

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

January 2024

Monterey County Water Resources Agency





MONTEREY COUNTY WATER RESOURCES AGENCY
Salinas Valley Water Conditions
Quarterly Update for First Quarter of Water Year 2023-2024
January 2024

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Introduction

This report covers the first quarter of Water Year 2024 (WY24), consisting of October through December 2023. 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 2023-2024 indicate close to normal levels of precipitation, and reservoir storage is significantly higher than in December 2022 at both Nacimiento and San Antonio Reservoirs. Over the first quarter of WY24, groundwater elevations increased across all monitored subareas and aquifers, and are higher than they were one year ago.

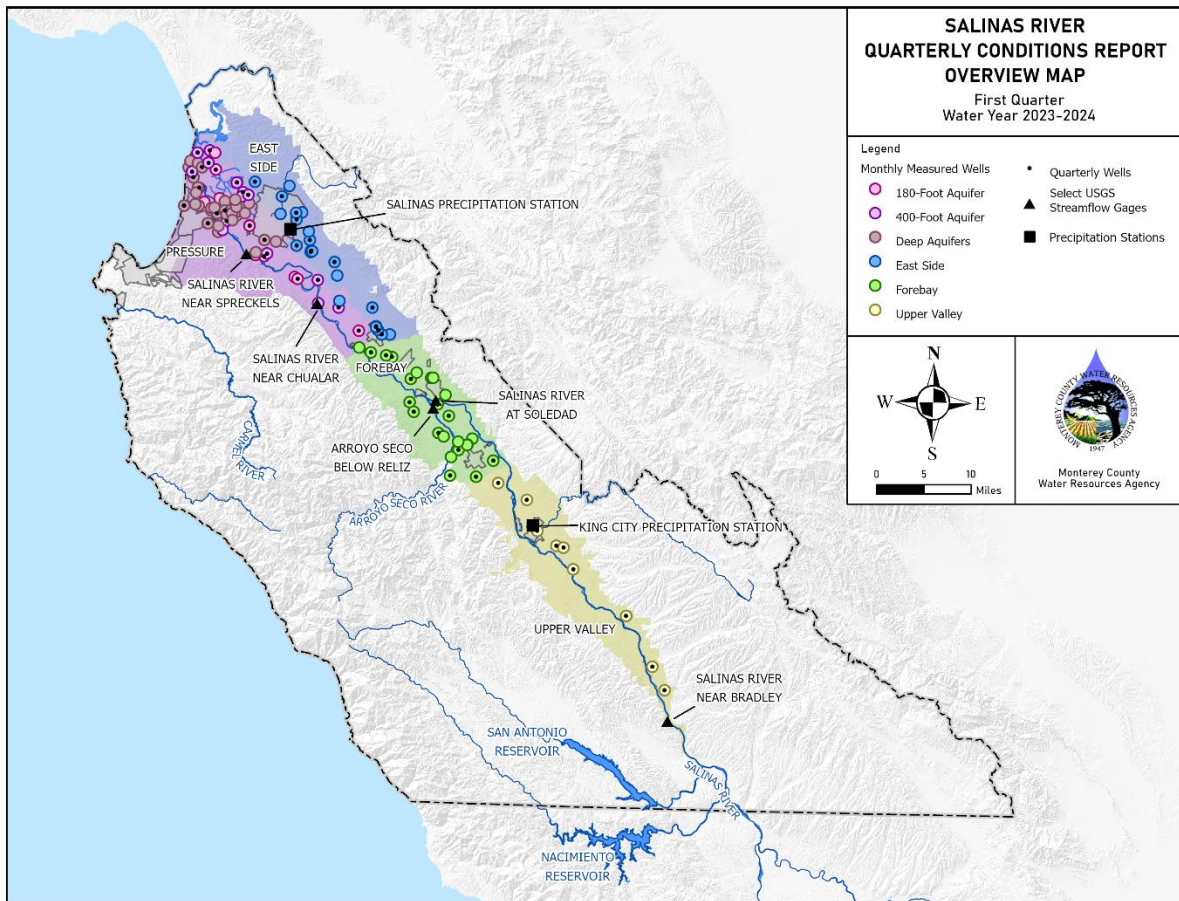


Figure 1: Geographic extent of the area covered by this report and supporting data sources.

Precipitation

Preliminary National Weather Service rainfall data indicates that the first quarter of WY24 brought below normal rainfall to Salinas and above normal rainfall to King City. Totals for the quarter were 2.62 inches at the Salinas Airport (66% of normal rainfall of 3.98 inches for the quarter) and 4.71 inches in King City (132% of normal rainfall of 3.57 inches for the quarter).

Figure 2 and Figure 3 show monthly and cumulative precipitation data for the current and 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.

