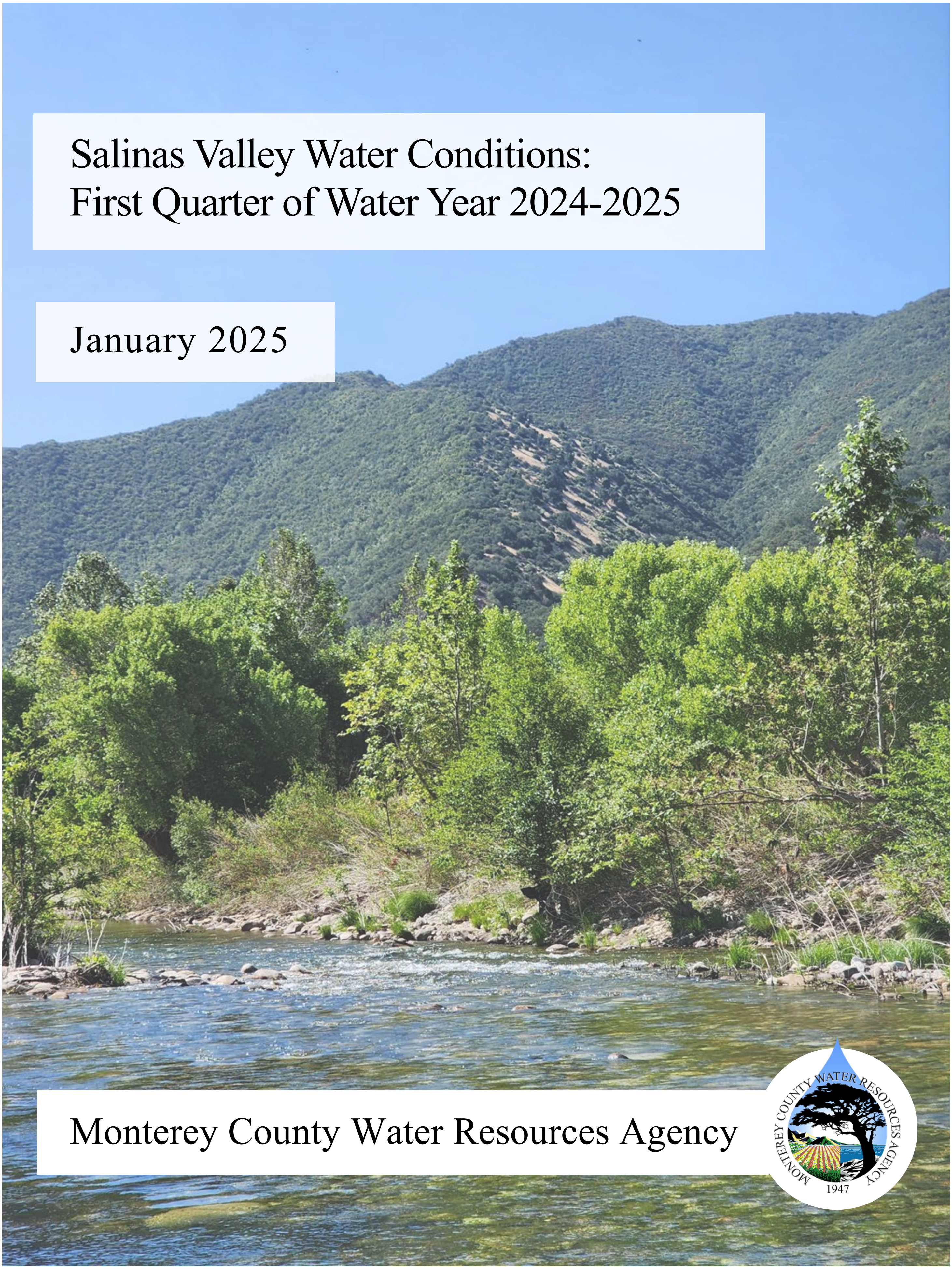
Salinas Valley Water Conditions: First Quarter of Water Year 2024-2025

January 2025



Monterey County Water Resources Agency

MONTEREY COUNTY WATER RESOURCES AGENCY
Salinas Valley Water Conditions
Quarterly Update for First Quarter of Water Year 2024-2025
January 2025

Prepared by Mackaby Pennington, Guillermo Diaz-Moreno, and Amy Woodrow

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Introduction

This report covers the first quarter of Water Year 2025 (WY25), consisting of October through December 2024. It provides a brief overview and discussion of hydrologic conditions in the Salinas Valley including precipitation, reservoir storage, streamflow, and groundwater level trends (Figure 1).

Data for the first quarter of Water Year 2024-2025 indicate overall precipitation levels similar to normal rainfall. Storage in Nacimiento Reservoir is lower than in December 2023 and storage is higher in San Antonio Reservoir compared to December 2023. Over the first quarter of WY25, groundwater elevations increased across all subareas and aquifers.

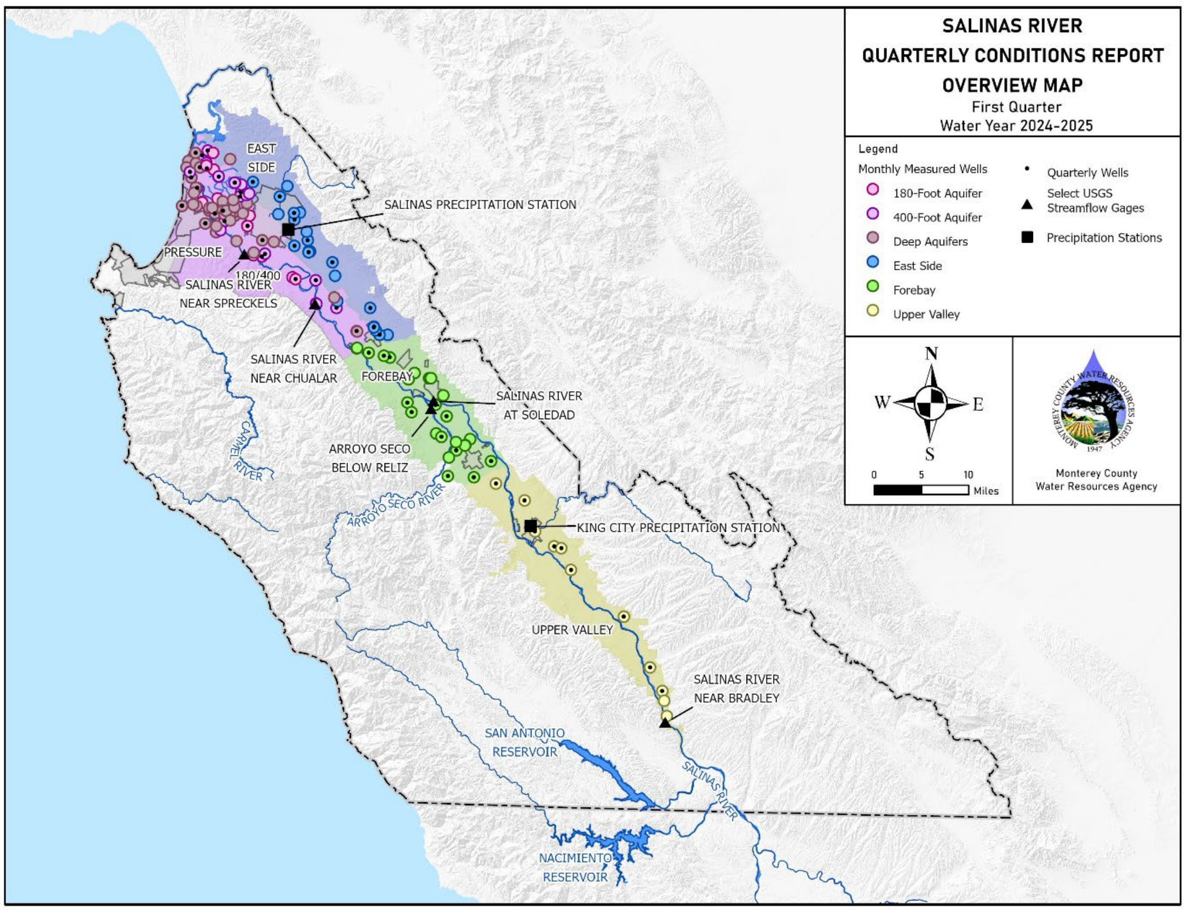
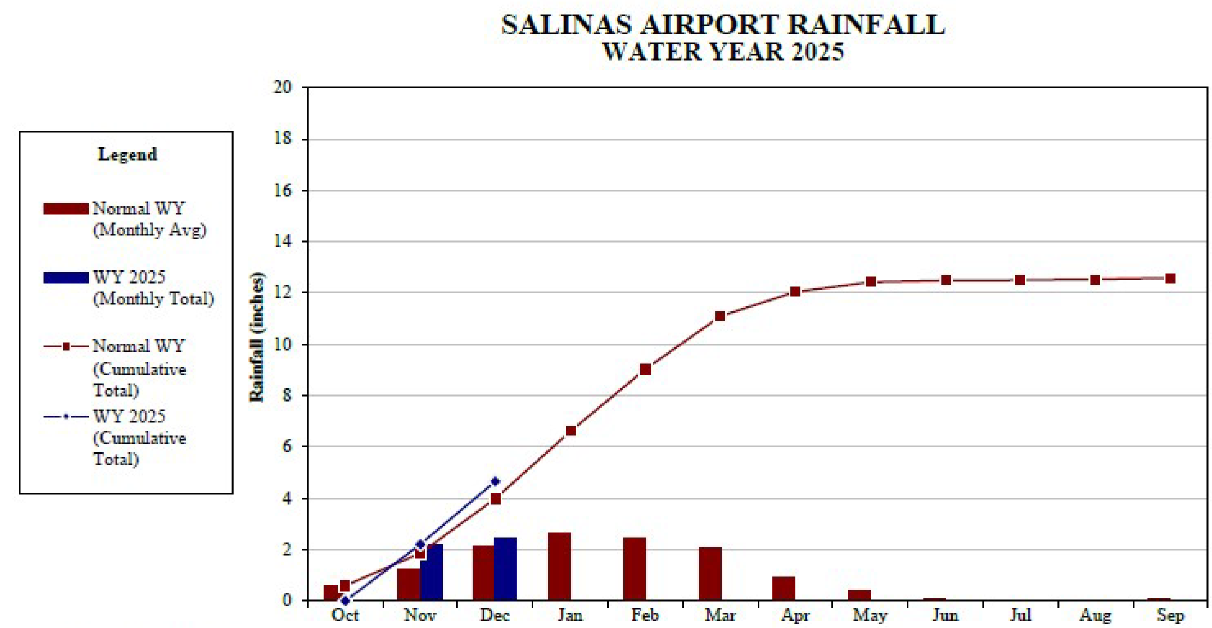


