

Salinas Valley Water Conditions: Fourth Quarter of Water Year 2023-2024

September 2024

Monterey County Water Resources Agency





MONTEREY COUNTY WATER RESOURCES AGENCY

Salinas Valley Water Conditions

Quarterly Update for Fourth Quarter of Water Year 2023-2024

September 2024

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

Table of Contents

Introduction.....	3
Precipitation.....	4
Reservoir Storage.....	5
Streamflow.....	7
Groundwater Elevations.....	8
180-Foot Aquifer	9
400-Foot Aquifer	10
Deep Aquifers	11
East Side Subarea.....	12
Forebay Subarea.....	13
Upper Valley Subarea	14
Depth to Groundwater vs Groundwater Elevation.....	16

List of Figures

Figure 1: Geographic extent of the area covered by this report and supporting data sources.....	3
Figure 2: Salinas Airport Rainfall for Water Year 2024.....	4
Figure 3: King City Rainfall for Water Year 2024	5
Figure 4: Nacimiento Reservoir Storage	6
Figure 5: San Antonio Reservoir Storage	6
Figure 6: Mean Daily Flow at Selected Stream Gages	7
Figure 7: Groundwater Elevation Trends for the 180-Foot Aquifer	9
Figure 8: Groundwater Elevation Trends in the 400-Foot Aquifer.....	10
Figure 9: Groundwater Elevation Trends in the Deep Aquifers	11
Figure 10: Groundwater Elevation Trends in the East Side Subarea.....	12
Figure 11: Groundwater Elevation Trends in the Forebay Subarea.....	13
Figure 12: Groundwater Elevation Trends in the Upper Valley Subarea	14
Figure 13: One-Year Groundwater Elevation Changes	15
Figure 14: Determining Depth to Groundwater.....	16
Figure 15: Depth to Groundwater in Wells Used for Quarterly Conditions Report, WY 2024.....	17

Introduction

This report covers the fourth quarter of Water Year 2024 (WY24), consisting of July through September 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 fourth quarter of Water Year 2023-2024 indicate higher than normal levels of precipitation. Storage in Nacimiento Reservoir is lower than in September 2023 and storage is higher in San Antonio Reservoir compared to September 2023. Over the fourth quarter of WY24, groundwater elevations decreased across all subareas and aquifers.

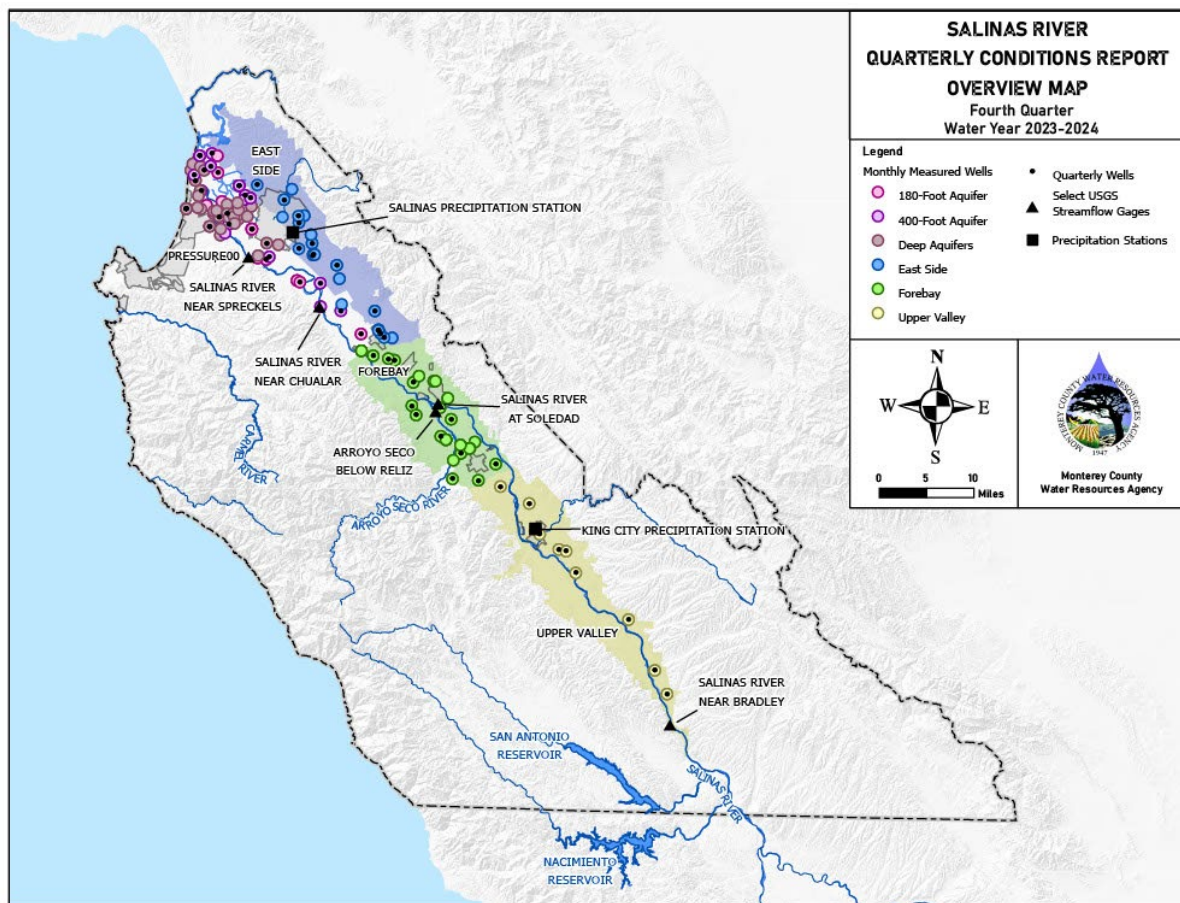


Figure 1: Geographic extent of the area covered by this report and supporting data sources.

Precipitation

Preliminary National Weather Service rainfall data indicates that the fourth quarter of WY24 brought above normal rainfall to Salinas and above normal rainfall to King City. Totals for the quarter were 0.09 inches at the Salinas Airport (100% of normal rainfall of 0.09 inches for the quarter) and 0.64 inches in King City (800% of normal rainfall of 0.08 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 1994 to 2023 is used for this calculation.