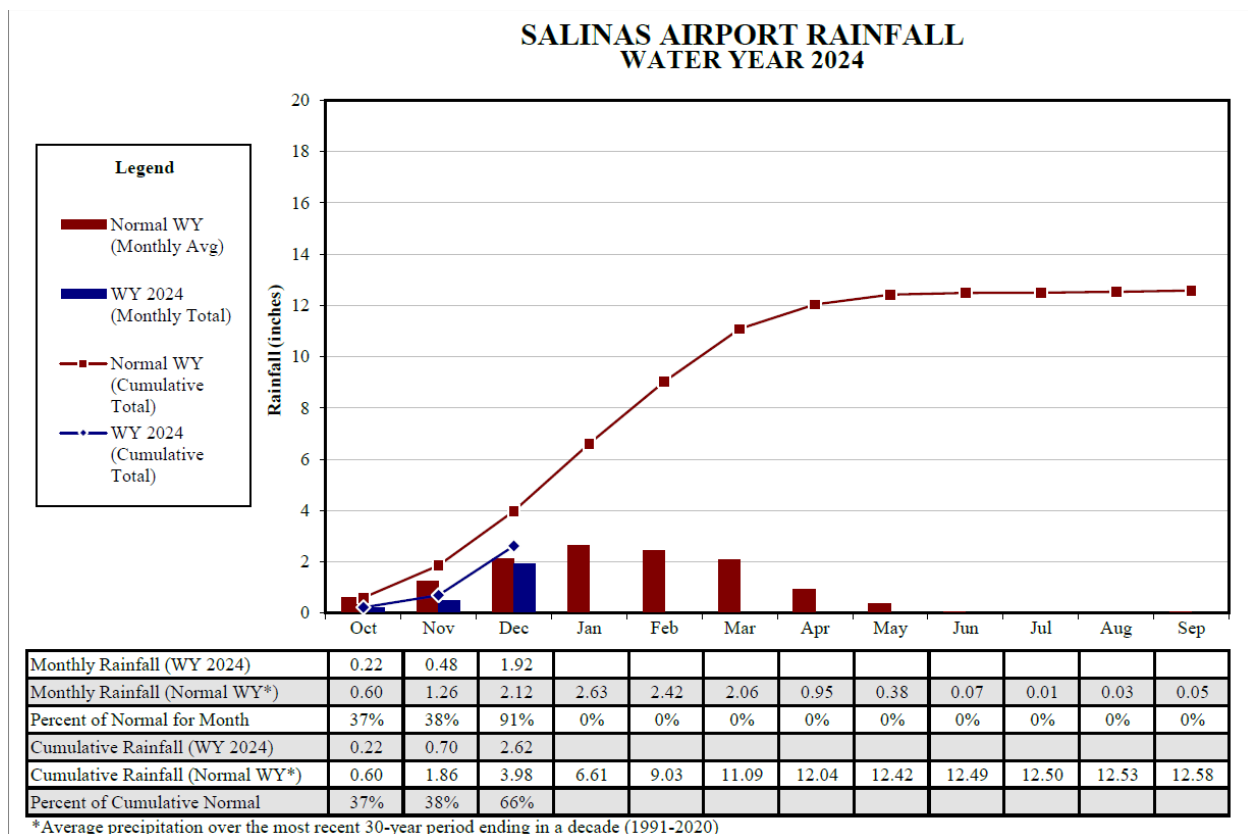


Figure 2: Salinas Airport Rainfall for Water Year 2024

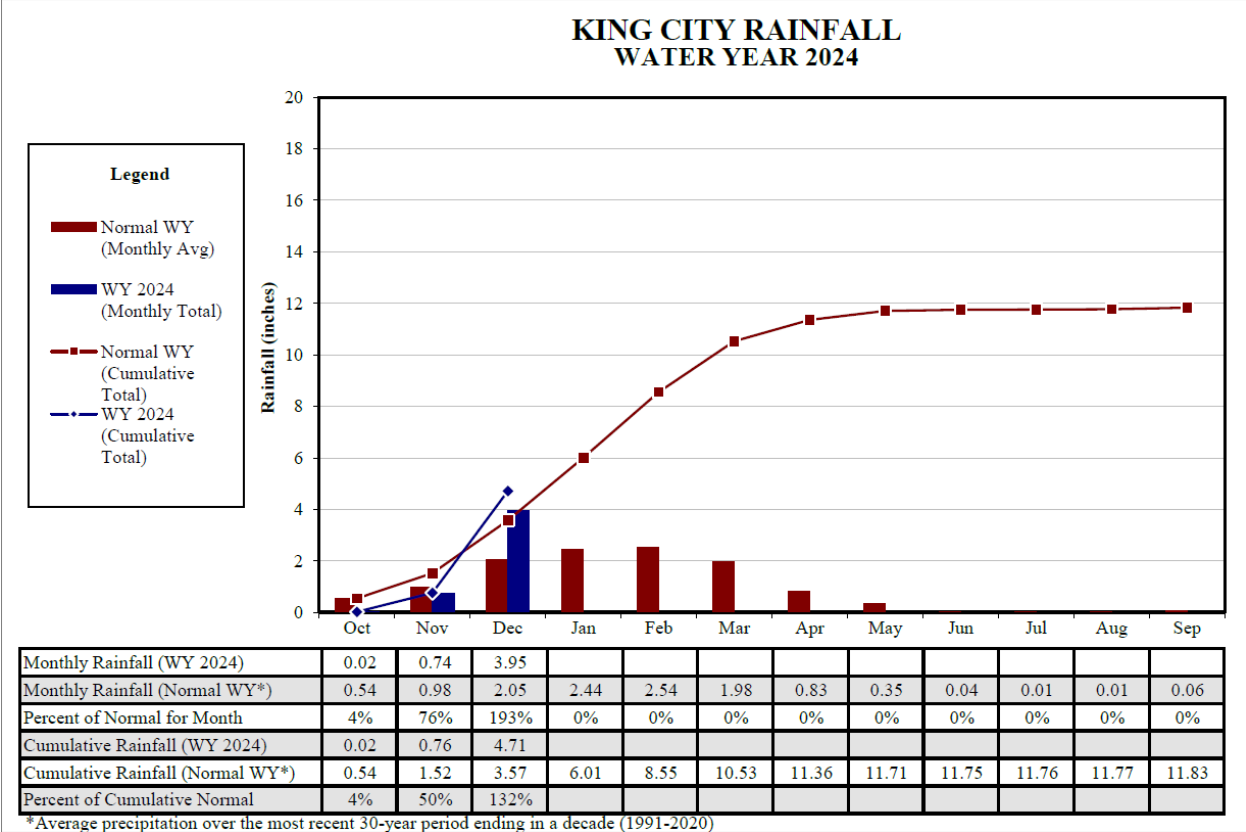


Figure 3: King City Rainfall for Water Year 2024

Reservoir Storage

At the end of the first quarter of Water Year 2024, storage at Nacimientto Reservoir on December 31, 2023 was 216,010 acre-feet, which is 112,380 acre-feet higher than in December 2022. Storage in San Antonio Reservoir on December 31, 2023 was 215,750 acre-feet, which is 179,455 acre-feet higher than at the same time in December 2022.

Reservoir	December 31, 2023 (WY24) Storage in acre-feet	December 31, 2022 (WY23) Storage in acre-feet	Difference in acre-feet
Nacimientto	216,010	103,630	112,380
San Antonio	215,750	36,295	179,455

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.