Figure 1: Geographic extent of the area covered by this report and supporting data sources.

Precipitation

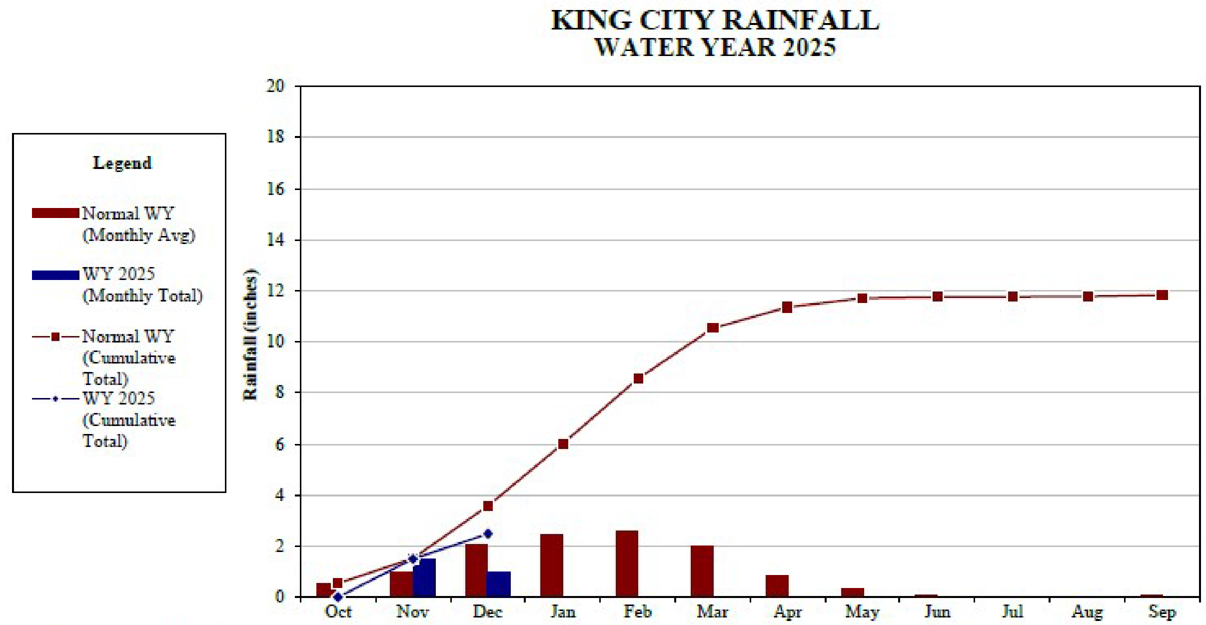
Preliminary National Weather Service rainfall data indicates that the first quarter of WY25 brought above normal rainfall to Salinas and below normal rainfall to King City. Totals for the quarter were 4.66 inches at the Salinas Airport (117% of normal rainfall of 3.98 inches for the quarter) and 2.48 inches in King City (69% of normal rainfall of 3.57 inches for the quarter).

Figure 2 and Figure 3 show monthly and cumulative precipitation data for the current water year and for a "normal" water year, based on long-term monthly precipitation averages, for the Salinas Airport and King City sites, respectively. Included below each graph is a table showing the numeric values for precipitation as well as percent of "normal" precipitation. For the purposes of these graphs, a "normal" water year is the average precipitation over the most recent 30-year period ending in a decade. Currently, the period from 1991 to 2020 is used for this calculation.



	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Monthly Rainfall (WY 2025)	0.00	2.21	2.45									
Monthly Rainfall (Normal WY*)	0.60	1.26	2.12	2.63	2.42	2.06	0.95	0.38	0.07	0.01	0.03	0.05
Percent of Normal for Month	0%	175%	116%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Cumulative Rainfall (WY 2025)	0.00	2.21	4.66									
Cumulative Rainfall (Normal WY*)	0.60	1.86	3.98	6.61	9.03	11.09	12.04	12.42	12.49	12.50	12.53	12.58
Percent of Cumulative Normal	0%	119%	117%									

Figure 2: Salinas Airport Rainfall for Water Year 2025



	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Monthly Rainfall (WY 2025)	0.00	1.50	0.98									
Monthly Rainfall (Normal WY*)	0.54	0.98	2.05	2.44	2.54	1.98	0.83	0.35	0.04	0.01	0.01	0.06
Percent of Normal for Month	0%	153%	48%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Cumulative Rainfall (WY 2025)	0.00	1.50	2.48									
Cumulative Rainfall (Normal WY*)	0.54	1.52	3.57	6.01	8.55	10.53	11.36	11.71	11.75	11.76	11.77	11.83
Percent of Cumulative Normal	0%	99%	69%									

Figure 3: King City Rainfall for Water Year 2025

Reservoir Storage

At the end of the first quarter of WY25, storage at Nacimiento Reservoir on December 31, 2024 was 199,748 acre-feet, which is 16,632 acre-feet lower than on the same day in December 2023. Storage in San Antonio Reservoir on December 31, 2024 was 233,650 acre-feet, which is 17,900 acre-feet higher than on the same day in December 2023.

Reservoir	December 31, 2024 (WY25) Storage in acre-feet	December 31, 2023 (WY24) Storage in acre-feet	Difference in acre-feet
Nacimiento	199,748	216,380	-16,632
San Antonio	233,650	215,750	17,900

Graphs showing daily reservoir storage for the last five water years, along with 30-year average daily storage for comparison, are included as Figure 4 and Figure 5.

