

Appendix 3B

New Deep Aquifers RMS Data and SMC Development

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New Deep Aquifers Data

Since the submittal of the 180/400-Foot Aquifer Subbasin (Subbasin) WY 2023 Annual Report, the Deep Aquifers Study has been completed, prompting revisions to the Deep Aquifers groundwater elevation monitoring network. To align with the recommendations of the Deep Aquifer Study, the SVBGSA expanded the number of RMS wells in the Deep Aquifers from 11 to 17 in the 180/400-Foot Aquifer Subbasin. In addition to these 17 wells, the SVBGSA recently installed 3 new Deep Aquifers monitoring wells (180/400-DA-1, 180/400-DA-2, and 180/400-DA-3) and is working with MCWRA to add an existing well (13S/02E-15M03) to the monitoring network. SVBGSA aims to include these additional wells in the WY 2024 Annual Report.

The expansion of the groundwater level monitoring network and installation of new wells allows for better coverage of the Deep Aquifers and therefore, for development of groundwater elevation contours. Figure 1 shows the fall 2023 groundwater elevations contours for the Deep Aquifers, which are mainly based on groundwater elevations collected from November to December. Groundwater elevations were collected in the 3 new Deep Aquifers monitoring wells during the installation process. November 2023 groundwater elevations were collected in 2 of the new Deep Aquifer wells (180/400-DA-1 and 180/400-DA-3). Well 180/400-DA-2 was not yet installed during fall 2023 so its June 2024 groundwater elevation is used to inform the fall 2023 groundwater elevation contours because it is the only well in the southern portion of the Deep Aquifers. Although this groundwater elevation does not align with the timing of fall groundwater elevation measurements, it helps inform general groundwater flow in the Deep Aquifers. These contours will enable estimation of change in storage in the Deep Aquifers in the WY 2024 annual report.

These contours were created using all Deep Aquifers groundwater elevations available. The Deep Aquifers comprise multiple formations, which can lead to differences in groundwater elevations in wells that are close in proximity. However, most wells are screened across multiple formations so only one set of contours were created for the Deep Aquifers.