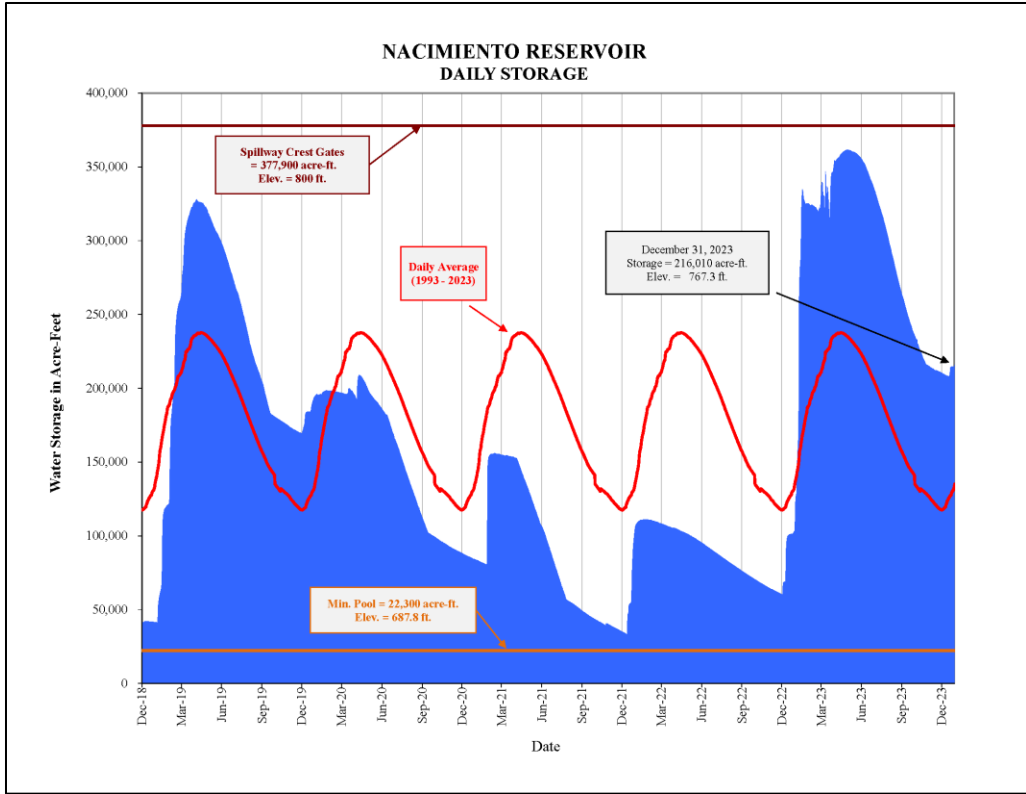


Figure 4: Nacimiento Reservoir Storage

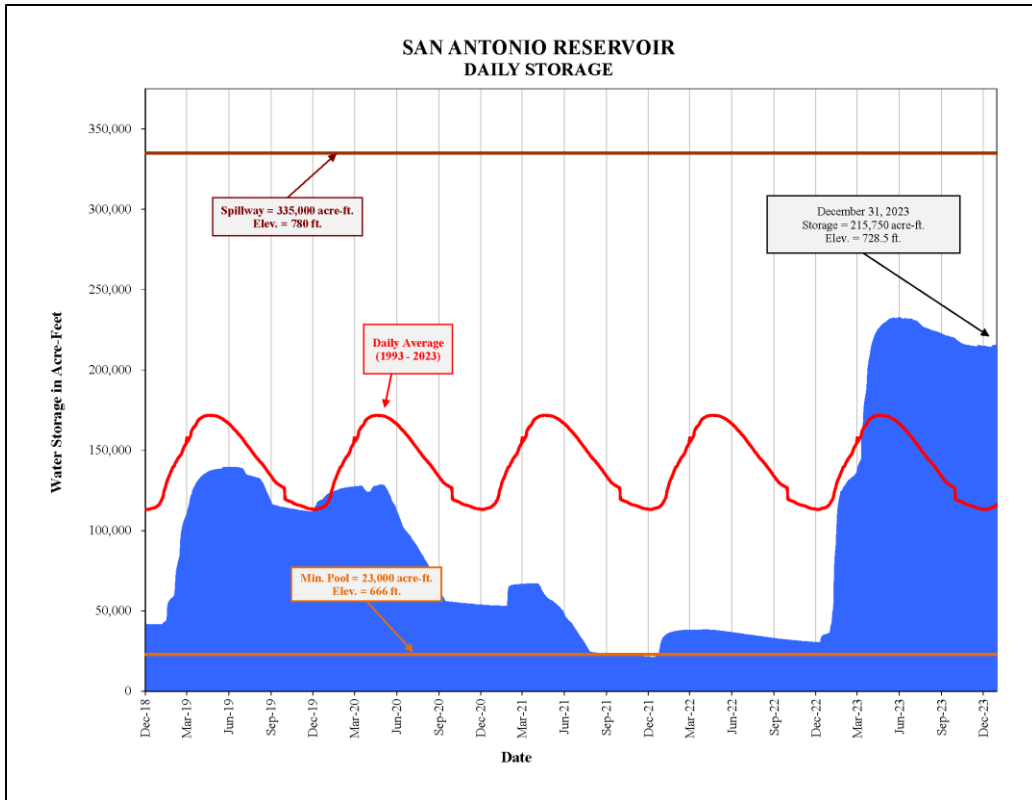


Figure 5: San Antonio Reservoir Storage

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 first quarter of WY24 was predominantly the result of releases being made from the reservoirs with the exception of a small increase in December due to the rainfall recorded at the end of the quarter.

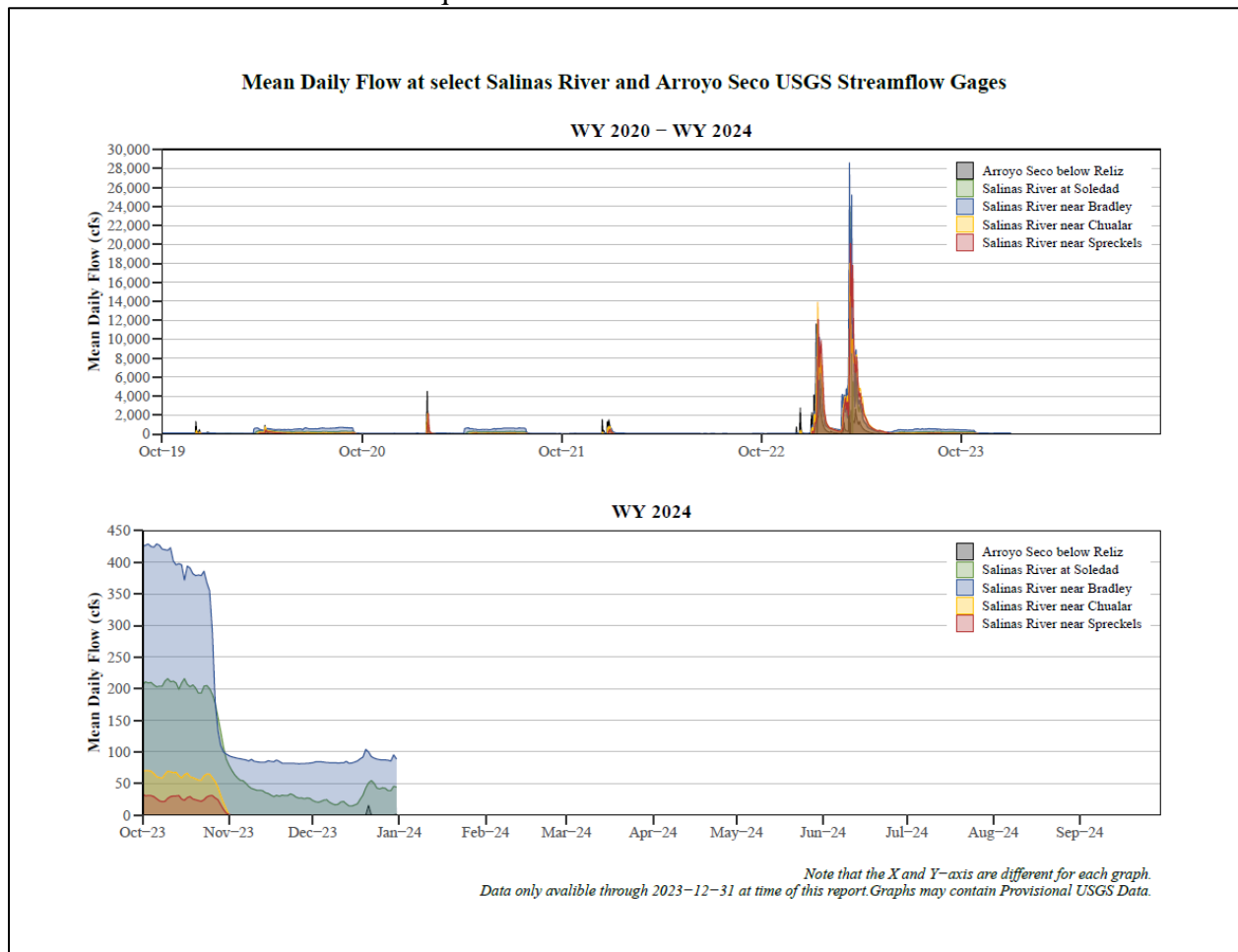


Figure 6: Mean Daily Flow at Selected Stream Gages

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.