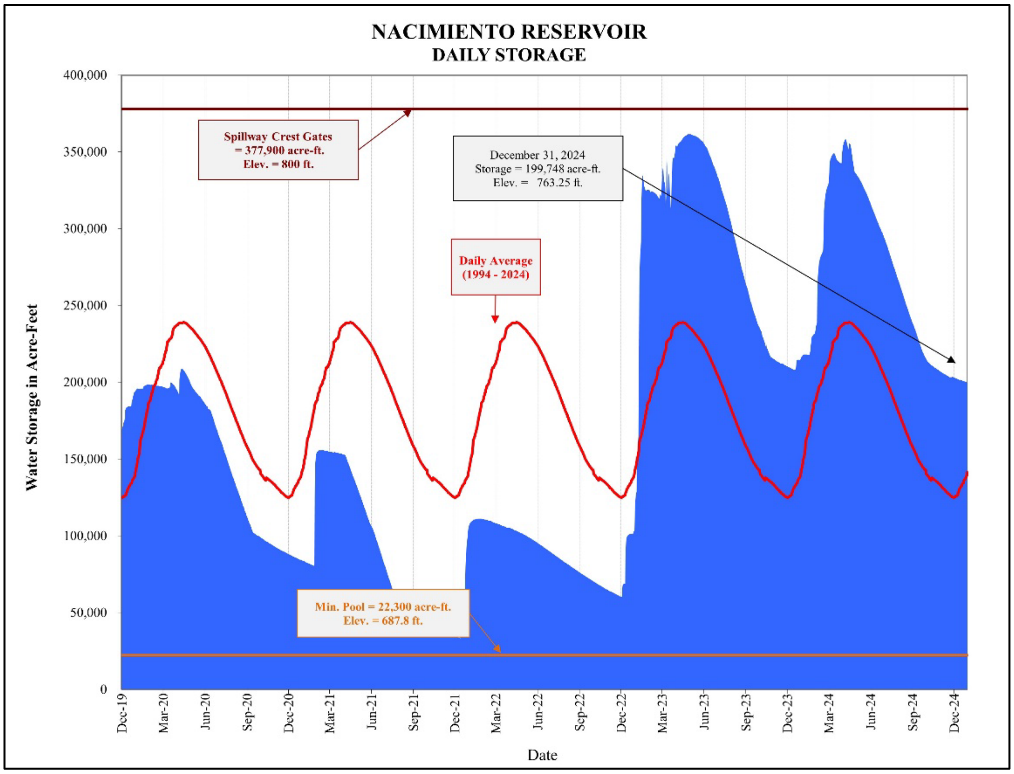


Figure 4: Nacimiento Reservoir Storage

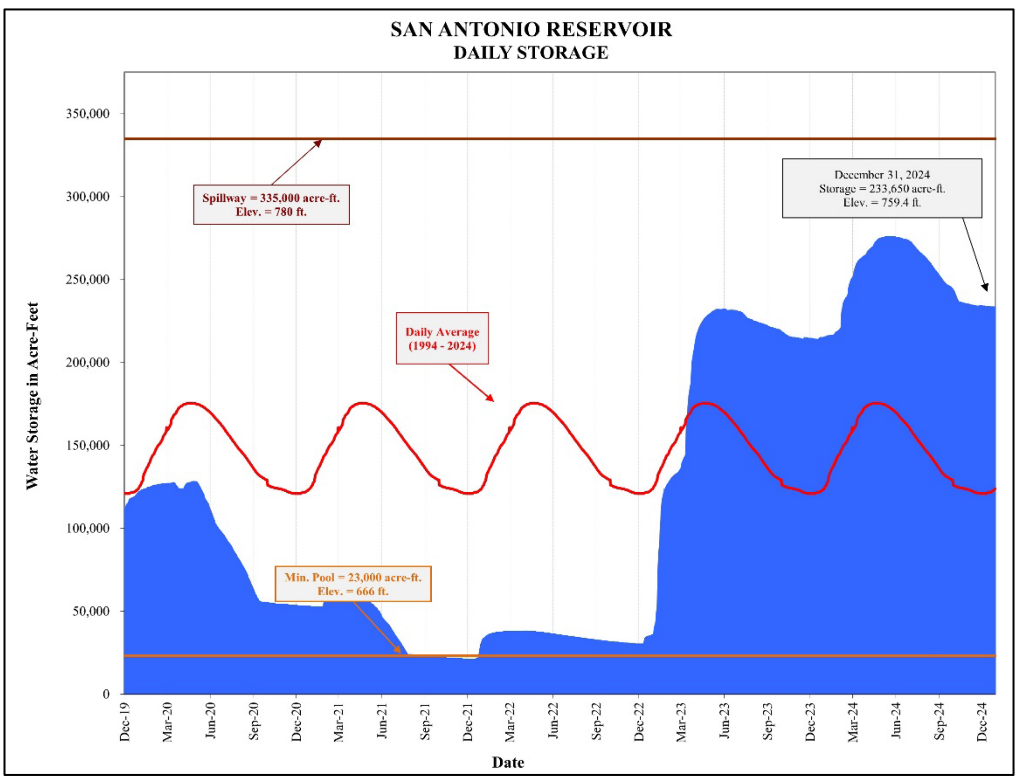


Figure 5: San Antonio Reservoir Storage

Streamflow

The Salinas River is predominately a losing stream, meaning streamflow moves from the streambed into the underlying aquifers. The U.S. Geological Survey maintains several streamflow gages throughout the Salinas River watershed that continuously measure discharge or flow in the river (Figure 1). Figure 6 shows mean daily flow, in cubic feet per second, from select gages on the Salinas River and Arroyo Seco for the last five years (WY 2020-2024) and the current water year (WY25).

Streamflow recorded during the first quarter of WY25 can be predominantly attributed to releases being made from the Nacimiento and San Antonio reservoirs. October flows are due to conservation and environmental releases from these reservoirs. The conservation releases support groundwater recharge and Salinas River Diversion Facility operations, while environmental releases support fish and wildlife habitat. During the preceding two months of November and December of WY25, streamflow can be attributed to minimum releases from both reservoirs and some precipitation.