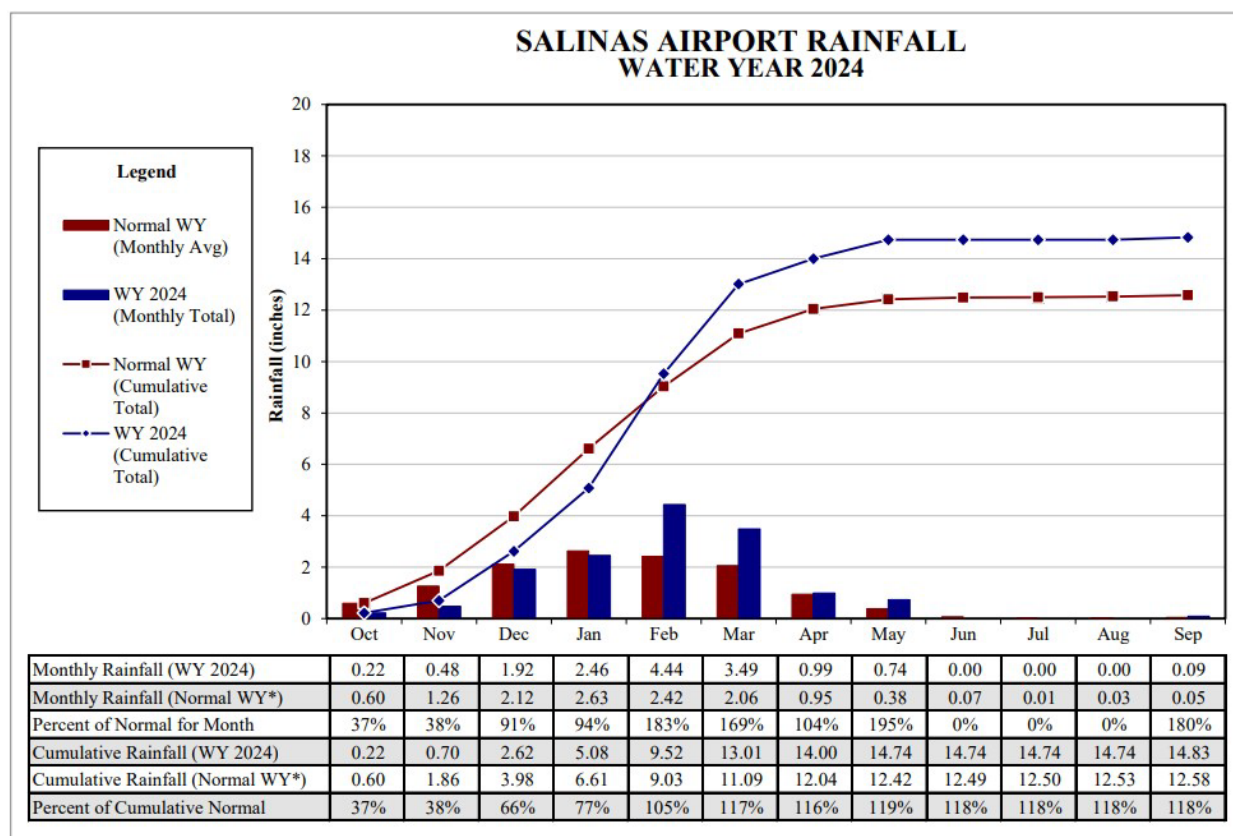


Figure 2: Salinas Airport Rainfall for Water Year 2024

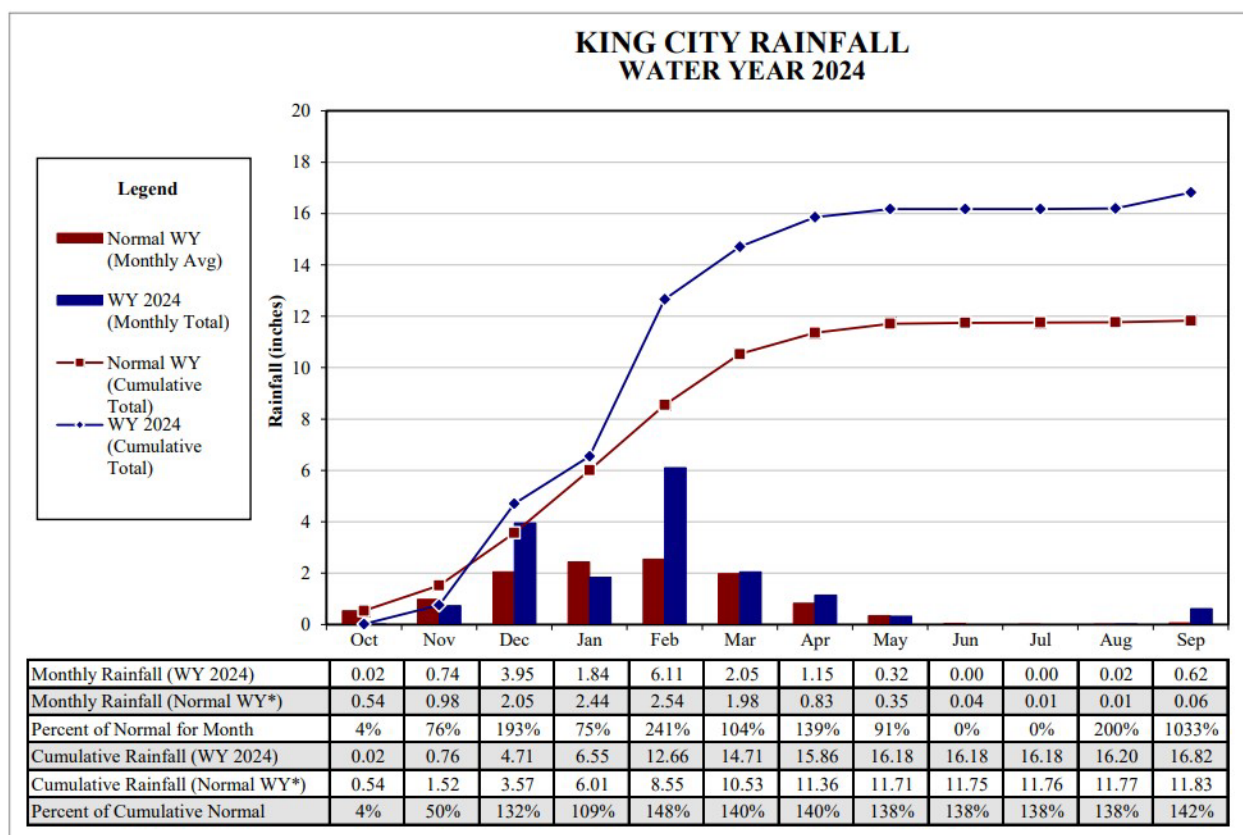


Figure 3: King City Rainfall for Water Year 2024

Reservoir Storage

At the end of the fourth quarter of WY24, storage at Nacimiento Reservoir on September 30, 2024 was 216,010 acre-feet, which is 20,190 acre-feet lower than at the same time in September 2023. Storage in San Antonio Reservoir on September 30, 2024 was 244,900 acre-feet, which is 25,350 acre-feet higher than at the same time in September 2023.

Reservoir	September 30, 2024 (WY24) Storage in acre-feet	September 30, 2023 (WY23) Storage in acre-feet	Difference in acre-feet
Nacimiento	216,010	236,200	-20,190
San Antonio	244,900	219,550	25,350

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.

