MONTGOMERY & ASSOCIATES
Water Resource Consultants

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May 7, 2021

Ms. Piret Harmon
Scotts Valley Water District
2 Civic Center Dr.
Scotts Valley, CA 95066

SUBJECT: REVIEW OF APRIL 2021 GROUNDWATER CONDITIONS IN THE SCOTTS VALLEY WATER DISTRICT AREA

Dear Ms. Harmon:

The Scotts Valley Water District (District) has requested Montgomery & Associates (M&A) to review spring 2021 groundwater conditions in the Scotts Valley Water District (District) due to the high probability that annual rainfall will be drastically below average for the year thus potentially impacting the District's water supply.

This letter summarizes our review of historical and recent climate, pumping, and groundwater level data. The data reviewed included recent rainfall data through April 30, recent groundwater production data through April 27, and historical groundwater level data from monitoring wells.

SUMMARY OF RAINFALL

As of April 30, 2021, the water year rainfall total measured at the El Pueblo Yard Station in Scotts Valley is 16.74 inches. This is 40.1% of long-term average rainfall of 41.75 inches per year (Figure 1). Although, it appeared the most recent drought ended in Water Year 2015, the mostly average or below average rainfall since, with the exception of Water Year 2017, indicates that the drought is continuing. From Water Year 2016 to present, the Scotts Valley area has received a total of 228.41inches of rainfall, which averages to roughly 38.07 inches per year. If it were not for Water Year 2017 having record rainfall, the average since 2016 would be less than 38 inches per year (Figure 1).

The National Integrated Drought Information System (NIDIS) is a multi-agency partnership that coordinates drought monitoring, forecasting, planning, and information at national, tribal, state, and local levels. The Dought.gov online tool developed by NSDIS classifies Scotts Valley as being in a moderate to severe drought (https://www.drought.gov/location/scotts%20valley%2C%20ca).

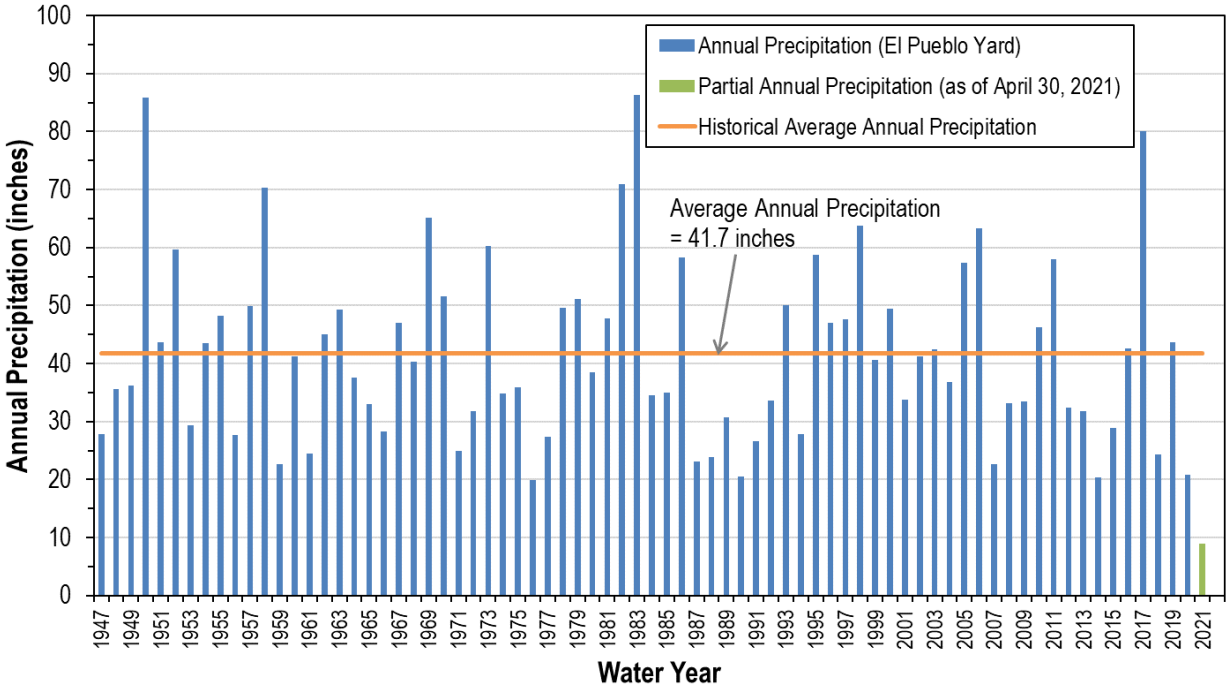

Figure 1. Annual Rainfall at El Pueblo Yard

Figure 2 shows the likelihood of receiving various amounts of rain in April, (orange line) and May (grey line). Using the distribution for May, as a worst-case scenario, if only the median rainfall of 0.6 inches occurs, total rainfall for the water year will be around 17.34 inches. This is only 41.5% of average and the lowest on record. Even if the maximum historical May rainfall of 7.7 inches occurs, the total rainfall for the water year will be 24.44 inches, which is 58.5% of average which would be the 10th lowest on record.