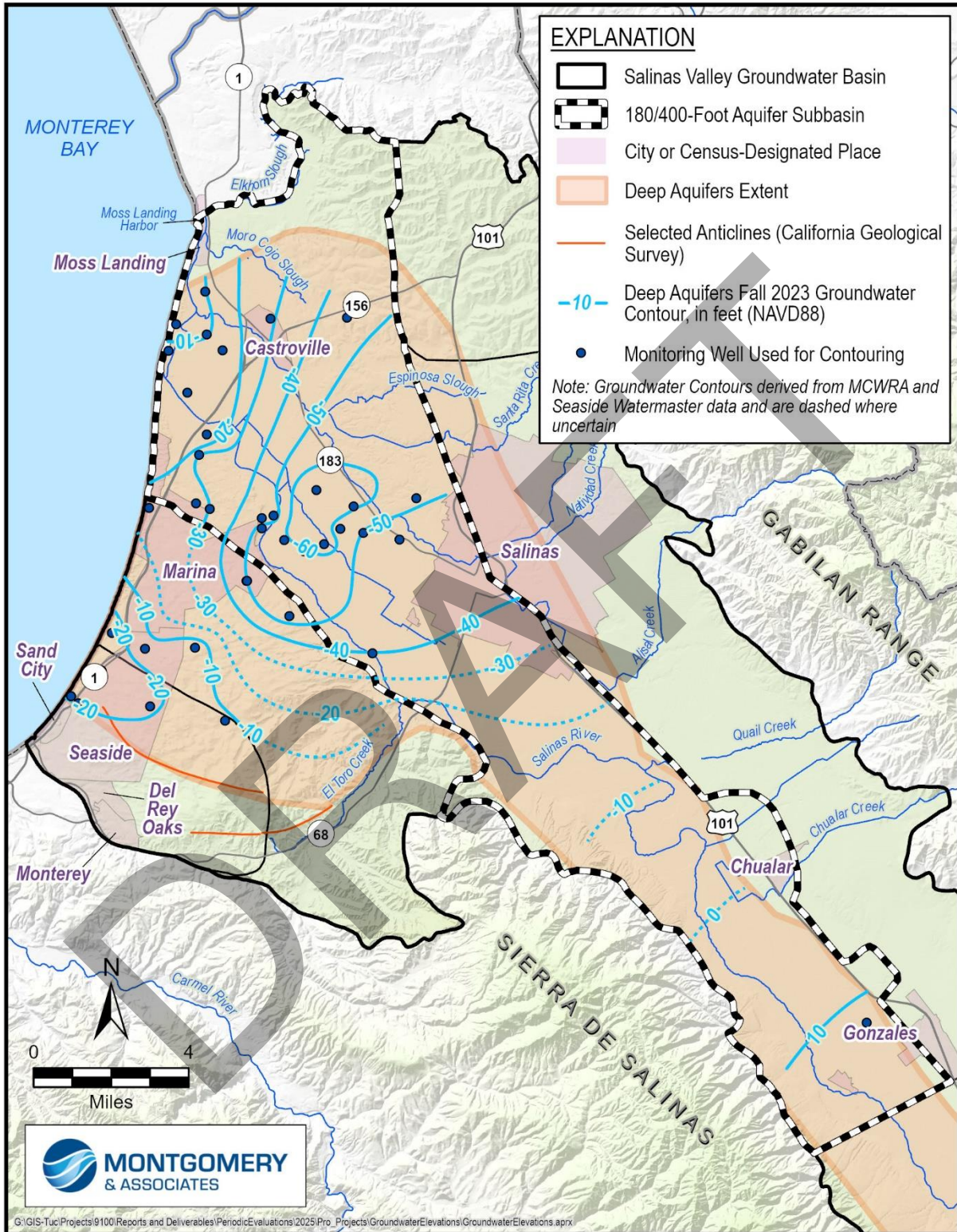


Figure 1. Fall 2023 Deep Aquifers Groundwater Elevation Contours

Sustainable Management Criteria Development

As new RMS wells are added to the groundwater elevation monitoring network, sustainable management criteria (SMC) for these wells must be developed. The groundwater levels SMC in the 180/400-Foot Aquifer Subbasin are based on historical (2003 and 2015) groundwater elevations. Most of the new Deep Aquifers RMS wells came online from 2020 to 2021 and therefore do not have 2003 or 2015 groundwater elevation measurements. Consequently, a different approach than that taken for RMS wells with historical groundwater elevation records was developed to determine the SMC for the new Deep Aquifers RMS wells.

Minimum Thresholds:

The minimum thresholds for the new Deep Aquifers RMS wells are based on an estimated 2015 groundwater elevation and were developed using the procedure outlined below:

1. Calculate rate of change from 2015 to 2021 for Deep Aquifers RMS wells that have historical groundwater elevation records.
2. Create spatially-interpolated raster layer of the 2015 to 2021 rate of change using the wells with data available for this period.
3. Extract interpolated rate of change for Deep Aquifers RMS wells without historical groundwater elevation measurements.
4. Use interpolated rate of change to calculate an estimated 2015 groundwater elevation based on the measured 2021 groundwater elevation for the wells without historical records.
5. Add 1 foot to the estimated 2015 groundwater elevation to align with minimum thresholds for other RMS wells throughout the Subbasin.

Groundwater elevations from fall 2021 were used to establish the rate of change in step 1 above because 2021 is when the earliest groundwater elevation was measured in most new Deep Aquifers RMS wells without historical records.

Measurable Objectives and Interim Milestones:

The measurable objectives for the new Deep Aquifers RMS wells were developed by adding 5 feet to the minimum threshold to allow for operation flexibility. Additionally, the measurable objectives for the new RMS wells within 1 mile of the Monterey Subbasin boundary were reviewed to ensure that they were above the minimum thresholds of the nearest Deep Aquifers RMS wells in the Monterey Subbasin. The measurable objective for 1 RMS well (14S/02E-28H04) had to be adjusted to meet this condition; for this well, the measurable objective is 15 feet above the minimum threshold.

The interim milestones developed for the new Deep Aquifers RMS wells mirror that of other RMS wells throughout the Subbasin. Each interim milestone increases linearly from the 2020

groundwater elevation to the measurable objective. Where 2020 groundwater elevations are not available, 2021 groundwater elevations were used.

Table 1 specifies the minimum thresholds, interim milestones, and measurable objectives for the Deep Aquifers RMS wells. SMC were revised for 2 existing Deep Aquifers RMS wells to align with the new RMS wells. All other existing Deep Aquifers RMS wells have historical groundwater elevation measurements, and their SMC are set as those for RMS wells in other principal aquifers.

Table 1. Sustainable Management Criteria for Deep Aquifers Representative Monitoring Sites

Cadastral	Minimum Threshold	Interim Milestone 1	Interim Milestone 2	Interim Milestone 3	Measurable Objective
13S/01E-36J02	-4.2	-6.7	-3.8	-0.9	2
13S/02E-19Q03	-2.4	-5.1	-1.3	2.5	6.3
14S/02E-07J03 ¹	-9.5	-15.2	-11.6	-8.1	-4.5
14S/02E-14R02 ¹	-30.8	-35.1	-32.0	-28.9	-25.8
14S/02E-20E01 ¹	-23.7	-26.1	-23.6	-21.2	-18.7
14S/02E-21K04 ¹	-44.4	-47.1	-44.6	-42.0	-39.4
14S/02E-23J02 ¹	-42.2	-46.8	-43.6	-40.4	-37.2
14S/02E-25A03 ¹	-31.5	-37.0	-33.5	-30.0	-26.5
14S/02E-26G01 ¹	-31.3	-36.2	-32.9	-29.6	-26.3
14S/02E-27K02 ¹	-33.8	-38.2	-35.1	-31.9	-28.8
14S/02E-35B01 ¹	-28.8	-34.5	-30.9	-27.4	-23.8
14S/03E-19C01 ¹	-51.7	-57.2	-53.7	-50.2	-46.7
14S/02E-28H04 ¹	-58.0	-67.6	-59.4	-51.2	-43.0
13S/02E-28L03 ²	-20.4	-29.6	-24.8	-20.1	-15.4
13S/02E-32E05	-9.2	-10.6	-6.6	-2.5	1.6
14S/02E-06L01	-7.2	-10.3	-5.9	-1.4	3
14S/02E-22A03 ²	-45.1	-87.4	-71.7	-55.9	-40.1
13S/02E-15M03	Well not yet monitored for groundwater elevations.				
180/400-DA-1	New monitoring well; monitoring began in fall 2023.				
180/400-DA-3					
180/400-DA-2					

¹New Deep Aquifer RMS Well

²SMC revised to align with new RMS wells