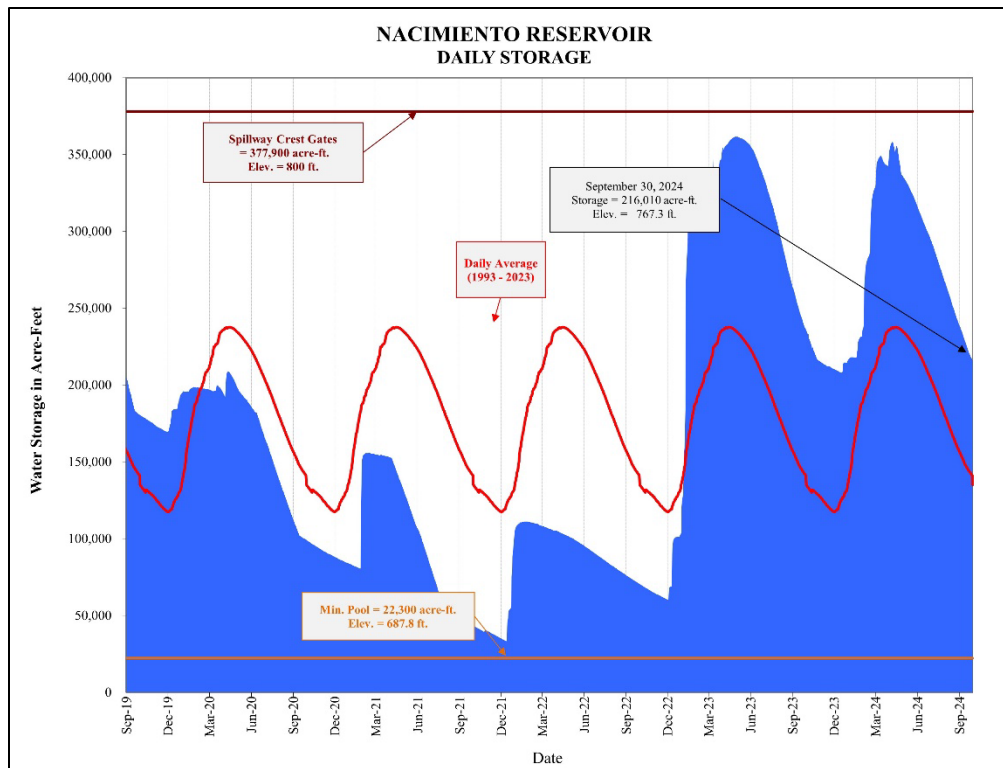


Figure 4: Nacimiento Reservoir Storage

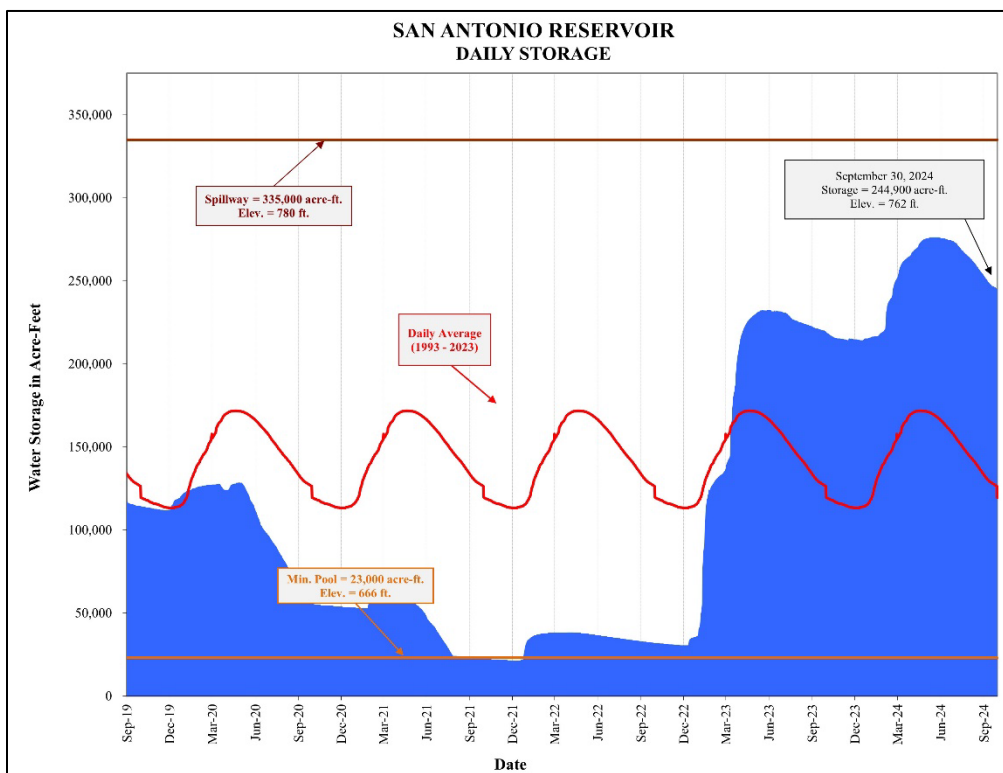


Figure 5: San Antonio Reservoir Storage

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 (WY 2024).

Streamflow recorded during the fourth quarter of WY24 can be attributed to conservation and environmental releases from the Nacimiento and San Antonio reservoirs, as is evidenced by the very consistent streamflow measurements during the fourth quarter of WY24. The conservation releases from the Nacimiento and San Antonio Reservoirs support groundwater recharge and SRDF operations, while environmental releases support fish and wildlife habitat.

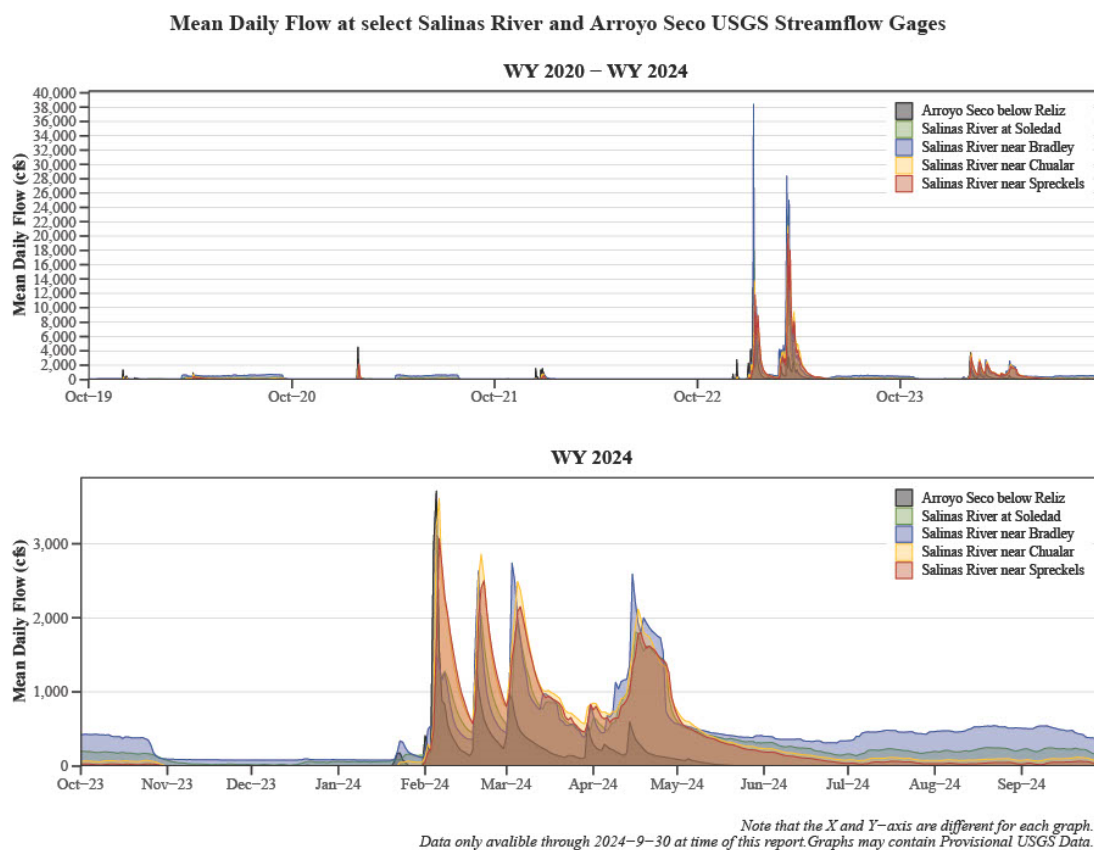


Figure 6: Mean Daily Flow at Selected Stream Gages

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 (WY24) with past conditions. Graphs for individual subareas, showing the current year's groundwater elevation conditions, last year's conditions (WY23) 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 (WY1994-WY2023) 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 September 2024, with additional detail provided on Figures 7-12.