Using the median May rainfall of 0.6 inches, the cumulative two-year average is likely to be around 19.12 inches, which is 45.8% of average. The cumulative three-year average would be 27.32 inches, which is 65.4% of average.

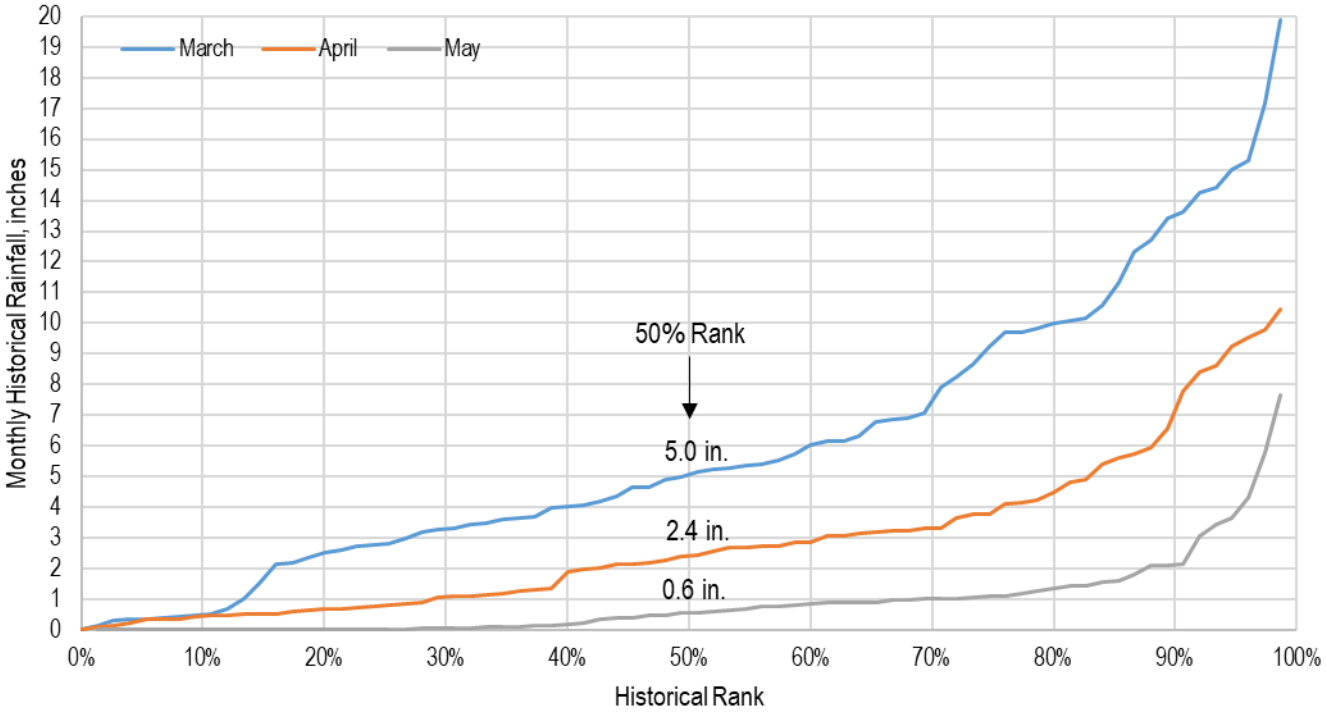

Figure 2. Historical March through May Rainfall Ranking

SUMMARY OF GROUNDWATER PUMPING

Groundwater levels in the basin are influenced more rapidly by pumping than by response to rainfall, as described in previous Annual Reports. In Table 1, the past six years' fall and winter pumping are listed to provide comparisons of the relative amounts of groundwater pumped from each aquifer during the same time periods.