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 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 water level 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 water levels 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 December 2023, with additional detail provided on Figures 7-12.

Subarea/Aquifer	December 2023 Groundwater Elevation (ft-msl)	Change during First Quarter	One Year Change	Difference from 30-Year Average Elevation
180-Foot Aquifer	11 feet	Up 8 feet	Up 8 feet	Up <1 foot
400-Foot Aquifer	2 feet	Up 10 feet	Up 6 feet	Up <1 foot
Deep Aquifers	-24 feet	Up 10 feet	Up <1 foot	Not applicable
East Side	-4 feet	Up 22 feet	Up 7 feet	Down 6 feet
Forebay	164 feet	Up 3 feet	Up 14 feet	Up 5 feet
Upper Valley	318 feet	Up 3 feet	Up 9 feet	Up 3 feet

180-Foot Aquifer

Over the last quarter, groundwater elevation levels increased eight feet in the 180-Foot Aquifer (Figure 7). Groundwater elevations have increased eight feet compared to December 2022 and are up less than one foot from the 30-year average.

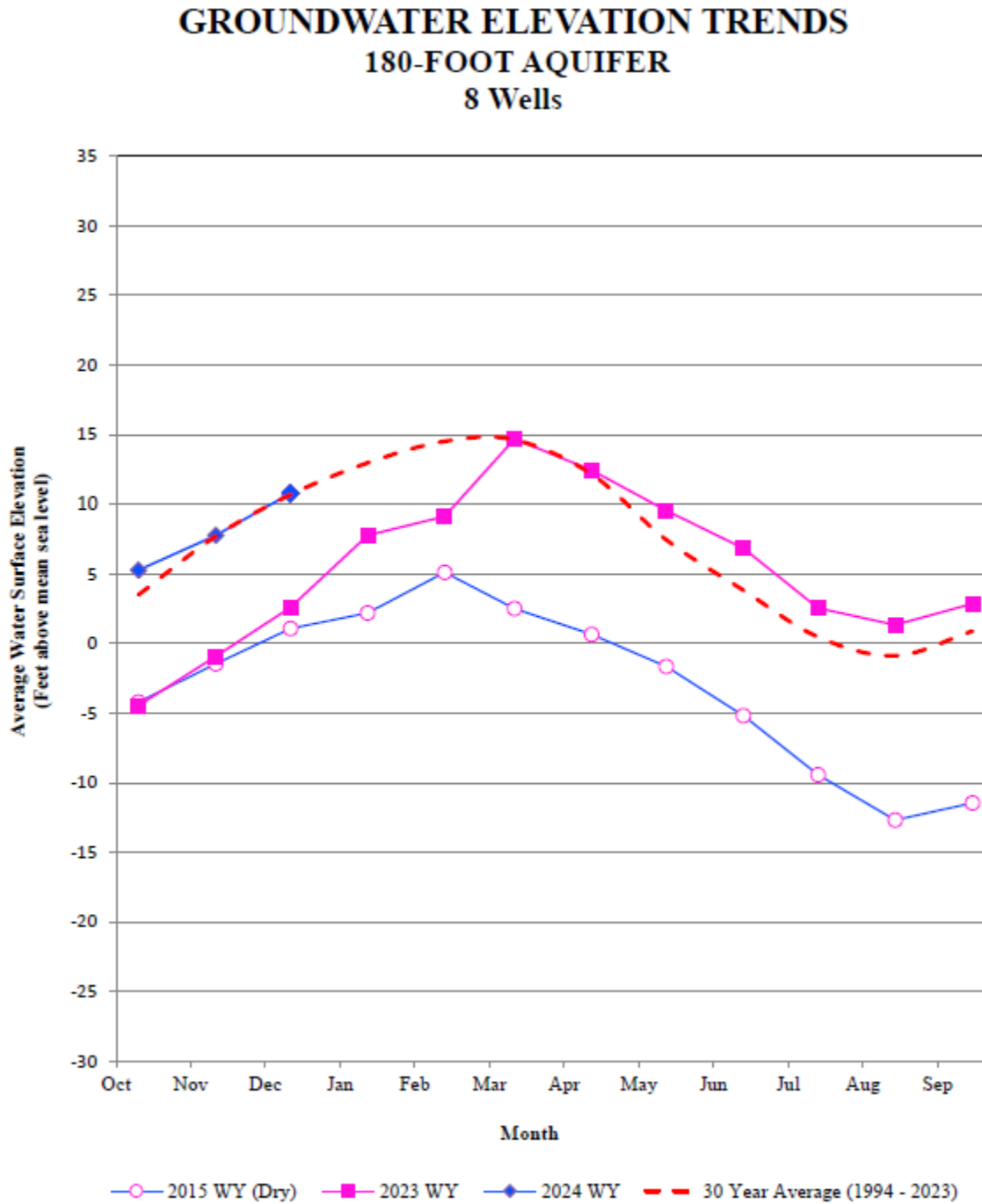


Figure 7: Groundwater Elevation Trends for the 180-Foot Aquifer

400-Foot Aquifer

Over the last quarter, groundwater elevation levels increased ten feet in the 400- Foot Aquifer (Figure 8). Groundwater levels are up six feet compared to December 2022 and up half a foot from the 30-year average.