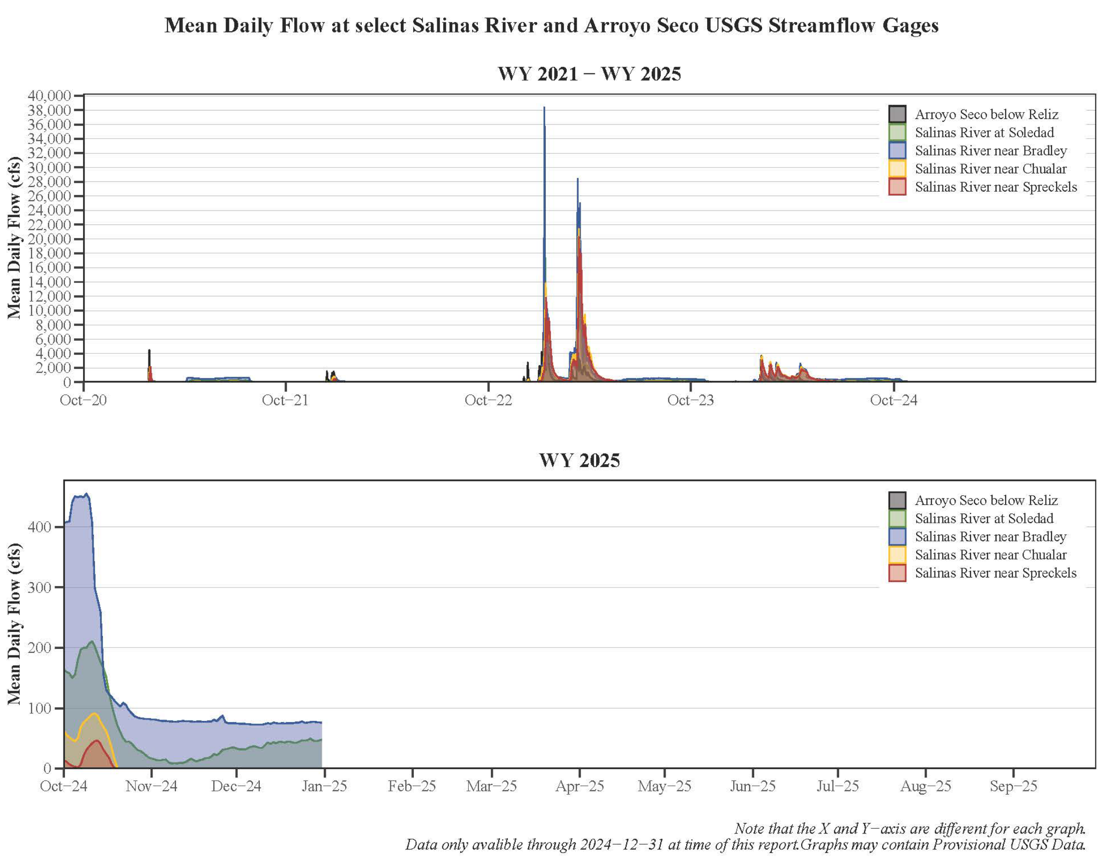


Figure 6: Mean Daily Flow at Selected Stream Gages

Groundwater Elevations

Groundwater elevation data provides insight into how an aquifer or subarea responds to hydrologic conditions over time, such as changes in precipitation and reservoir releases. A one-year comparison can show the short-term effects of a single wet or dry year while a long-term comparison will help provide information on general trends in groundwater storage and demonstrate effects that occur on a longer time scale as surface hydrology interacts with the underlying geology. Subareas or aquifers will respond differently to these hydrologic conditions. For example, groundwater elevations in shallower aquifers may respond more quickly to a wet season while aquifers that are confined, deeper, or more depleted may take longer to show a response to hydrologic conditions. Changes in groundwater elevations within a confined aquifer will also occur in response to groundwater pumping demands.

More than 130 wells are measured monthly throughout the Salinas Valley to monitor seasonal groundwater elevation fluctuations. Data from approximately 50 of these wells are used in the preparation of this report (Figure 1). The measurements are grouped by hydrologic subarea, averaged, and a single groundwater elevation value for the wells within each subarea is graphed to compare current groundwater elevations (WY25) with past conditions. Graphs for individual subareas, showing the current year's groundwater elevation conditions, last year's conditions (WY24), wet conditions (WY99) and dry conditions (WY15) are found in the following sections.

For comparison to long term conditions, a curve showing monthly groundwater elevations averaged over the most recent 30 years (WY1995-WY2024) is included on each graph. The Deep Aquifers graph (Figure 9) does not include a 30-year average because there is not yet a 30-year period of record to make that comparison. Table 1 provides a summary of the groundwater elevation trends for December 2024 in units of feet relative to mean sea level (ft-msl), with additional detail provided on Figures 7-12.

Table 1: Groundwater Elevation Trends Summary for December 2024

Subarea/Aquifer	December 2024 Groundwater Elevation (ft-msl)	Change during First Quarter	One Year Change	Difference from 30-Year Average Elevation
180-Foot Aquifer	13 feet	Up 9 feet	Up 2 feet	Up 3 feet
400-Foot Aquifer	6 feet	Up 13 feet	Up 3 feet	Up 4 feet
Deep Aquifers	-23 feet	Up 12 feet	Up <1 foot	Not applicable
East Side	3 feet	Up 33 feet	Up 7 feet	Up 2 feet
Forebay	165 feet	Up 3 feet	Up 1 foot	Up 6 feet
Upper Valley	319 feet	Up 2 feet	Up <1 foot	Up 4 feet

180-Foot Aquifer

Over the last quarter, groundwater elevations increased nine feet in the 180-Foot Aquifer (Figure 7). Groundwater elevations for December 2024 are up two feet compared to December 2023 and are up three feet from the 30-year average.

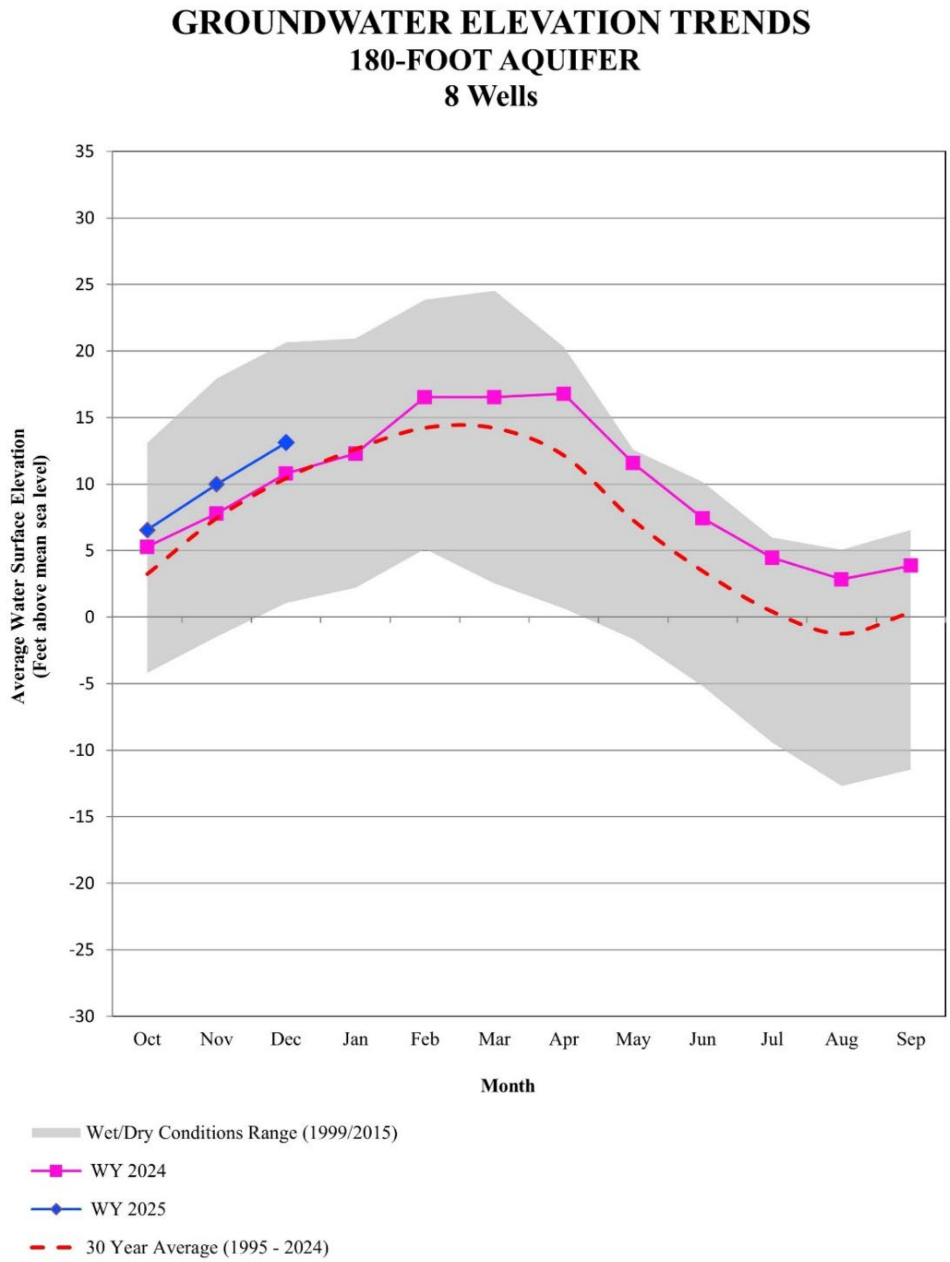


Figure 7: Groundwater Elevation Trends for the 180-Foot Aquifer

400-Foot Aquifer

Over the last quarter, groundwater elevations increased thirteen feet in the 400- Foot Aquifer (Figure 8). Groundwater elevations for December 2024 are up three feet compared to December 2023 and up four feet from the 30-year average.