Table 1: Groundwater Elevation Trends Summary for September 2024				
Subarea/Aquifer	September 2024 Groundwater Elevation (ft-msl)	Change during Fourth Quarter	One Year Change	Difference from 30-Year Average Elevation
180-Foot Aquifer	4 feet	Down 4 feet	Up 1 foot	Up 3 feet
400-Foot Aquifer	-8 feet	Down 3 feet	No change	Up 5 feet
Deep Aquifers	-35 feet	Down 6 feet	Down <1 foot	Not applicable
East Side	-30 feet	Down 7 feet	Down 4 feet	Down 7 feet
Forebay	162 feet	Down 5 feet	Up <1 foot	Up 7 feet
Upper Valley	317 feet	Up <1 feet	Up 2 feet	Up 5 feet

180-Foot Aquifer

Over the last quarter, groundwater elevations decreased four feet in the 180-Foot Aquifer (Figure 7). Groundwater elevations for September 2024 are up one foot compared to September 2023 and are up three feet from the 30-year average.

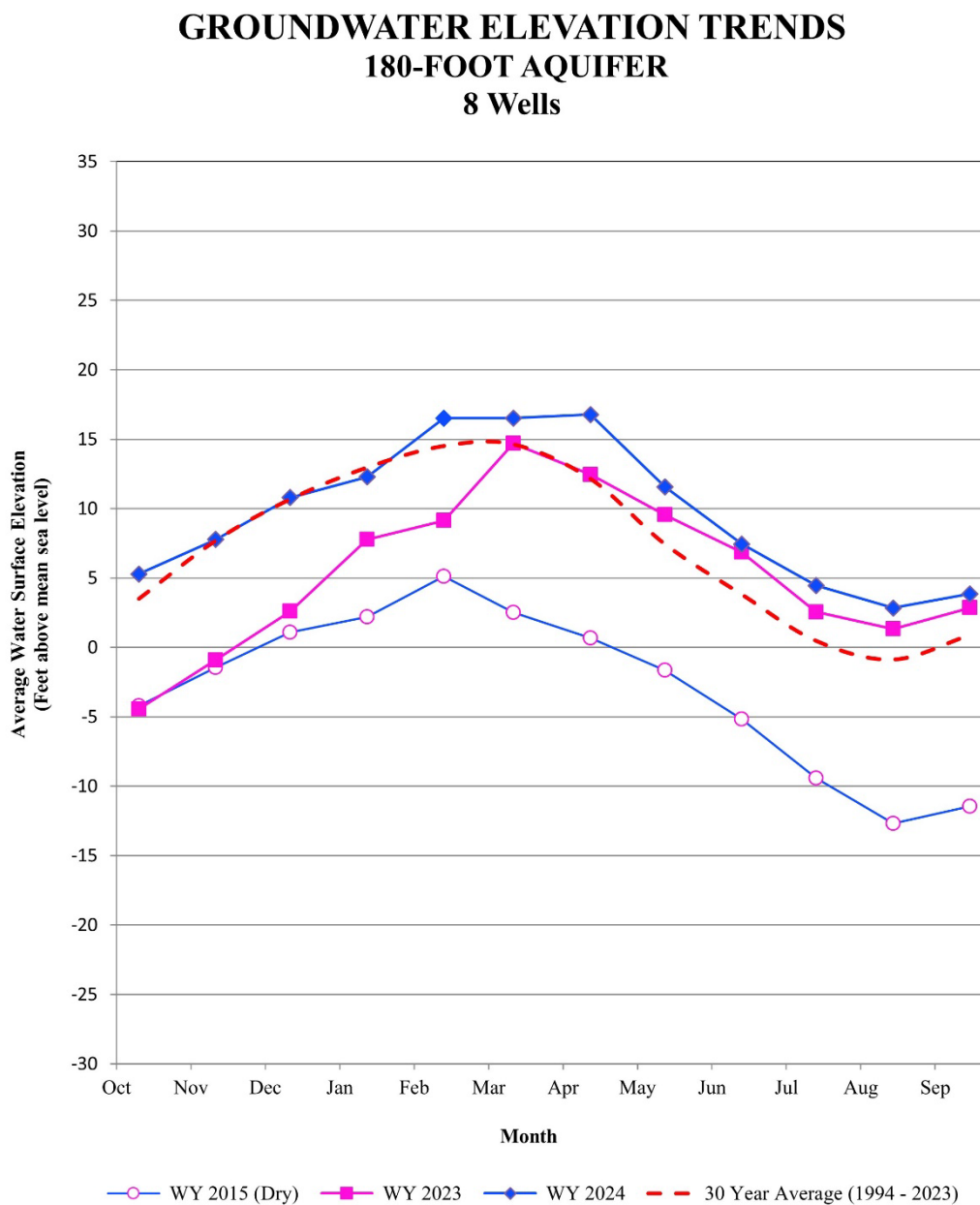