Table 1. Summary of Fall and Winter Production

Time Period	Lompico Production Wells #10A, #11A and #11B (AF)	Lompico/Butano Production Wells #3B and Orchard Well (AF)	Total (AF)
Oct 2015 - Mar 2016	286.5	287.0	573.5
Oct 2016 - Mar 2017	385.5	193.6	579.1
Oct 2017 - Mar 2018	368.4	234.7	603.1
Oct 2018 - Mar 2019	97.6	422.7	520.4
Oct 2019 - Mar 2020	250.8	301.2	552.0
Oct 2020 - Mar 2021	468.4	127.5	595.9

Note: The District no longer pumps groundwater from the Santa Margarita aquifer.

Through March, District pumping in Water Year 2021 is the second highest over the last six water years (Table 1). The Orchard Run treatment plant has been offline for upgrades since December 2020 which has resulted in groundwater pumped by the Orchard Well and Well #3B being much less than the past five years (Table 1). To make up for lost production from the Orchard Run treatment plant, Lompico wells #10A, #11A and #11B have been pumped more than in previous years (Table 1). New pumps installed in Wells #10A and #11A have improved their pumping capacity.

GROUNDWATER LEVEL OBSERVATIONS

Table 2 summarizes the changes in groundwater levels at monitoring wells in the District. Figures showing selected hydrographs for the wells are indicated in Table 2, and well locations are shown on Figure 3.

Table 2. Summary of April 2021 Groundwater Levels

Well	Change in Groundwater Level Since Oct 2020 (feet)	Change in Groundwater Level Since Oct 2017 (feet)	Hydrograph Figure Number
Santa Margarita Aquifer			
SVWD AB303 MW-1	-0.7	-2.3	Figure 4
SVWD AB303 MW-3B	-0.1	+2.6	-
SV4–MW	-1.5	-7.3	-
TW-18	-0.1	+2.1	Figure 5
Monterey Formation			
Well #9	+1.1	+14.5	Figure 6
Lompico Aquifer			
TW-19	-5.3	+29.5	
SVWD Well #10	-6.6	+33.3	Figure 8
SVWD AB303 MW-2	+0.8	+9.1	Figure 9
Lompico/Butano Aquifer			
Stonewood	+0.5	+1.6	-
Canham	-0.5	-1.9	Figure 12