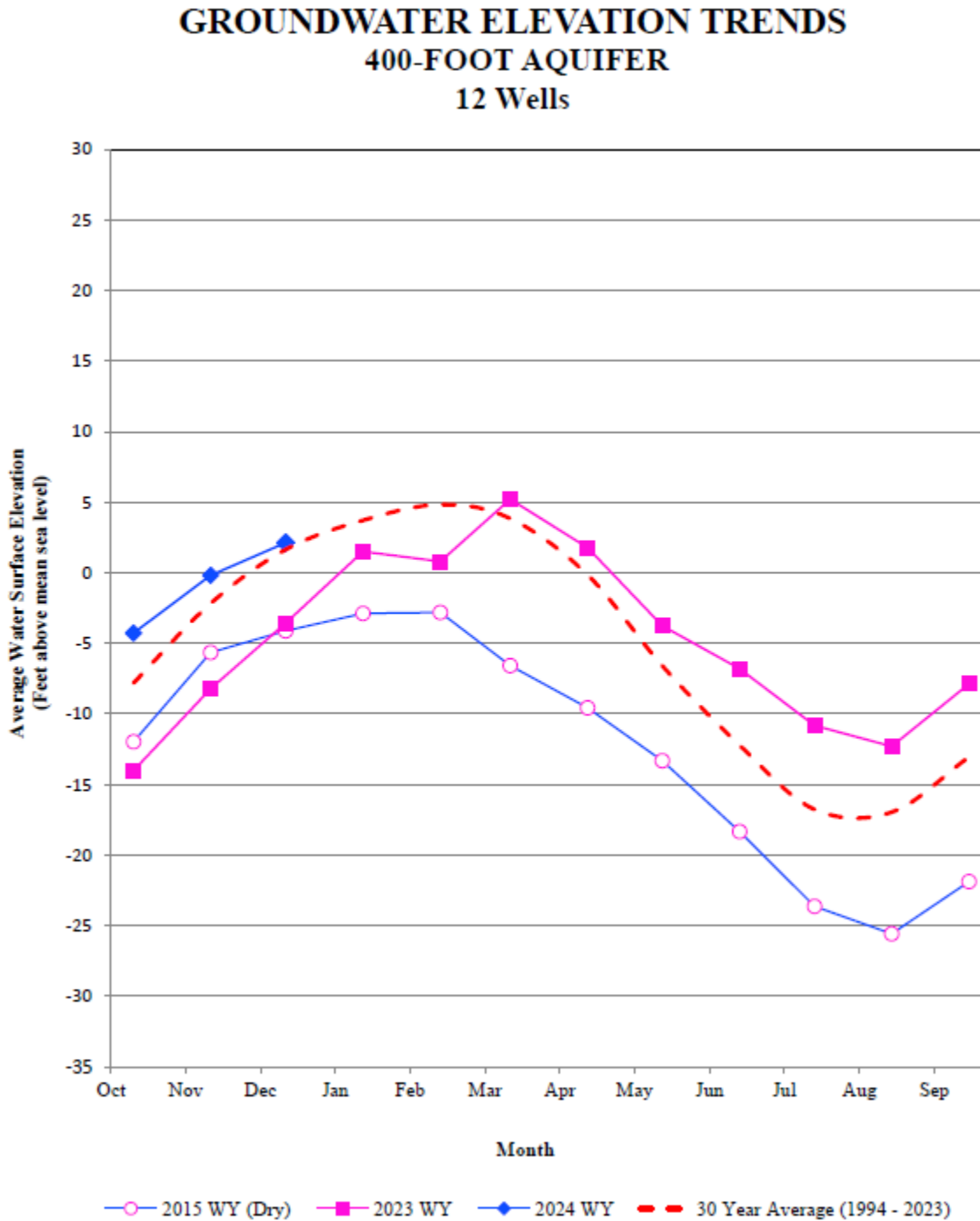


Figure 8: Groundwater Elevation Trends in the 400-Foot Aquifer

Deep Aquifers

Over the last quarter, groundwater elevations increased ten feet in the Deep Aquifers (Figure 9). Groundwater elevation levels are up less than one foot compared to December 2022. Given the shorter period of record in the wells used for 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 level data from the eleven wells to show the seasonal and long-term trends in these wells.

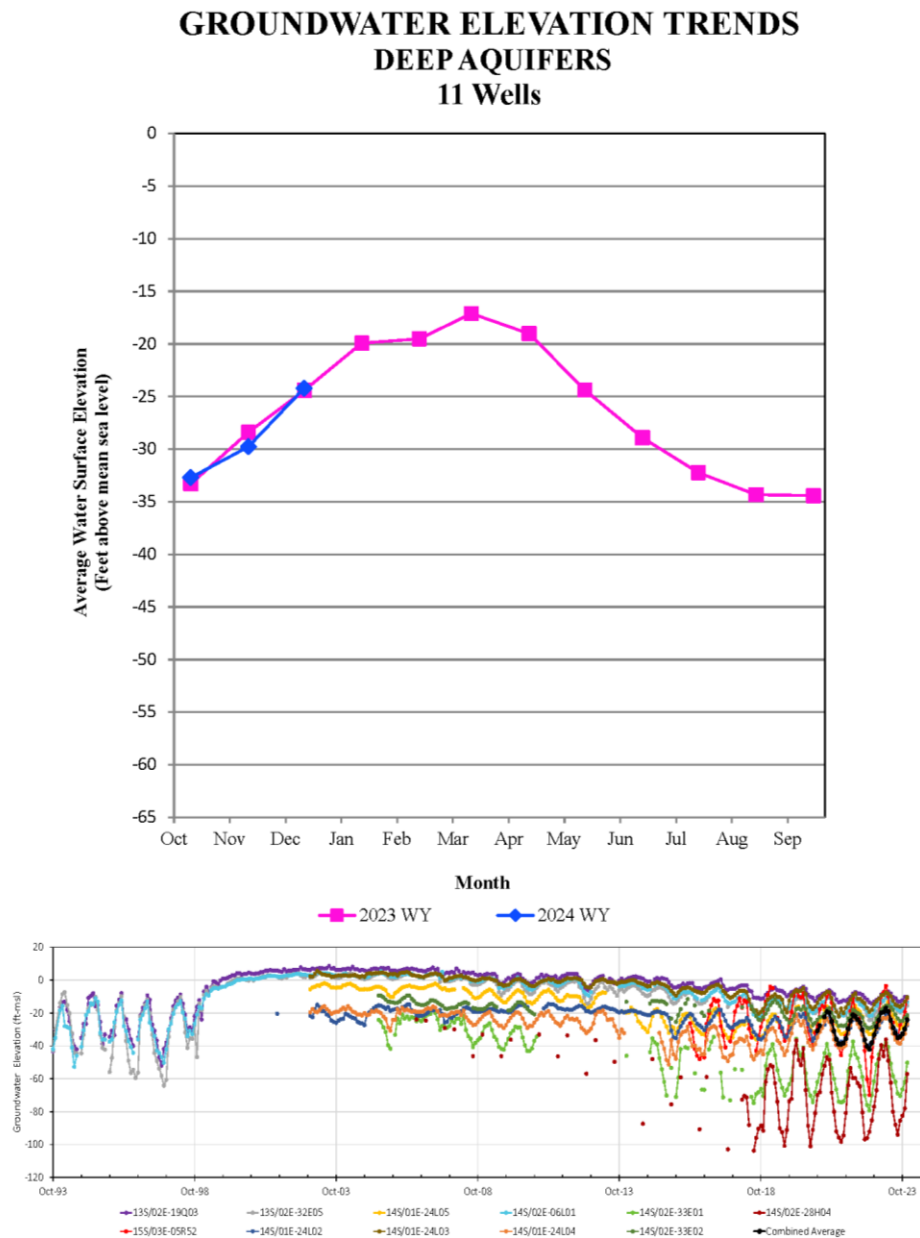


Figure 9: Groundwater Elevation Trends in the Deep Aquifers

East Side Subarea

East Side groundwater elevation levels increased twenty-two feet over the last quarter (Figure 10). Groundwater elevation levels are up seven feet from December 2022 levels and down six feet from the 30-year average.