Figure 7: Groundwater Elevation Trends for the 180-Foot Aquifer

400-Foot Aquifer

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

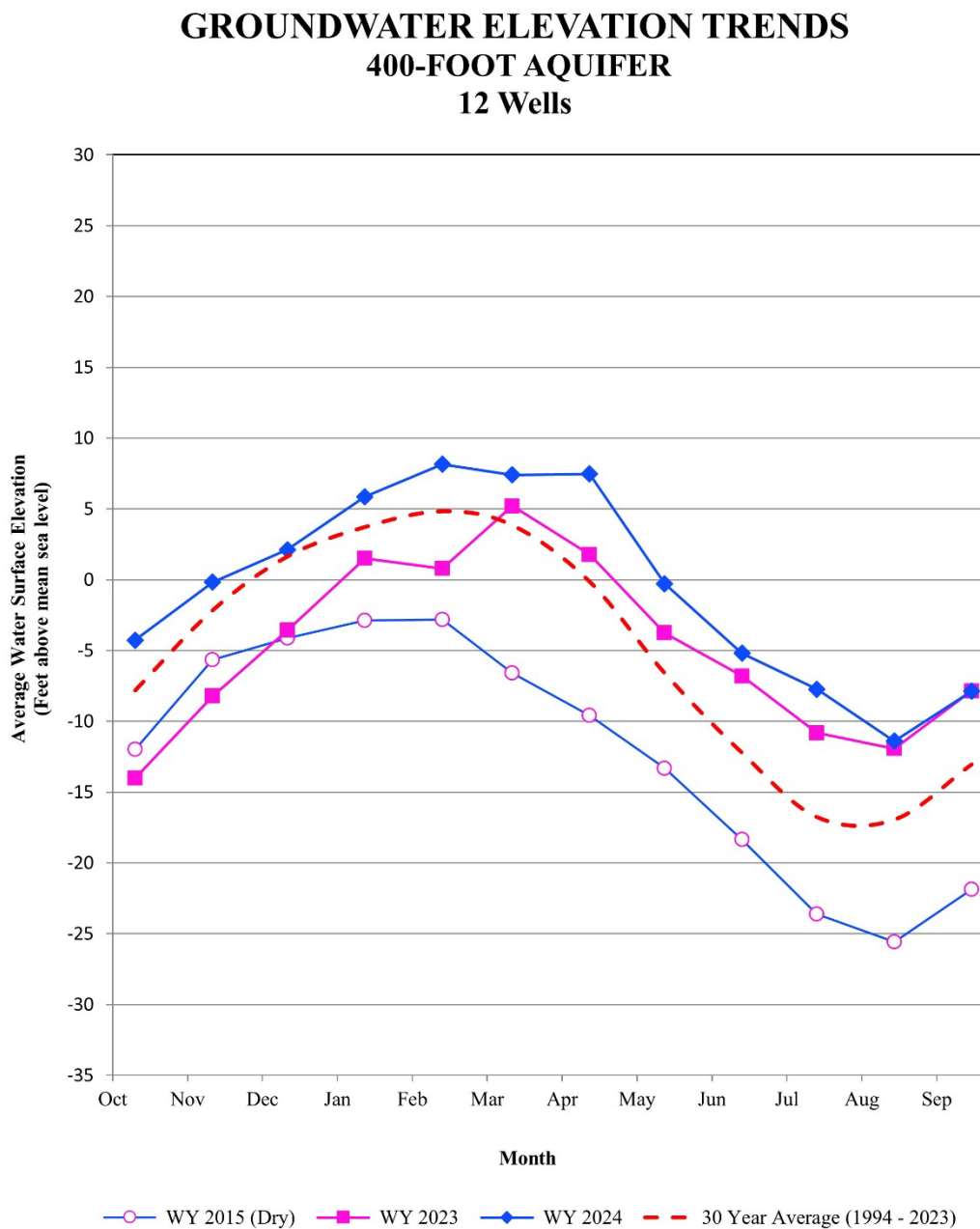


Figure 8: Groundwater Elevation Trends in the 400-Foot Aquifer

Deep Aquifers

Over the last quarter, groundwater elevations decreased six feet in the Deep Aquifers (Figure 9). Groundwater elevations for September 2024 are down less than one foot compared to September 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.

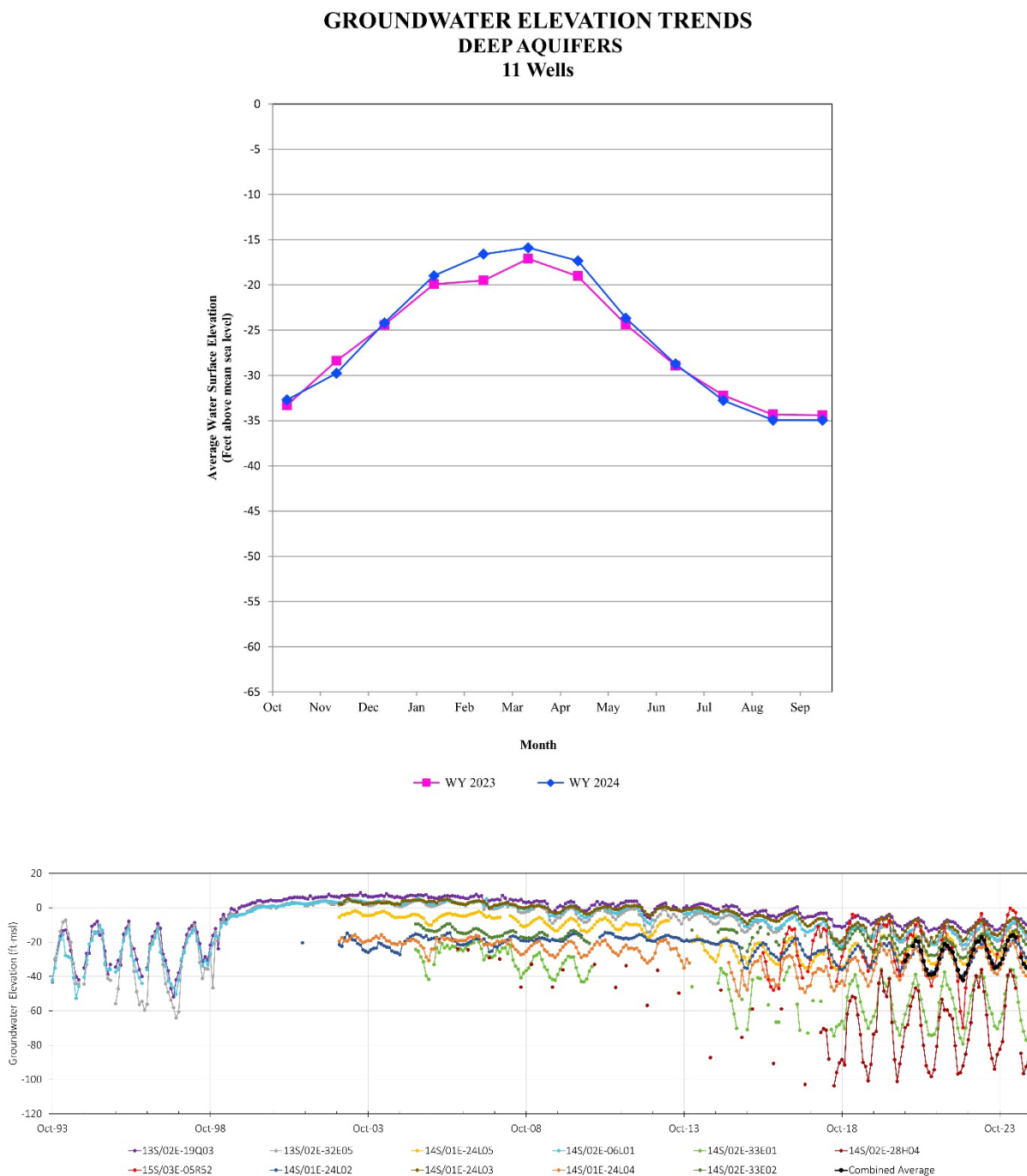


Figure 9: Groundwater Elevation Trends in the Deep Aquifers

East Side Subarea

East Side groundwater elevations decreased seven feet over the last quarter (Figure 10). Groundwater elevations for September 2024 are down four feet from September 2023 elevations and down seven feet from the 30-year average.

