	10	--
Orthophosphate (as PO4)	mg/L	20	<0.1	<0.1	0.76	--	--
Trace Elements							
Aluminum	µg/L	20	<20	<20	55	1,000	200
Antimony	µg/L	20	<1	<1	<1	6	--
Arsenic	µg/L	20	<2	<2	<2	10	--
Barium	µg/L	20	12	90	470	1,000	--
Beryllium	µg/L	20	<1	<1	<1	4	--
Boron	µg/L	20	<100	<100	325	--	--
Cadmium	µg/L	20	<1	<1	<1	5	--
Chromium	µg/L	20	<1	<1	2.6	50	--
Copper[7]	µg/L	20	<1	<1	3.6	1,300	1,000
Iron	µg/L	20	<20	<20	250	--	300
Lead[7]	µg/L	20	<1	<1	<1	15	--
Manganese	µg/L	20	<1	<1	920	--	50
Mercury	µg/L	20	<1	<1	<1	2	--
Nickel	µg/L	20	<1	1.7	17.8	100	--
Selenium	µg/L	20	<5	<5	<5	50	--
Silver	µg/L	20	<1	<1	<1	--	100
Thallium	µg/L	20	<1	<1	<1	2	--
Vanadium	µg/L	20	<1	0.8	4.7	--	--
Zinc	µg/L	20	<10	<10	<10	--	5,000
Organics							
11-chloroeicosafluoro-3-oxaundecane-sulfonic acid	ng/L	20	<2	<2	<2	--	--
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ng/L	20	<2	<2	<2	--	--
9-chlorohexadecafluoro-3-oxanone-sulfonic acid	ng/L	20	<2	<2	<2	--	--
Bromochloroacetic Acid (BCAA)	µg/L	20	<1	<1	<1	--	--
Bromochloromethane	µg/L	20	<0.5	<0.5	<0.5	--	--
Bromodichloroacetic Acid (BDCAA)	µg/L	20	<1	<1	<1	--	--
Bromodichloromethane (THM)	µg/L	20	<0.5	<0.5	<0.5	--	--
Bromoform (THM)	µg/L	20	<0.5	<0.5	<0.5	--	--
Bromomethane	µg/L	20	<0.5	<0.5	<0.5	--	--
Chloroform (THM)	µg/L	20	<0.5	<0.5	0.66	--	--

See summary notes and descriptions at the end of Table C-8b.

Table C-8b Summary of WY 2024 Recycled Water Irrigation Site Monitoring Data for the Llagas Subbasin

Parameter	Units[1]	Llagas Subbasin				Maximum Contaminant Level	
		n[2]	Min[3]	Median[4]	Max	MCL[5]	SMCL[6]
Dibromoacetic Acid (DBAA)	µg/L	20	<1	<1	<1	--	--
Dibromochloromethane (THM)	µg/L	20	<0.5	<0.5	<0.5	--	--
Dibromomethane	µg/L	20	<0.5	<0.5	<0.5	--	--
Dichloroacetic Acid (DCAA)	µg/L	20	<1	<1	<1	--	--
Haloacetic Acids (HAA5)	µg/L	20	<1	<1	1.3	60	--
Monobromoacetic Acid (MBAA)	µg/L	20	<1	<1	<1	--	--
Monochloroacetic Acid (MCAA)	µg/L	20	<2	<2	<2	--	--
n-Nitrosodiethylamine (NDEA)	ng/L	20	<2	<2	<2	--	--
n-Nitrosodimethylamine (NDMA)	ng/L	20	<2	<2	<2	--	--
n-Nitrosodi-n-Butylamine (NDBA)	ng/L	20	<2	<2	<2	--	--
n-Nitrosodi-n-Propylamine (NDPA)	ng/L	20	<2	<2	<2	--	--
n-Nitrosomethylethylamine (NMEA)	ng/L	20	<2	<2	<2	--	--
n-Nitrosopyrrolidine (NPYR)	ng/L	20	<2	<2	<2	--	--
Perfluorobutanesulfonic acid (PFBS)	ng/L	20	<2	4.1	22.4	--	--
Perfluorodecanoic acid (PFDA)	ng/L	20	<2	<2	5.3	--	--
Perfluorododecanoic acid (PFDoA)	ng/L	20	<2	<2	<2	--	--
Perfluoroheptanoic acid (PFHPA)	ng/L	20	<2	<2	7.1	--	--
Perfluorohexane Sulfonic Acid (PFHxS)	ng/L	20	<2	<2	6	10	--
Perfluorohexanoic Acid (PFHxA)	ng/L	20	<2	4.5	35.1	--	--
Perfluorononanoic acid (PFNA)	ng/L	20	<2	<2	4.7	10	--
Perfluorooctanoic Acid (PFOA)	ng/L	20	<2	3.7	32.1	4	--
Perfluorooctyl Sulfonate (PFOS)	ng/L	20	<2	2.5	110.7	4	--
Perfluoroundecanoic acid (PFUnA)	ng/L	20	<2	<2	<2	--	--
Tribromoacetic Acid (TBAA)	µg/L	20	<4	<4	<4	--	--
Trichloroacetic Acid (TCAA)	µg/L	20	<1	<1	1.3	--	--