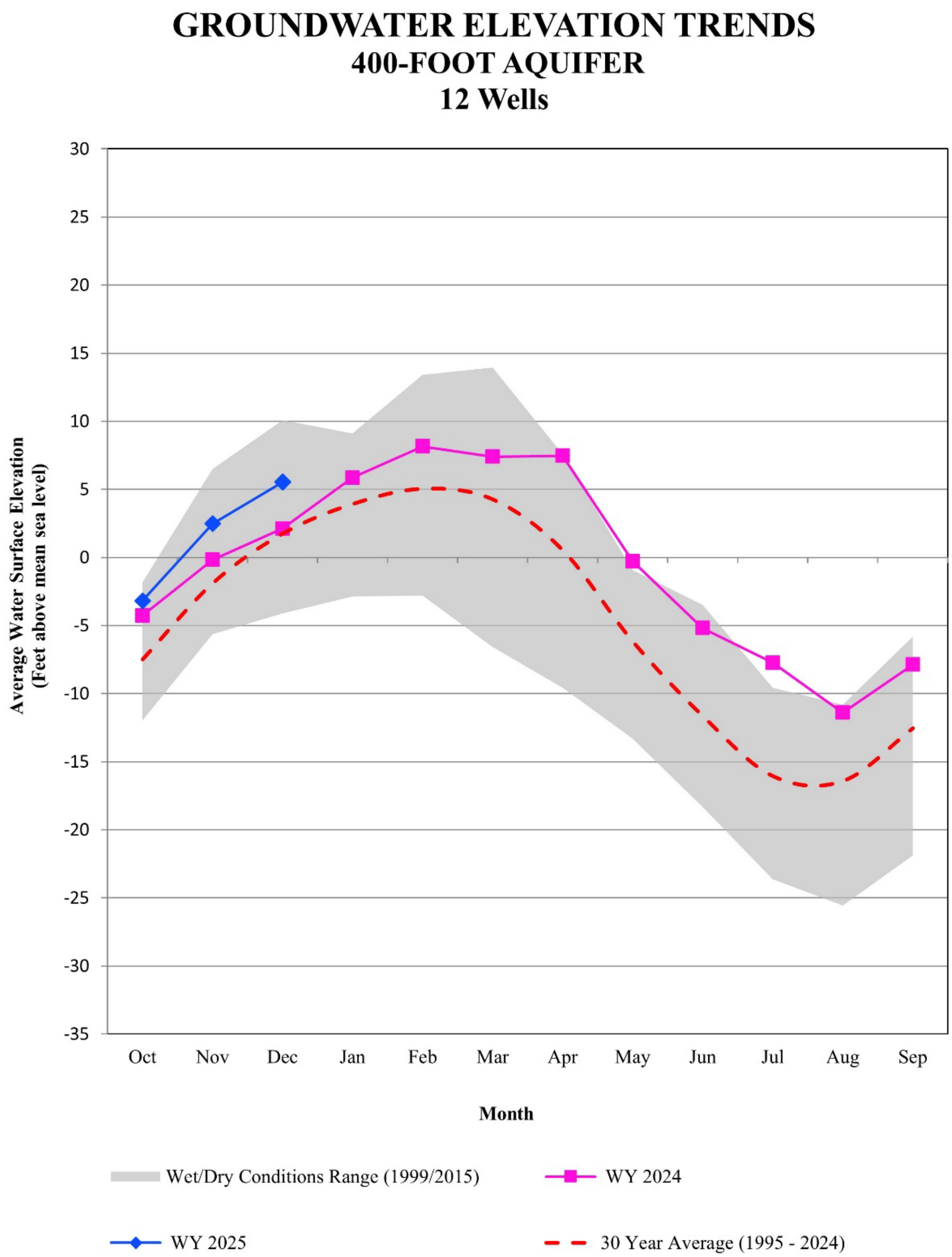


Figure 8: Groundwater Elevation Trends in the 400-Foot Aquifer

Deep Aquifers

Over the last quarter, groundwater elevations increased twelve feet in the Deep Aquifers (Figure 9). Groundwater elevations for December 2024 are up less than one foot compared to December 2023. Given the shorter period of record available for some of the wells monitored in the Deep Aquifers, a 30-year average cannot yet be calculated. To represent the long-term trends in the Deep Aquifers, Figure 9 also includes a 30-year time series graph with groundwater elevation data from the eleven wells to show the seasonal and long-term trends in these wells.

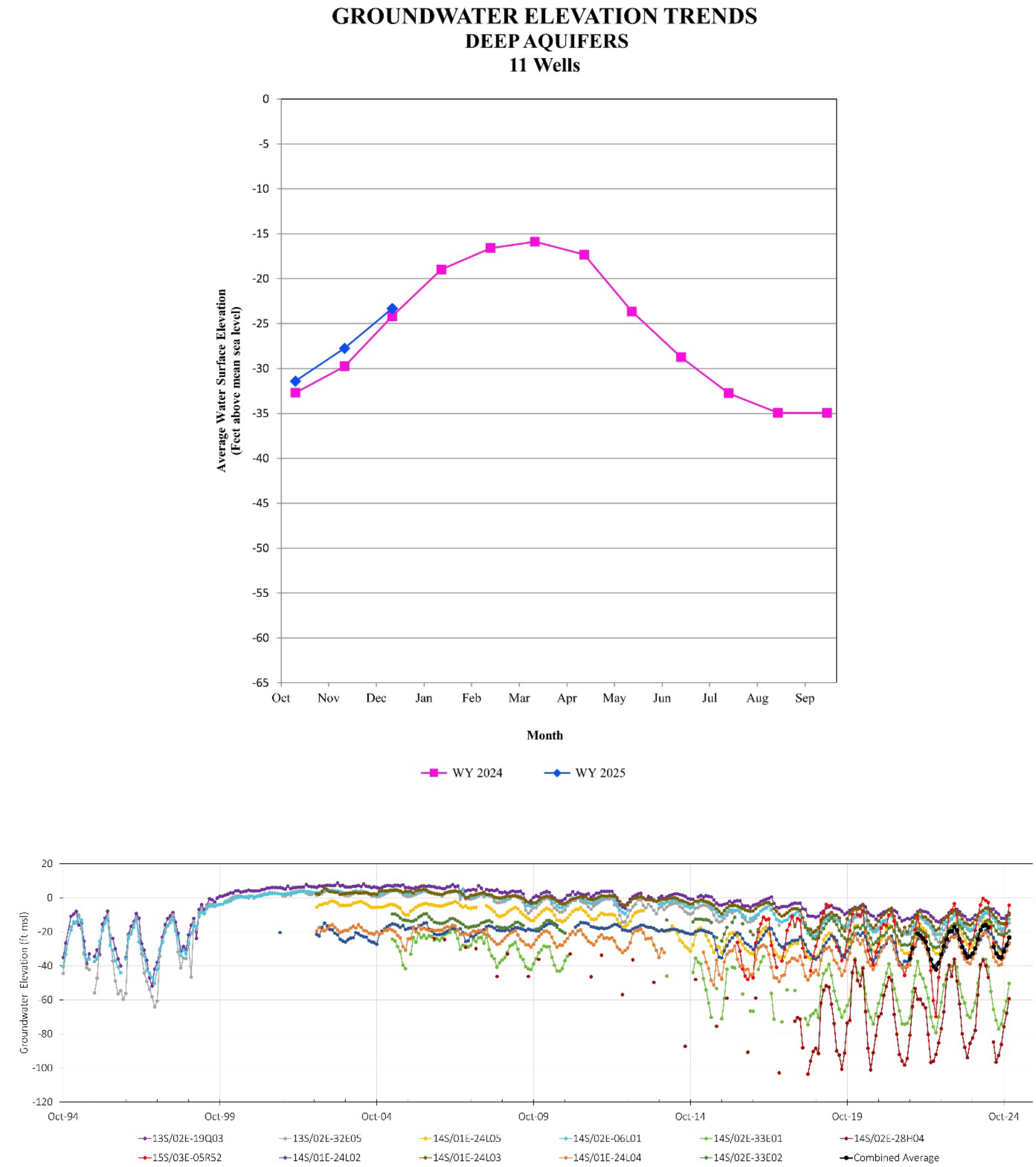


Figure 9: Groundwater Elevation Trends in the Deep Aquifers

East Side Subarea

East Side groundwater elevations increased thirty-three feet over the last quarter (Figure 10). Groundwater elevations for December 2024 are up seven feet from December 2023 elevations and up two feet from the 30-year average.