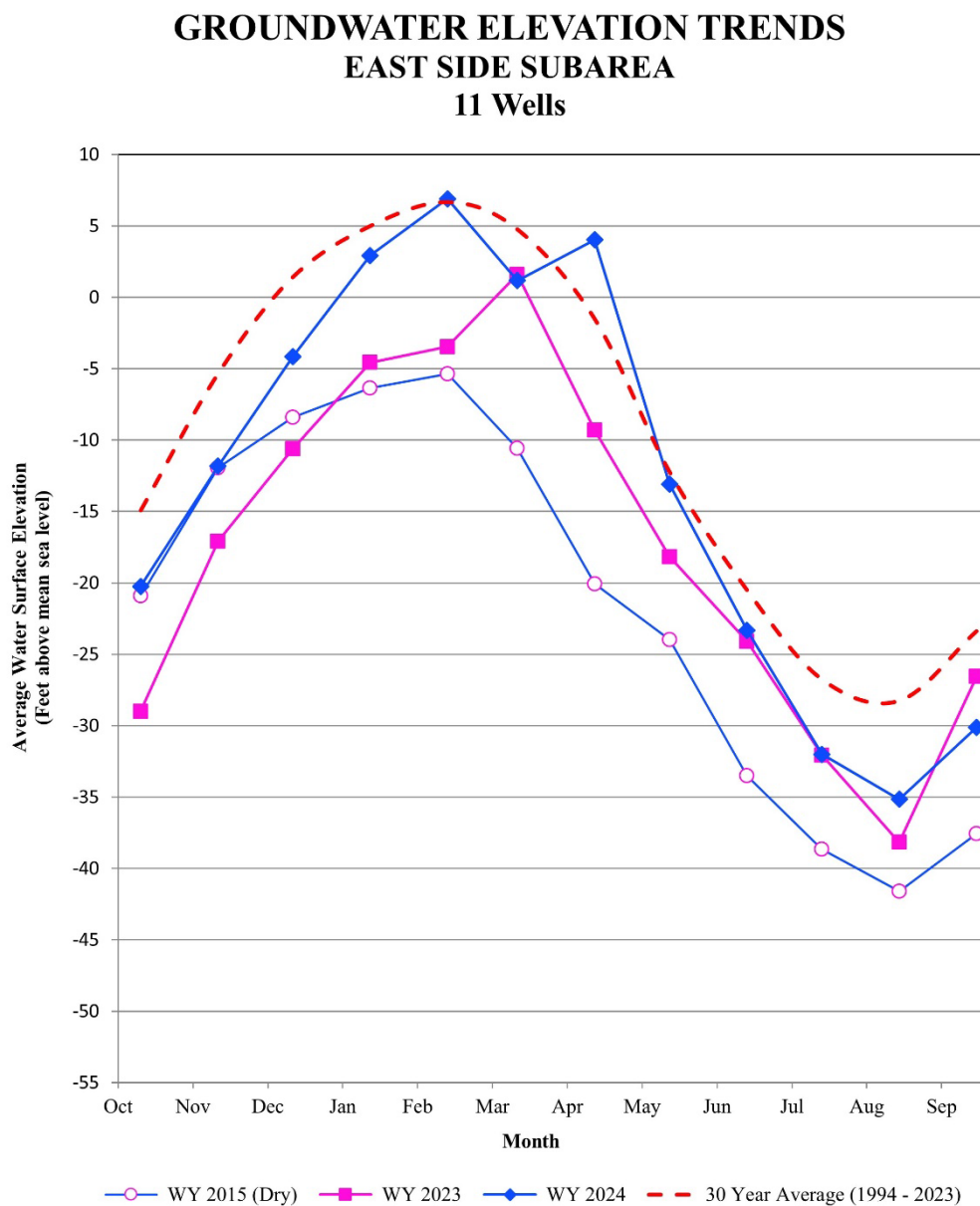


Figure 10: Groundwater Elevation Trends in the East Side Subarea

Forebay Subarea

Over the last quarter, groundwater elevations have decreased five feet in the Forebay (Figure 11). Groundwater elevations for September 2024 are up less than one foot from September 2023 elevations and are up seven feet from the 30-year average.