Table C-8b Summary of WY 2024 Recycled Water Irrigation Site Monitoring Data (Notes)

Table includes data for wells near areas irrigated with water from South County Regional Wastewater Authority (SCRWA).

1. mg/L = milligrams per liter; µg/L = micrograms per liter; ng/L = nanograms per liter.

2. n = number of results for each parameter. Some parameters may have been analyzed more than once at a particular well.

3. The minimum shown is the lowest detected value. The lowest reporting limit (e.g., <0.2) is shown when there are no quantified values at the lowest reporting limit.

4. For parameters with results with multiple reporting limits, the median was computed using the Maximum Likelihood Estimate (MLE) method.

5. MCL = Maximum Contaminant Level specified in the Code of Federal Regulations 40CFR141 and/or Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.

6. MCL = Maximum Contaminant Level specified in the Code of Federal Regulations 40CFR141 and/or Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.

7. Lead and copper do not have primary MCLs but have "action levels" of 15 and 1,300 µg/L, respectively. These substances are regulated by the state for public water systems since they can adversely affect public health.

APPENDIX D
WY 2024 Recharge Water Quality Results

Table D-1 Summary of 2024 Recharge Water Quality Indicator Data

Parameter	Units[1]	Recharge System							
		Lower Llagas				Penitencia			
		n[2]	Min[3]	Median[4]	Max	n	Min	Median	Max
Water Quality Indicators									
Bicarbonate Alkalinity (as CaCO3)	mg/L	4	63	143	180	2	29	189	348
Oxidation Reduction Potential (ORP)	mV	4	167	224	232	2	100	120	139
pH, Field	pH Units	4	7.76	8.05	9.64	2	7.69	8.66	9.63
Source Temperature	C	4	17.6	20.2	23.7	2	25.2	25.2	25.2
Specific Conductance, Field	µS/cm	4	310	370	414	2	224	673	1,122
Turbidity, Field	NTU	4	1.24	2.38	3.86	2	2.99	4.9	6.8
Total Alkalinity (as CaCO3)	mg/L	4	121	143	188	2	65	207	348
Major and Minor Ions									
Bicarbonate (as HCO3)	mg/L	4	77	175	219	2	35	230	425
Boron	µg/L	4	<100	115	192	2	<100	244	437
Bromide	mg/L	4	<0.1	<0.1	<0.1	2	<0.1	0.2	0.3
Calcium (Dissolved)	mg/L	4	9.3	35	37.5	2	13.8	42	70
Chloride	mg/L	4	9	12	18	2	20	64	107
Fluoride (natural source)	mg/L	4	<0.1	<0.1	0.1	2	<0.1	<0.1	<0.1
Magnesium (Dissolved)	mg/L	4	17.3	21.9	25.2	2	7.9	27	46.6
Nitrate	mg/L	4	<0.1	0.19	0.51	2	<0.1	<0.1	<0.1
Potassium (Dissolved)	mg/L	4	1	1.2	1.4	2	1.5	3.7	5.8
Silica	mg/L	4	10	19	19.9	2	8.1	16	24.5
Sodium (Dissolved)	mg/L	4	11.5	13.2	15.6	2	17.5	57.2	96.9
Sulfate	mg/L	4	12.8	20.4	30.2	2	13.1	36.5	59.9
Total Dissolved Solids (TDS)	mg/L	4	184	223	240	2	128	388	648

Table D-1 Summary of 2024 Recharge Water Quality Indicator Data (Notes)

1. mg/L = milligrams per liter; µg/L = micrograms per liter; µS/cm = microSiemens per centimeter; NTU = nephelometric turbidity units.

2. n = number of results for each parameter. Some parameters may have been analyzed more than once at a particular well.

3. The minimum shown is the lowest detected value. The lowest reporting limit (e.g., <0.2) is shown when there are no quantified values at the lowest reporting limit.