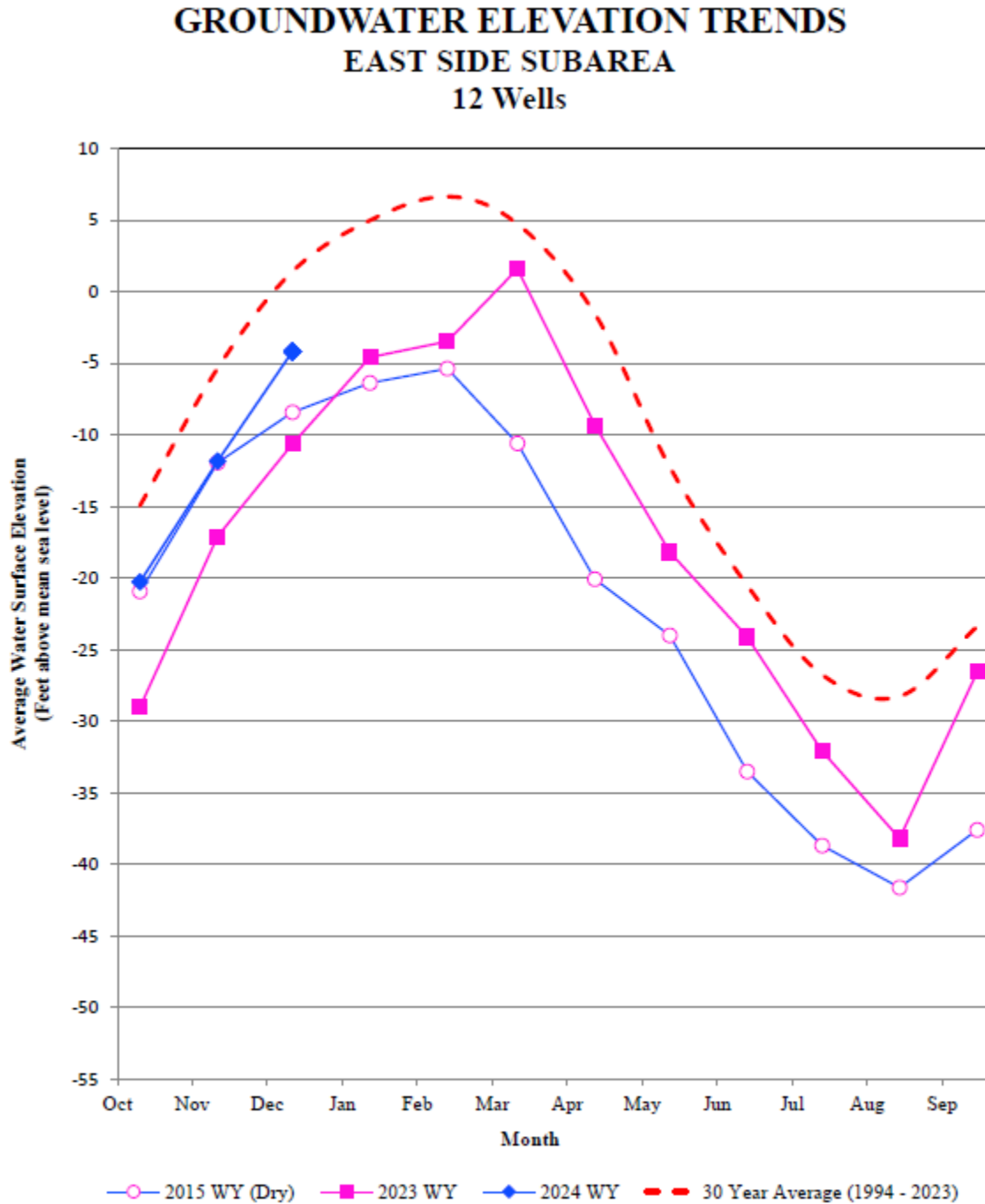


Figure 10: Groundwater Elevation Trends in the East Side Subarea

Forebay Subarea

Over the last quarter, groundwater elevation levels have increased three feet in the Forebay (Figure 11). Groundwater elevation levels are up fourteen feet from December 2022 levels and are up five feet from the 30-year average.

GROUNDWATER ELEVATION TRENDS FOREBAY SUBAREA 13 Wells

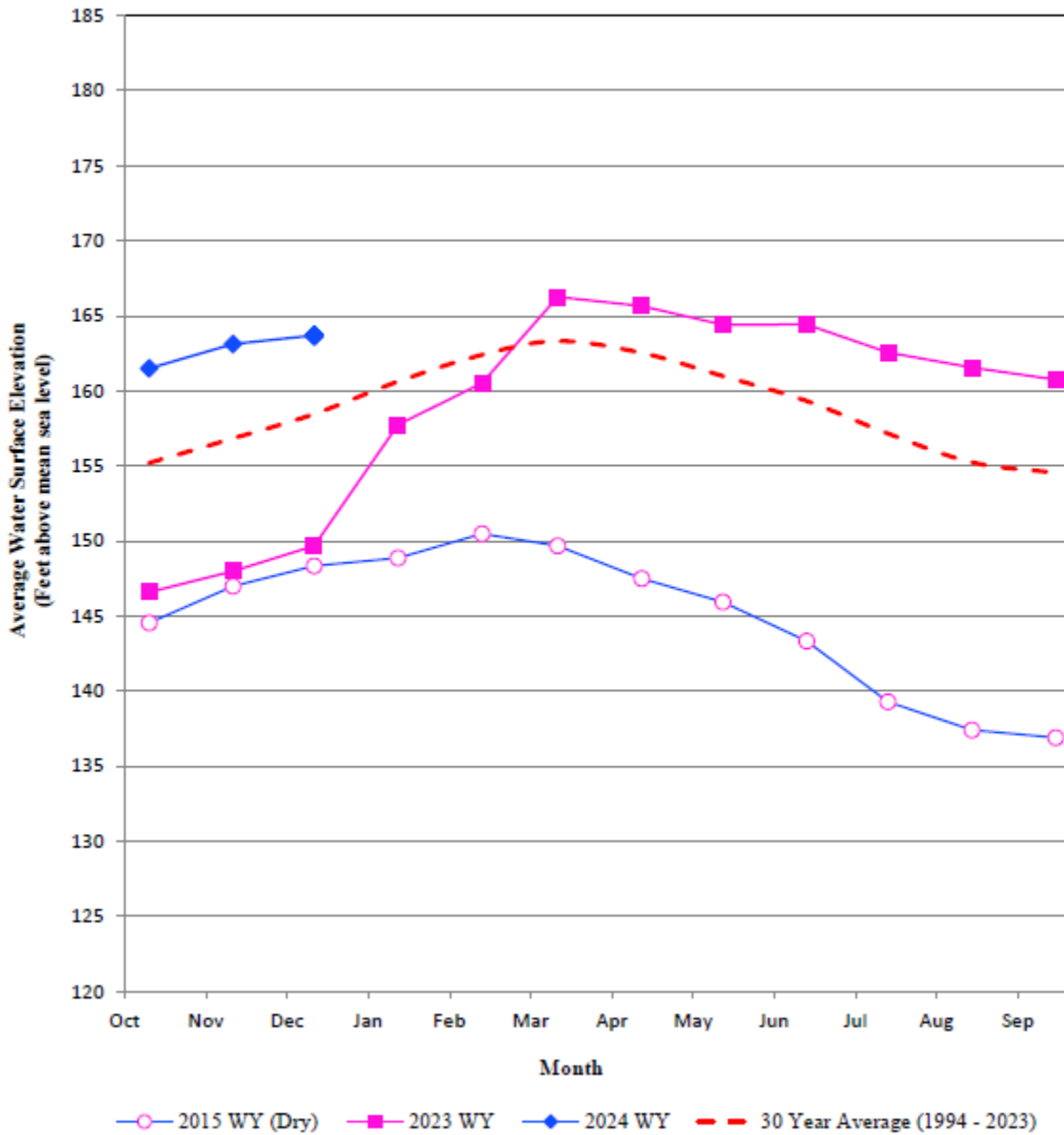


Figure 11: Groundwater Elevation Trends in the Forebay Subarea

Upper Valley Subarea

Upper Valley groundwater elevation levels have increased three feet over the last quarter (Figure 12). Groundwater elevation levels are up nine feet from December 2022 levels and up three feet from the 30-year average.