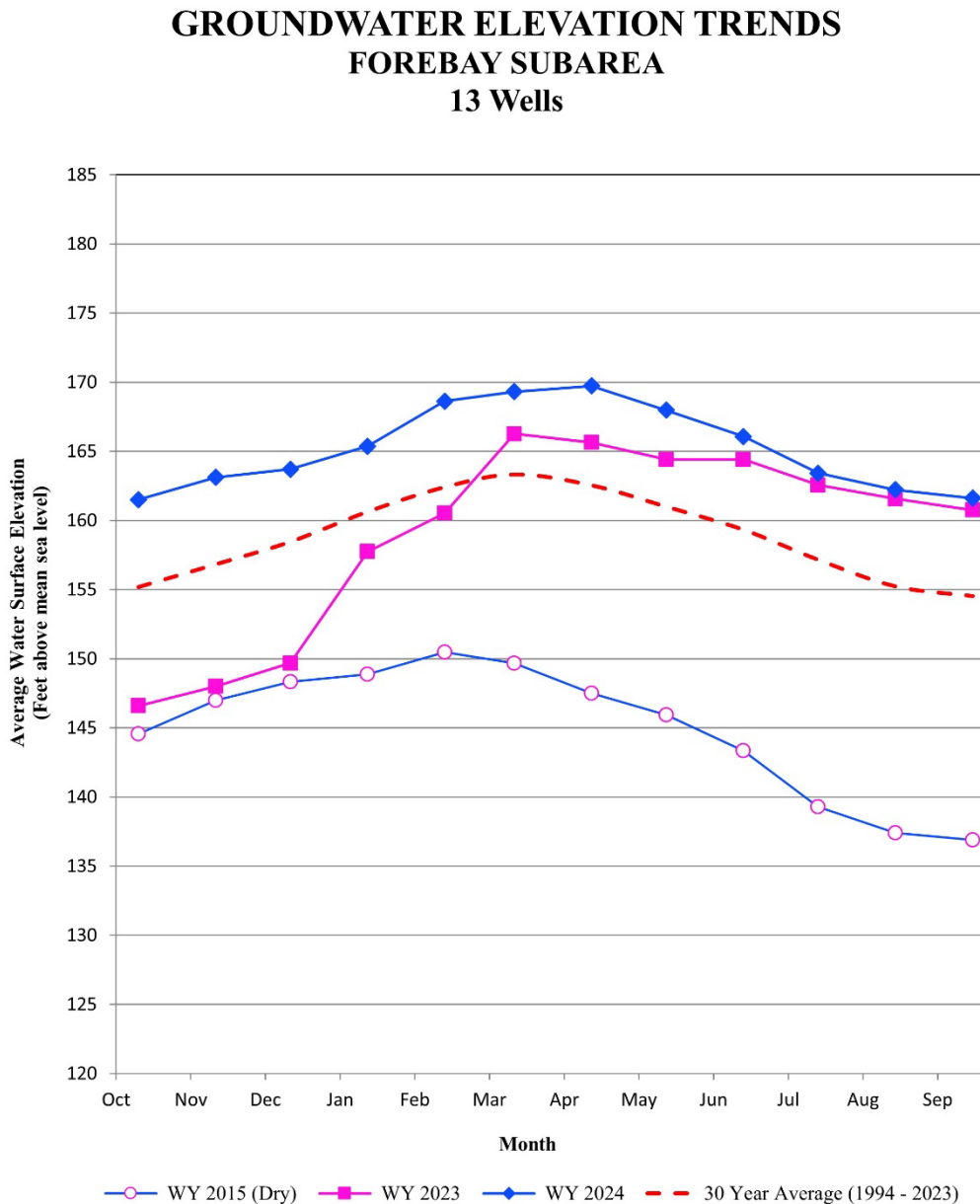


Figure 11: Groundwater Elevation Trends in the Forebay Subarea

Upper Valley Subarea

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

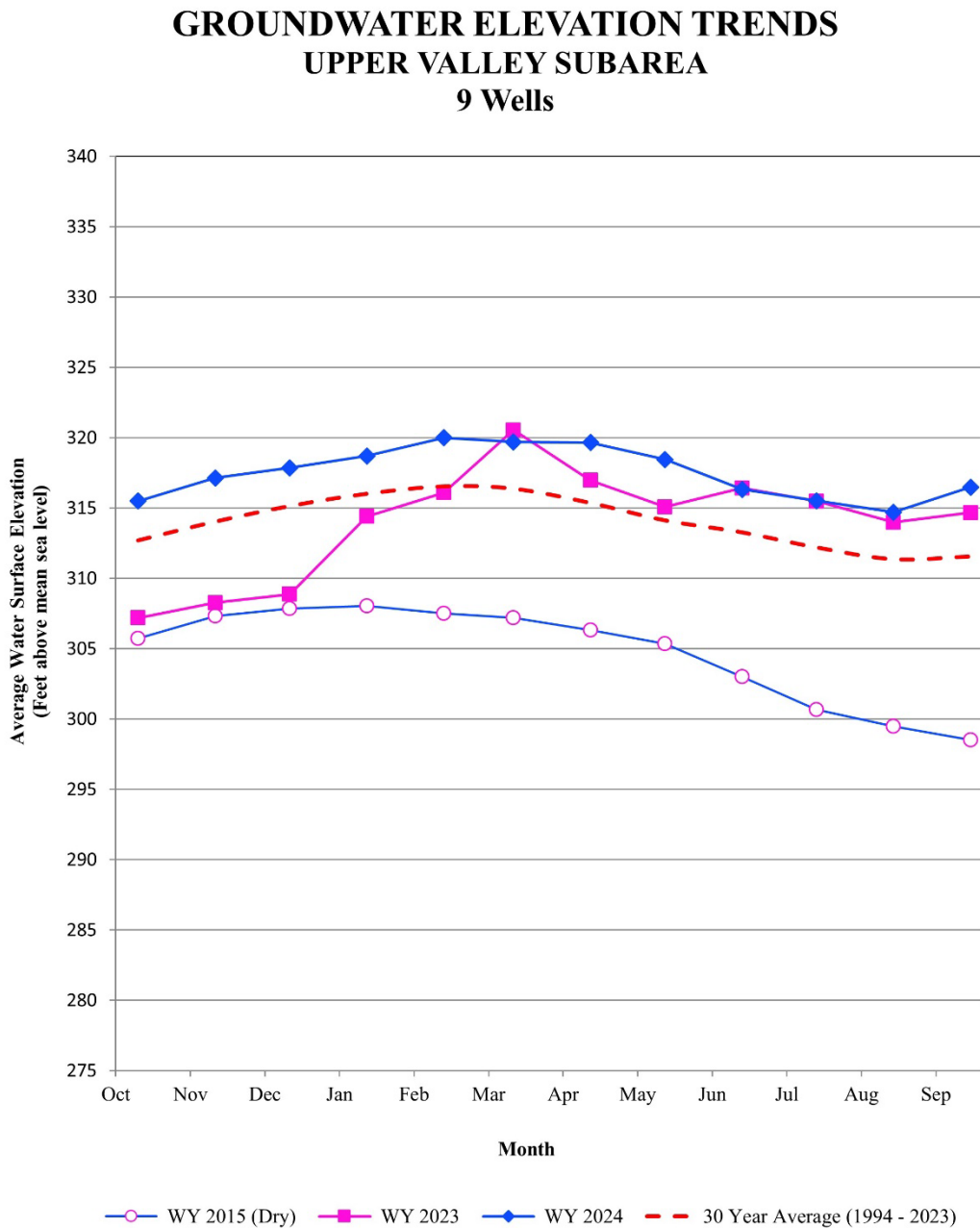


Figure 12: Groundwater Elevation Trends in the Upper Valley Subarea

Figure 13 shows the spatial distribution of changes in groundwater elevations from September 2023 to September 2024. Over the last Water Year, most of the monitored wells in all hydrologic subareas experienced no significant change in groundwater elevation. However, localized variability in groundwater elevation trends was observed, particularly in the East Side subarea.