4. For parameters with results with multiple reporting limits, the median was computed using the Maximum Likelihood Estimate (MLE) method.

Table D-2 Summary of 2024 Recharge Water Quality Trace Metals Data

Parameter	Units[1]	Recharge System							
		Lower Llagas				Penitencia			
		n[2]	Min[3]	Median[4]	Max	n	Min	Median	Max
Aluminum (Dissolved)	µg/L	4	<20	<20	<20	2	<20	<20	<20
Antimony (Dissolved)	µg/L	4	<1	<1	<1	2	<1	<1	<1
Arsenic (Dissolved)	µg/L	4	<2	<2	2	2	3	3	3
Barium (Dissolved)	µg/L	4	12.1	42.8	57.2	2	24.5	61	98
Beryllium (Dissolved)	µg/L	4	<1	<1	<1	2	<1	<1	<1
Cadmium (Dissolved)	µg/L	4	<1	<1	<1	2	<1	<1	<1
Chromium (Dissolved)	µg/L	4	<1	<1	<1	2	<1	<1	<1
Copper (Dissolved)	µg/L	4	<1	<1	1.1	2	<1	1.3	2.1
Iron (Dissolved)	µg/L	4	<20	21	34	2	<20	<20	<20
Lead (Dissolved)	µg/L	4	<1	<1	<1	2	<1	<1	<1
Manganese (Dissolved)	µg/L	4	1.2	3.1	4.5	2	<1	1.2	1.9
Mercury (Dissolved)	µg/L	4	<1	<1	<1	2	<1	<1	<1
Nickel (Dissolved)	µg/L	4	<1	1.3	2.2	2	<1	1.3	2
Selenium (Dissolved)	µg/L	4	<5	<5	<5	2	<5	<5	<5
Silver (Dissolved)	µg/L	4	<1	<1	<1	2	<1	<1	<1
Thallium (Dissolved)	µg/L	4	<1	<1	<1	2	<1	<1	<1
Vanadium (Dissolved)	µg/L	4	<1	1.1	2.8	2	<1	2	4
Zinc (Dissolved)	µg/L	4	<10	<10	<10	2	<10	<10	<10

Table D-2 Summary of 2024 Recharge Water Quality Trace Metals Data (Notes)

1. µg/L = micrograms per liter.

2. n = number of results for each parameter. Some parameters may have been analyzed more than once at a particular well.

3. The minimum shown is the lowest detected value. The lowest reporting limit (e.g., <0.2) is shown when there are no quantified values at the lowest reporting limit.

4. For parameters with results with multiple reporting limits, the median was computed using the Maximum Likelihood Estimate (MLE) method.