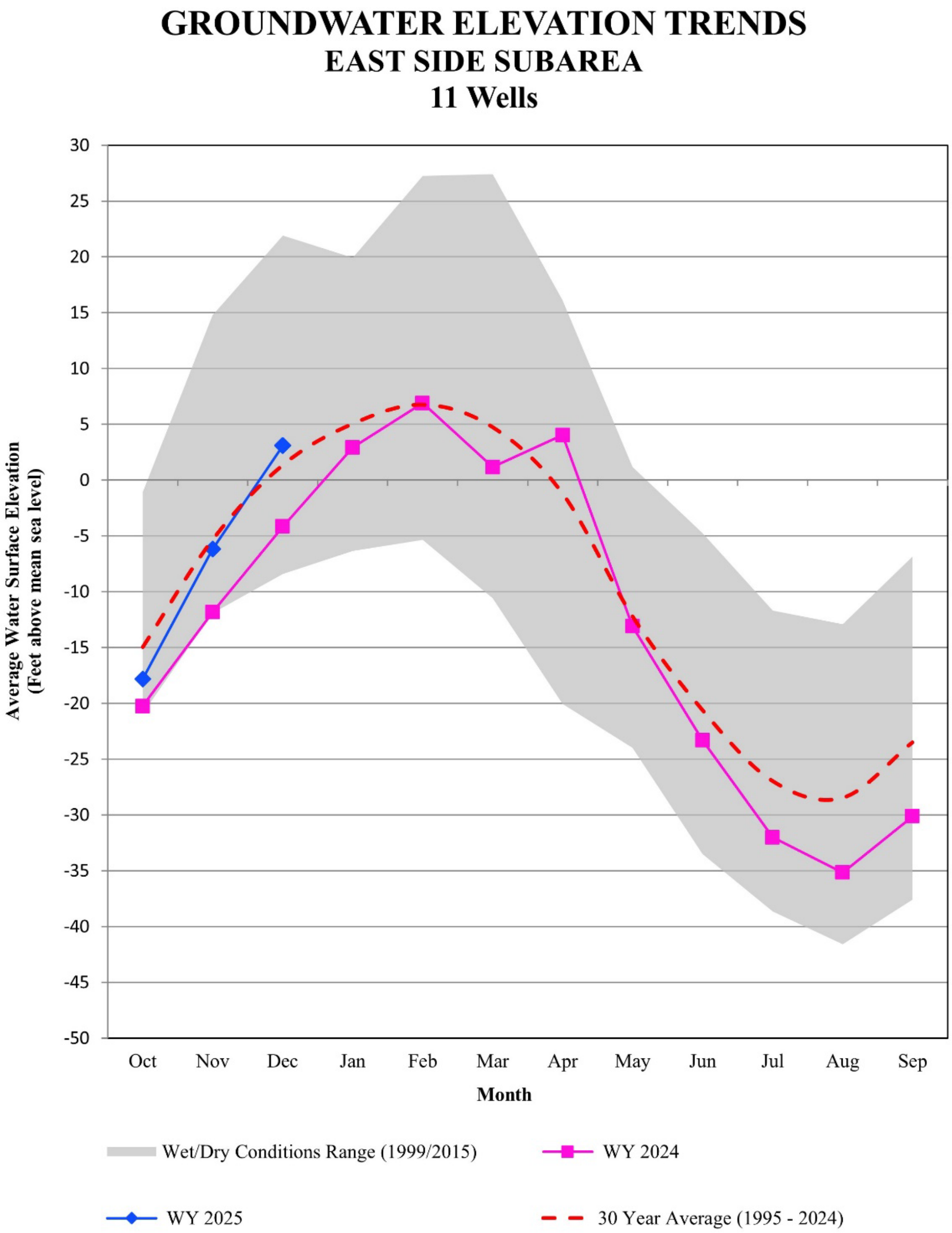


Figure 10: Groundwater Elevation Trends in the East Side Subarea

Forebay Subarea

Over the last quarter, groundwater elevations have increased three feet in the Forebay (Figure 11). Groundwater elevations for December 2024 are up one foot from December 2023 elevations and are up six feet from the 30-year average.

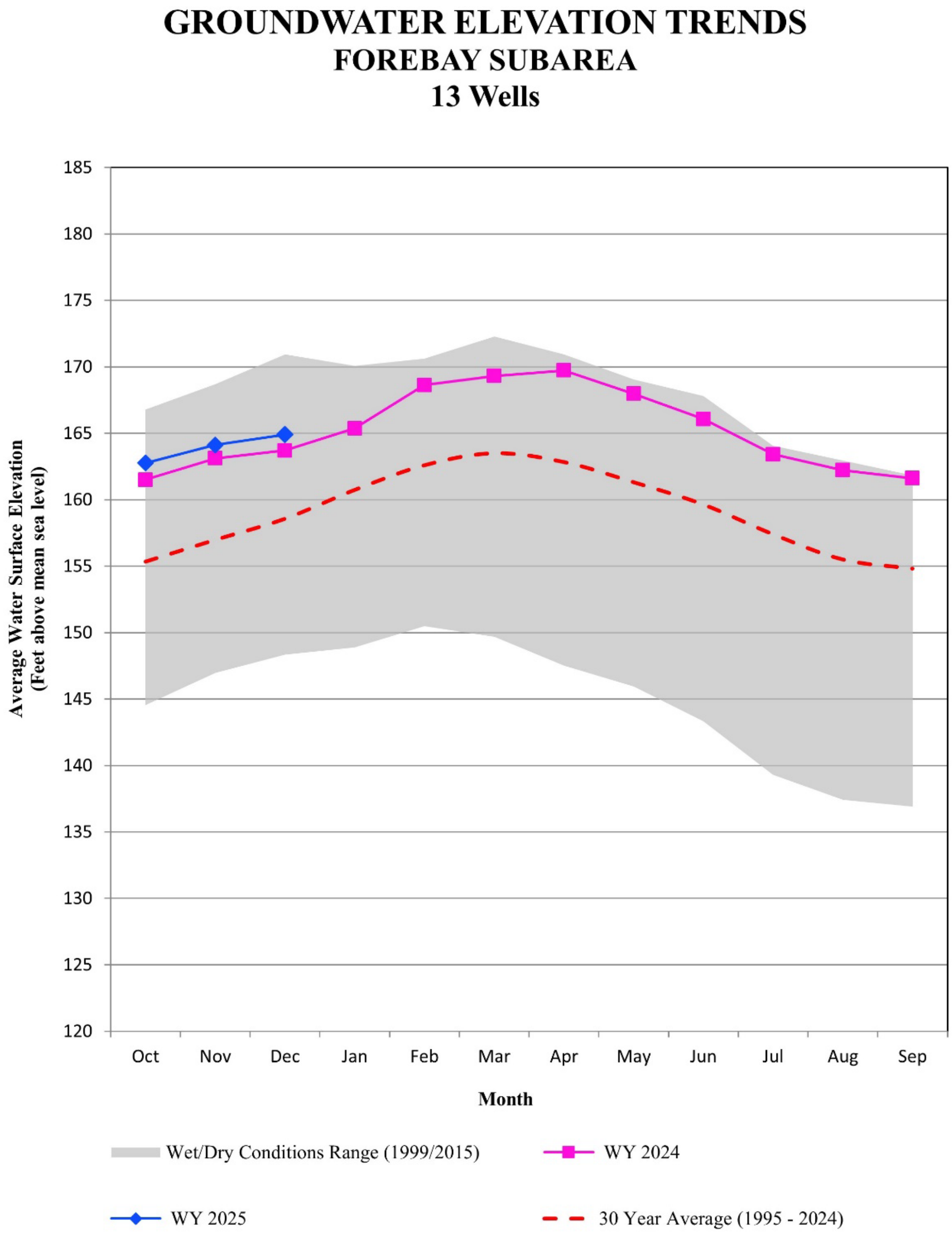


Figure 11: Groundwater Elevation Trends in the Forebay Subarea

Upper Valley Subarea

Upper Valley groundwater elevations have increased two feet over the last quarter (Figure 12). Groundwater elevations for December 2024 are up less than one foot from December 2023 elevations and up four feet from the 30-year average.