GROUNDWATER ELEVATION TRENDS UPPER VALLEY SUBAREA 9 Wells

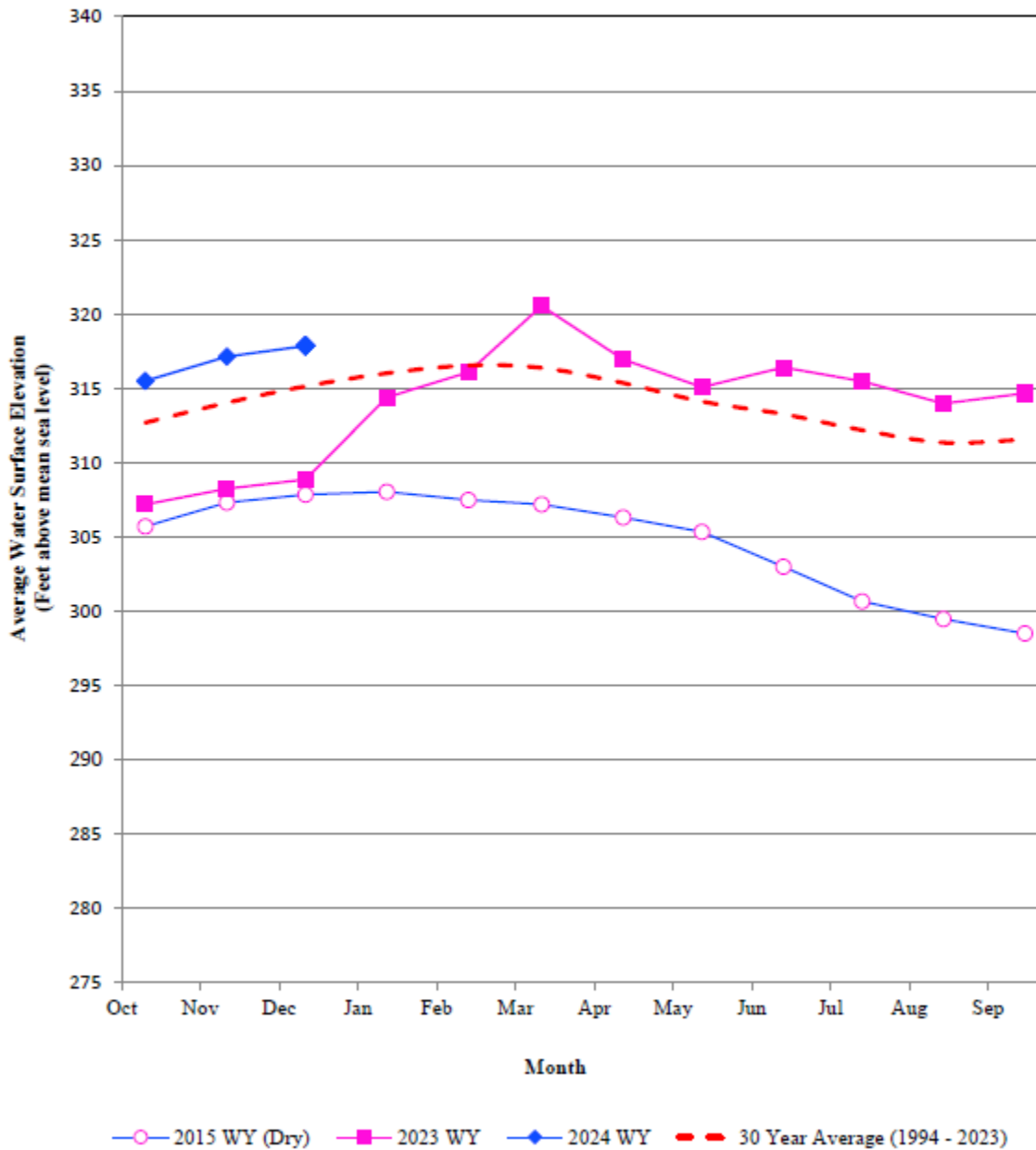


Figure 12: Groundwater Elevation Trends in the Upper Valley Subarea

Figure 13 shows the spatial distribution of changes in groundwater elevation levels from December 2022 to December 2023. Over the last Water Year, all hydrologic subareas experienced increasing groundwater elevations, though not all wells in the Deep and East Side aquifers showed signs of increased groundwater elevations.