Table D-3 Summary of 2024 Recharge Water Quality PFAS Data

Parameter	Units[1]	Recharge System							
		Lower Llagas				Penitencia			
		n[2]	Min[3]	Median[4]	Max	n	Min	Median	Max
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ng/L	4	<6.7	<6.8	<6.8	2	<6.9	<6.9	<6.9
4,8-Dioxa-3H-Perfluorononanoic Acid (ADONA)	ng/L	4	<6.7	<6.8	<6.8	2	<6.9	<6.9	<6.9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ng/L	4	<6.7	<6.8	<6.8	2	<6.9	<6.9	<6.9
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ng/L	4	<6.7	<6.8	<6.8	2	<6.9	<6.9	<6.9
N-ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ng/L	4	<1.7	<1.7	<1.7	2	<1.7	<1.7	<1.7
N-methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ng/L	4	<1.7	<1.7	<1.7	2	<1.7	<1.7	<1.7
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	ng/L	4	<3.3	<3.4	<3.4	2	<3.4	<3.4	<3.4
Perfluoro (2-ethoxyethane) Sulfonic Acid (PFEESA)	ng/L	4	<3.3	<3.4	<3.4	2	<3.4	<3.4	<3.4
Perfluoro Butanoic Acid (PFBA)	ng/L	4	<6.7	<6.8	<6.8	2	<6.9	11.2	19
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	ng/L	4	<3.3	<3.4	<3.4	2	<3.4	<3.4	<3.4
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	ng/L	4	<3.3	<3.4	<3.4	2	<3.4	<3.4	<3.4
Perfluorobutanesulfonic Acid (PFBS)	ng/L	4	<1.7	<1.7	<1.7	2	<1.7	12.8	25
Perfluorodecane Sulfonic Acid 8:2 FTS	ng/L	4	<6.7	<6.8	<6.8	2	<6.9	<6.9	<6.9
Perfluorodecanoic Acid (PFDA)	ng/L	4	<1.7	<1.7	<1.7	2	<1.7	<1.7	<1.7
Perfluorododecanoic Acid (PFDoA)	ng/L	4	<1.7	<1.7	<1.7	2	<1.7	<1.7	<1.7
Perfluoroheptanesulfonic Acid (PFHPS)	ng/L	4	<1.7	<1.7	<1.7	2	<1.7	<1.7	<1.7
Perfluoroheptanoic Acid (PFHPA)	ng/L	4	<1.7	<1.7	<1.7	2	<1.7	2.8	4.7
Perfluorohexane Sulfonic Acid (PFHxS)	ng/L	4	<1.7	<1.7	<1.7	2	<1.7	6.8	13
Perfluorohexane Sulfonic Acid 4:2 FTS	ng/L	4	<6.7	<6.8	<6.8	2	<6.9	<6.9	<6.9
Perfluorohexanoic Acid (PFHxA)	ng/L	4	<1.7	<1.7	<1.7	2	<1.7	5	9.2
Perfluorononanoic Acid (PFNA)	ng/L	4	<1.7	<1.7	<1.7	2	<1.7	1.6	2.4
Perfluorooctane Sulfonic Acid 6:2 FTS	ng/L	4	<6.7	<6.8	<6.8	2	<6.9	<6.9	<6.9
Perfluorooctane Sulfonic Acid (PFOS)	ng/L	4	<1.7	<1.7	<1.7	2	<1.7	12.4	24
Perfluorooctanoic Acid (PFOA)	ng/L	4	<1.7	<1.7	<1.7	2	<1.7	5.4	10
Perfluoropentanesulfonic Acid (PFPES)	ng/L	4	<1.7	<1.7	<1.7	2	<1.7	1.5	2.1
Perfluoropentanoic Acid (PFPEA)	ng/L	4	<3.3	<3.4	<3.4	2	<3.4	8.3	15
Perfluorotetradecanoic Acid (PFTA)	ng/L	4	<3.3	<3.4	<3.4	2	<1.7	<1.7	<1.7
Perfluorotridecanoic Acid (PFTrDA)	ng/L	4	<1.7	<1.7	<1.7	2	<1.7	<1.7	<1.7
Perfluoroundecanoic Acid (PFUnA)	ng/L	4	<1.7	<1.7	<1.7	2	<1.7	<1.7	<1.7

Table D-3 Summary of 2024 Recharge Water Quality PFAS Data (Notes)

1. ng/L = nanograms per liter.

2. n = number of results for each parameter. Some parameters may have been analyzed more than once at a particular well.

3. The minimum shown is the lowest detected value. The lowest reporting limit (e.g., <0.2) is shown when there are no quantified values at the lowest reporting limit.

4. For parameters with results with multiple reporting limits, the median was computed using the Maximum Likelihood Estimate (MLE) method.

Table D-4 Summary of 2024 Recharge Water Quality Pesticide Data

Parameter	Units[1]	Recharge System							
		Lower Llagas				Penitencia[5]			
		n[2]	Min[3]	Median[4]	Max	n	Min	Median	Max
Alachlor	µg/L	3	<0.25	<0.25	<0.25	-	-	-	-
Atrazine	µg/L	3	<0.25	<0.25	<0.25	-	-	-	-
gamma-BHC (lindane)	µg/L	3	<0.2	<0.2	<0.2	-	-	-	-
Hexachlorobenzene	µg/L	3	<0.25	<0.25	<0.25	-	-	-	-
Hexachlorocyclopentadiene	µg/L	3	<0.5	<0.5	<0.5	-	-	-	-
Methoxychlor	µg/L	3	<0.5	<0.5	<0.5	-	-	-	-
Molinate	µg/L	3	<0.5	<0.5	<0.5	-	-	-	-
Simazine	µg/L	3	<0.25	<0.25	<0.25	-	-	-	-
Thiobencarb	µg/L	3	<0.25	<0.25	<0.25	-	-	-	-

Table D-4 Summary of 2024 Recharge Water Quality Pesticide Data (Notes)

1. µg/L = micrograms per liter.

2. n = number of results for each parameter. Some parameters may have been analyzed more than once at a particular well.

3. The minimum shown is the lowest detected value. The lowest reporting limit (e.g., <0.2) is shown when there are no quantified values at the lowest reporting limit.

4. For parameters with results with multiple reporting limits, the median was computed using the Maximum Likelihood Estimate (MLE) method.

5. Pesticides were not analyzed for the Penitencia Recharge System.

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