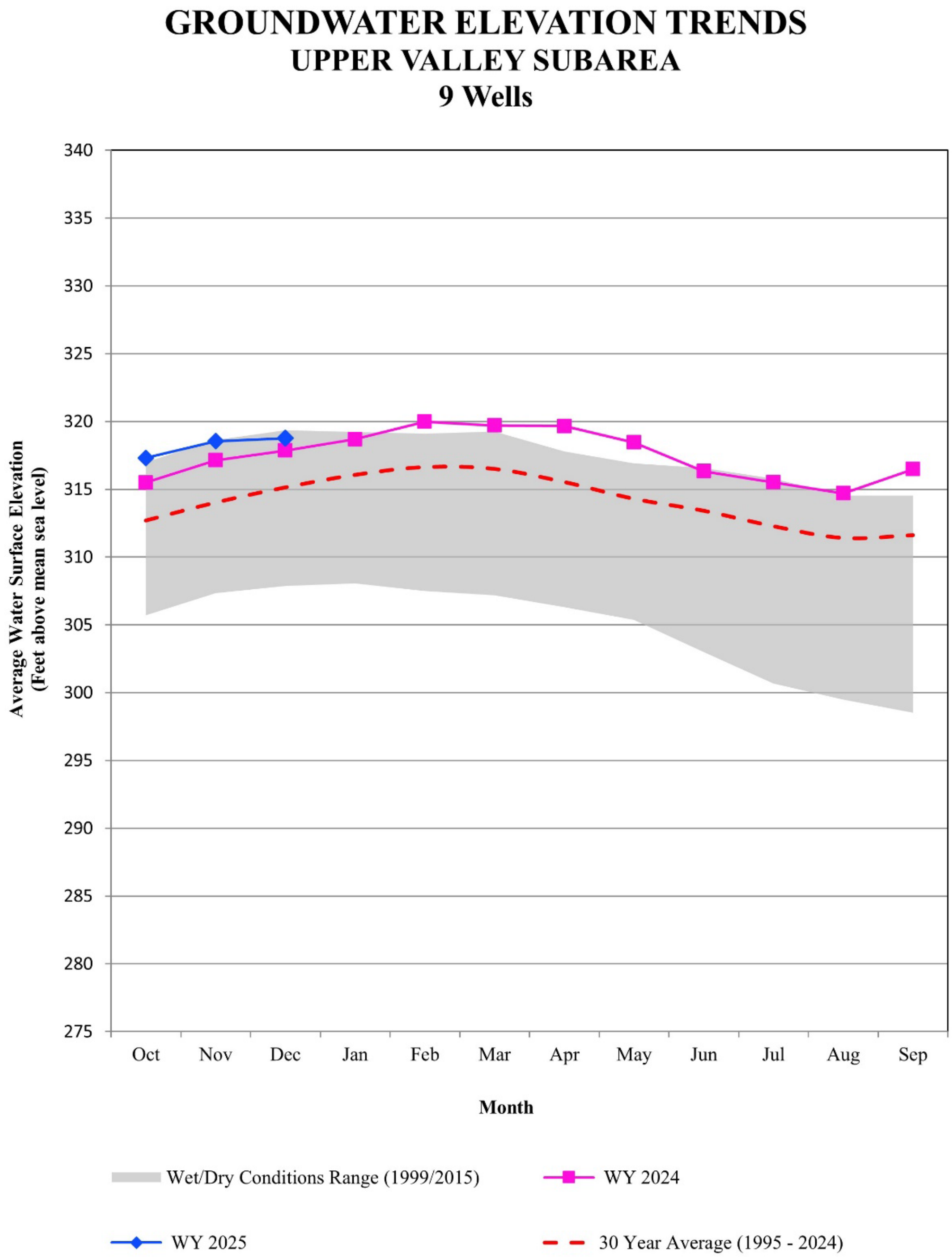


Figure 12: Groundwater Elevation Trends in the Upper Valley Subarea

Figure 13 shows the spatial distribution of changes in groundwater elevations from December 2023 to December 2024. Over the last Water Year, most of the monitored wells in all hydrologic subareas experienced no significant change in groundwater elevation, meaning that fluctuations were within five feet of the prior year's value. However, localized variability in groundwater elevation trends was observed, particularly in the East Side subarea where a majority of the groundwater elevations increased at least five feet compared to the prior year.

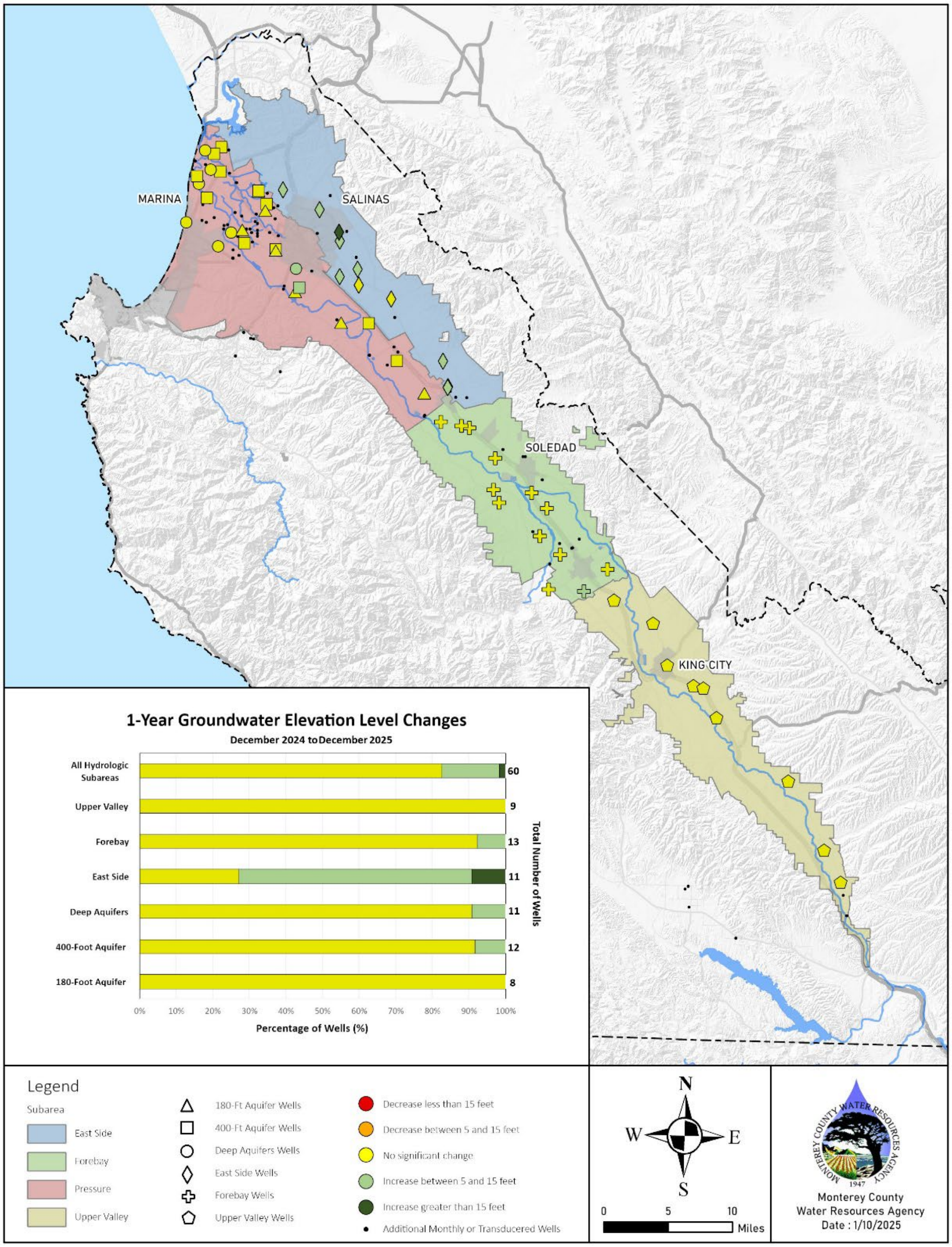


Figure 13: One-Year Groundwater Elevation Changes

Depth to Groundwater vs Groundwater Elevation

Most of the figures in this report use groundwater elevation as a means of describing where groundwater was observed in a well. Using groundwater elevation to describe and analyze the regional groundwater surface allows for comparison of data to determine things such as direction of groundwater flow and groundwater gradient while removing well-to-well variability from topography and well construction design. By measuring the depth to groundwater from a known and consistently used elevation at each well, often referred to as a reference point, it is possible to compare data between wells or to other relevant metrics, such as sea level. Groundwater elevation is calculated from the measured depth to groundwater using the reference point elevation and ground surface elevation. Figure 14 shows the relationship between the reference point and measured depth to water, along with how groundwater elevation is calculated.