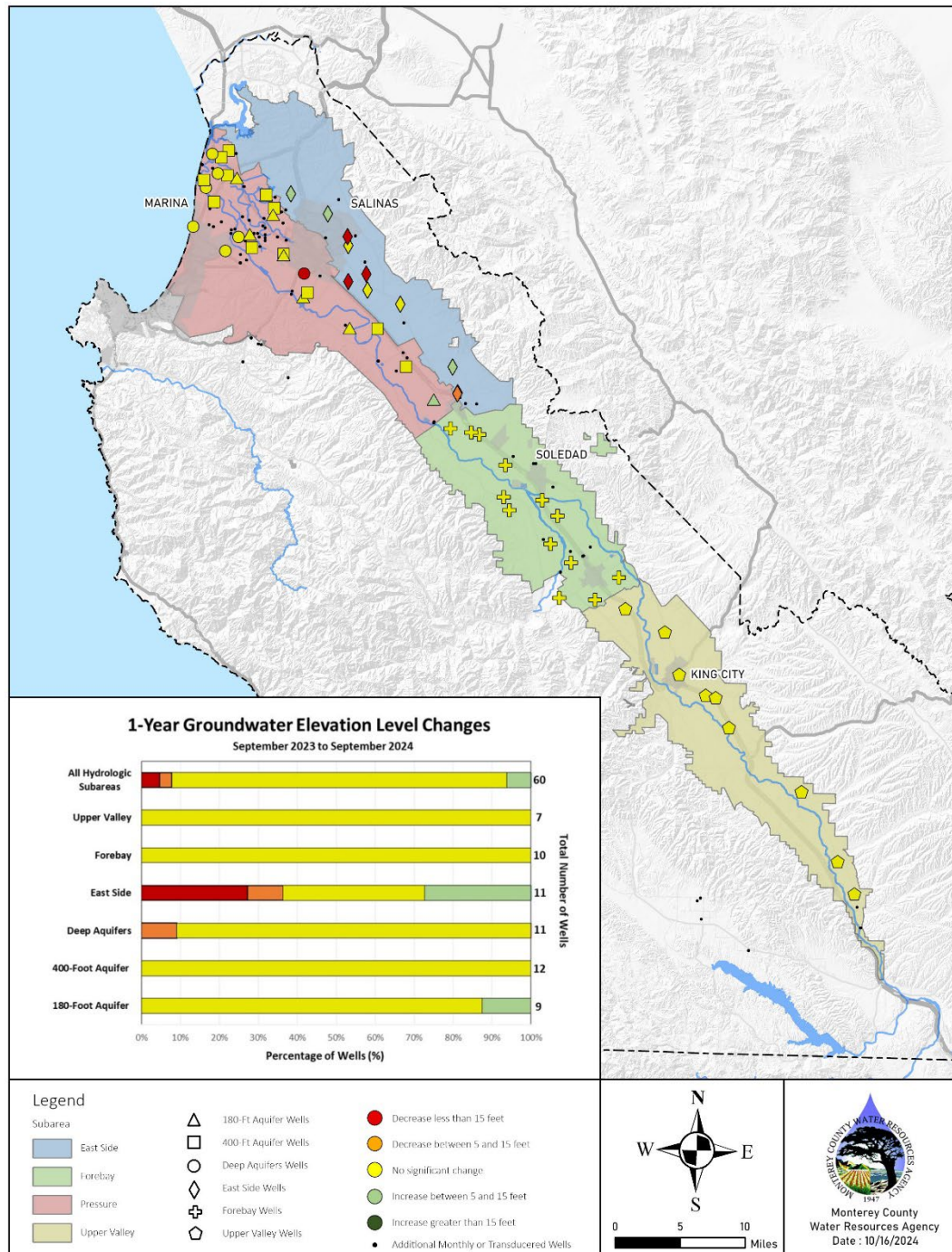


Figure 13: One-Year Groundwater Elevation Changes

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. Figure 14 shows the method for determining depth to groundwater and groundwater elevation in each well.¹ The depth to groundwater is measured from a reference point that is unique to each well. Groundwater elevation is calculated from the measured depth to groundwater using the reference point elevation and ground surface elevation.

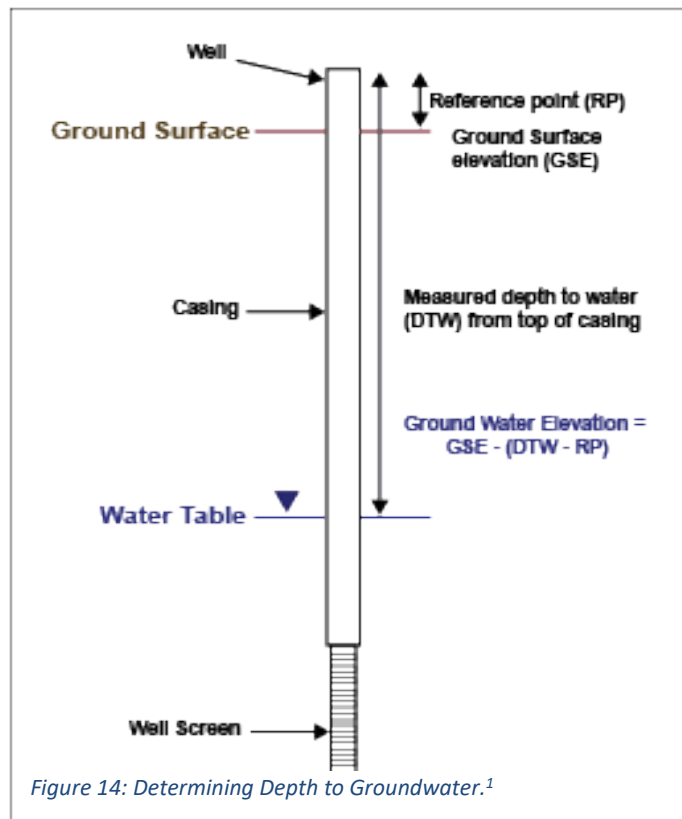
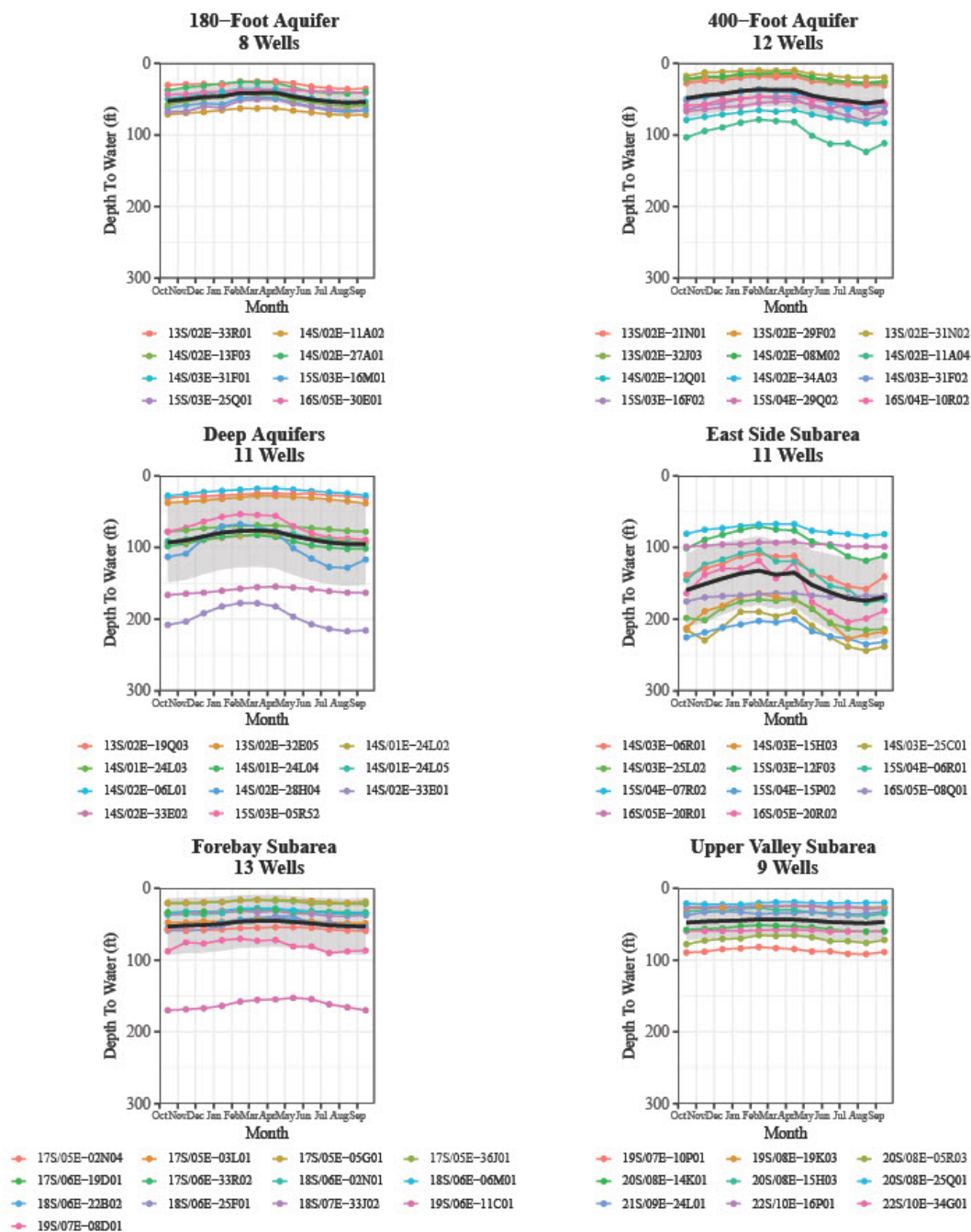


Figure 15 shows the depth to groundwater that was measured in each of the wells, within a given subarea, that is used for developing this quarterly water conditions report. As shown on Figure 15, there is a range of depth to water values within each subarea with some, like the East Side Subarea, having 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” and graphed as the “2024 WY” line on each of the preceding subarea-specific graphs (Figures 7-12).

¹ Figure 14 is modified from the Idaho Department of Environmental Quality.

Depth to Groundwater in Quarterly Conditions Report Wells, WY 2024



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 2024