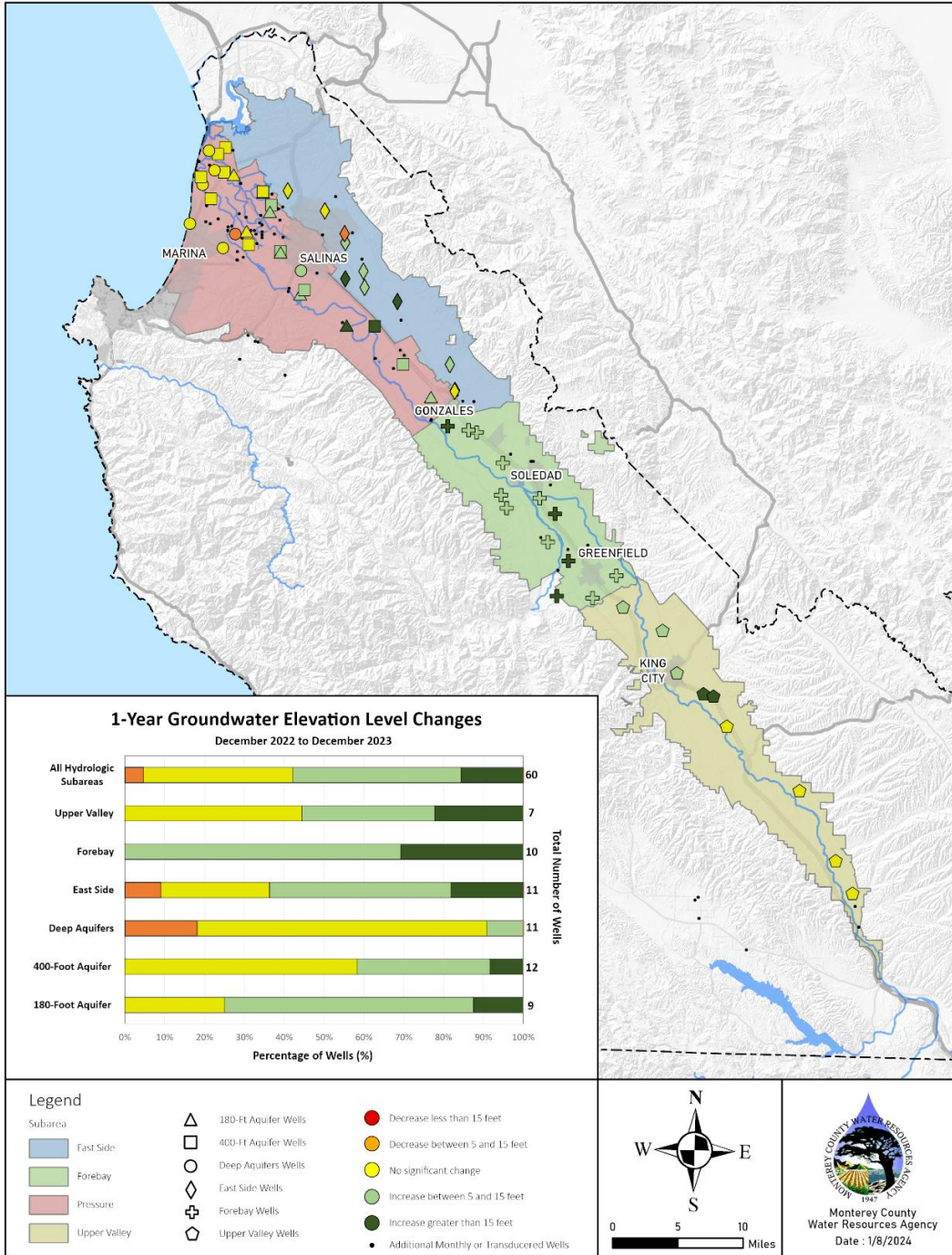


Figure 13: One-Year Groundwater Elevation Changes

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. However, Figure 14 shows the monthly depth to groundwater measured in each well, which is an alternative approach to representing the same type of data.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.

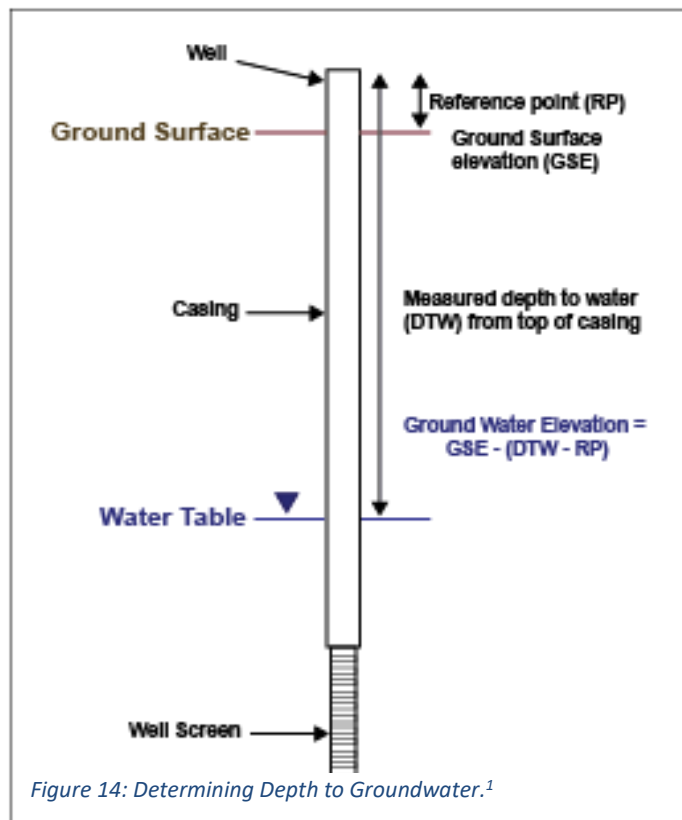
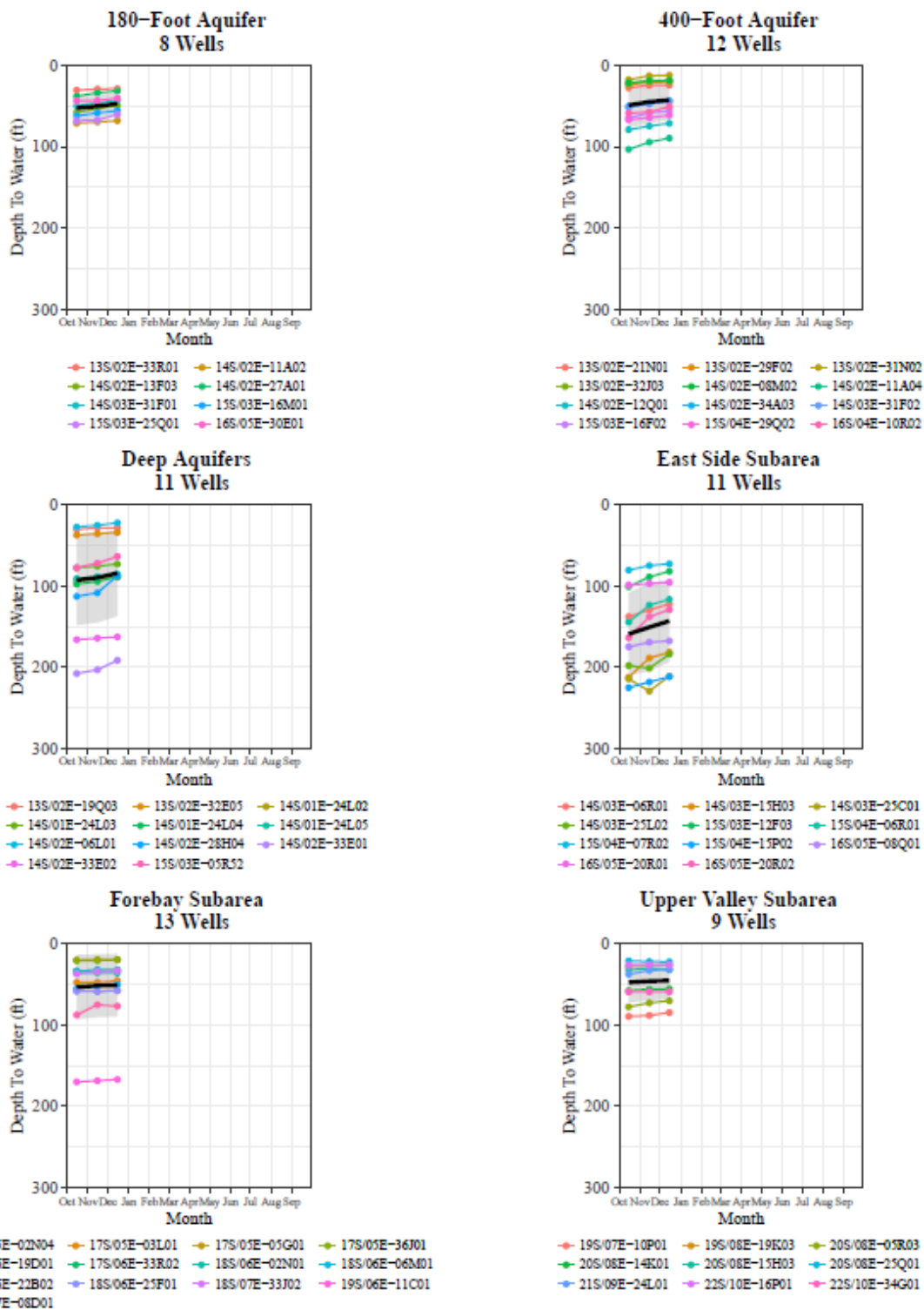


Figure 15 shows the depth to groundwater that was measured in each of the wells, within a given subarea, that is used for developing this quarterly water conditions report. As shown on Figure 15, there is a range of depth to water values within each subarea with some, like the East Side Subarea, having 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