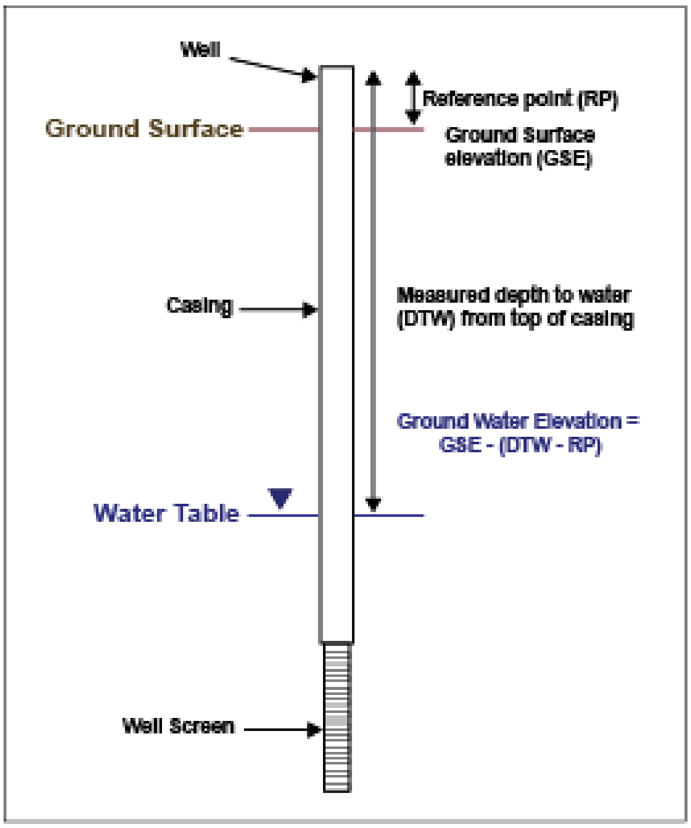
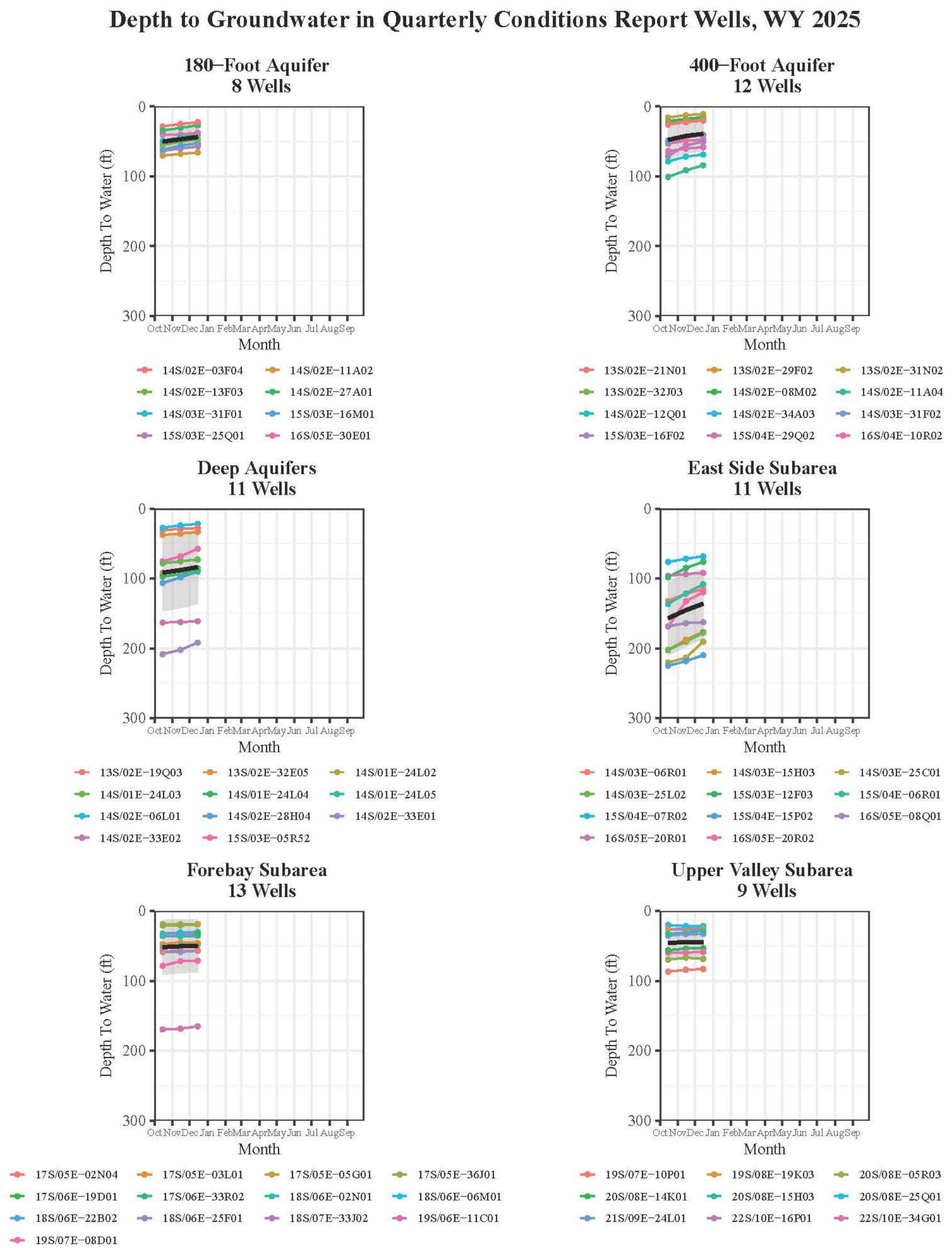


Figure 14: Relationship between Depth to Groundwater and Groundwater Elevation.[1]

Figure 15 shows the depth to groundwater that was measured in each of the wells, within a given subarea, that is used for developing this quarterly water conditions report. As shown on Figure 15, there is a range of depth to water values within each subarea with some, like the East Side Subarea, having a wider range of measured values than others, like the 180-Foot Aquifer. The black line on each of the subarea graphs in Figure 15 is the average depth to groundwater for each set of wells. This value is converted from "depth to groundwater" to "groundwater elevation" by accounting for the reference point and elevation of the ground surface and graphed as the "2025 WY" line on each of the preceding subarea-specific graphs (Figures 7-12). The range in depth to water values is the result of many factors (e.g. variations in topography, thickness of the aquifer, and the length of screen in the well) and illustrates the reason why groundwater elevation is the standard method for evaluating the groundwater system on a regional scale. However, the depth-to-water data have been included with this report as a means of demonstrating the methodology behind the groundwater elevation data that are used throughout the rest of the document.



Depth to Water is measured in feet below a standard reference point at each well. This may be close to, but not always equal to, the ground surface. The black line on each graph shows the average depth to water for each set of wells. The grey shaded area shows the standard deviation.

Figure 15: Depth to Groundwater in Wells Used for Quarterly Conditions Report, WY 2025