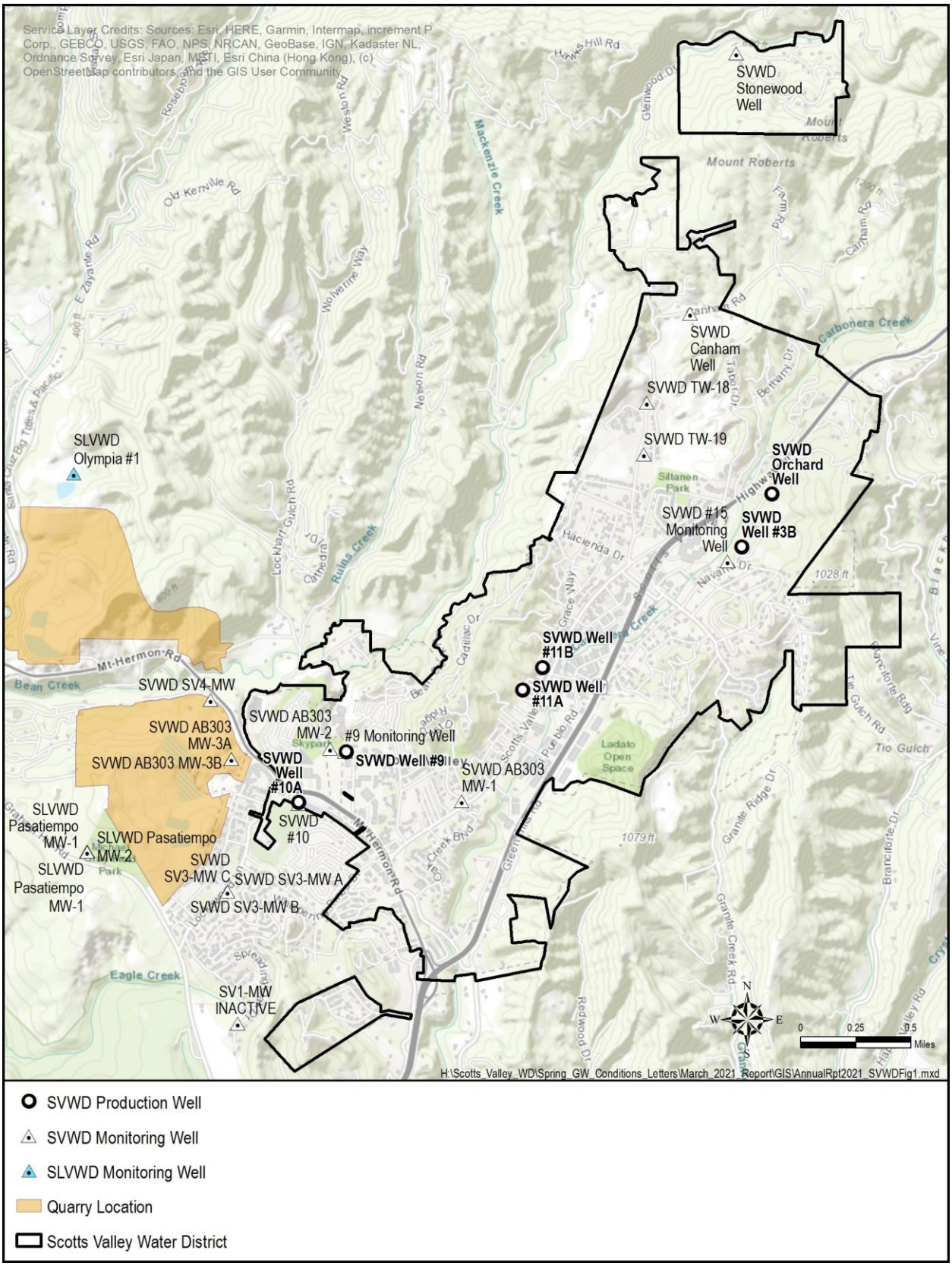

Figure 3. Scotts Valley Water District with Key Well Locations

Two of the three Santa Margarita aquifer monitoring wells in the southern portion of the District now show lower groundwater levels than October 2017 (Table 2). Last year, most groundwater levels were still higher than October 2017 levels. The lower levels in April 2021 are consistent with how the Santa Margarita aquifer responds to rainfall: in 2017 it filled up when it was a very wet year and because of the lower than normal rainfall, over the past three years, has not been able to replenish. This has caused its groundwater levels to fall as it naturally drains to Bean Creek. The northernmost Santa Margarita aquifer monitoring well, TW-18, still has fairly consistent groundwater levels (Figure 5). All the Santa Margarita aquifer monitoring wells in Table 2 have groundwater levels lower than the beginning of the water year

Table 2 shows the monitoring wells with the greatest increases since October 2017 are the Monterey Formation and Lompico aquifer wells. Hydrographs for Monterey Formation SVWD Well #9 (Figure 6) and Lompico aquifer wells TW-19 (), SVWD #10 (Figure 8), and AB303-MW2 (Figure 9) show an increasing rate of groundwater level recovery starting in the winter of 2017. This increase is in part due to Water Year 2017 being a very wet year, but increases have continued because of reduced pumping in the Lompico aquifer (Figure 10). Groundwater elevations in SVWD #10, which is located closest to the District's southern/central pumping wells as well as being relatively close to the SLVWD's Pasatiempo wells, has shown sustained increases in both seasonal high and seasonal low groundwater levels that have continued into April 2021.

Since October 2020, Lompico wells are showing signs of slowing rates of groundwater level increase or groundwater level decline. Both SVWD Well #10 and TW-19 have experienced 5-6 feet of groundwater level decline over fall and winter, while AB303 MW-2's groundwater level increased marginally by 0.8 feet. (Table 2). The TW-19 and AB303 MW-2 hydrographs show stabilization and/or slight decline of groundwater levels since 2020 (and Figure 9, respectively). Unlike the other Lompico monitoring wells, groundwater levels at SVWD Well #10 fluctuate by about 30 to 40 feet during annual cycles because of variable pumping at nearby SVWD pumping well #10A, making analysis of short-term groundwater level change at this well more challenging. The groundwater level trend at Lompico monitoring well AB303-MW2 was increasing from 2017 to spring 2020, but has remained stable since that time, suggesting impacts of reduced groundwater recharge. This well is close to SVWD #10 and reaffirms the finding that groundwater elevation in the Lompico aquifer may be stabilizing or decreasing after several years of consecutive groundwater level increases.

Groundwater levels in combined Lompico/Butano aquifer monitoring wells indicate that groundwater levels have not changed significantly since 2017 (Table 1). The Canham monitoring well, closest to the District's Lompico/Butano pumping wells has experienced a slight decline over the past seven years, with the average rate of decline being just under 0.3 feet per year (Figure 12). Groundwater levels in the Canham monitoring well dropped 0.5 feet over the past six months, even though the District's Orchard Well and Well #3B have not pumped since December.

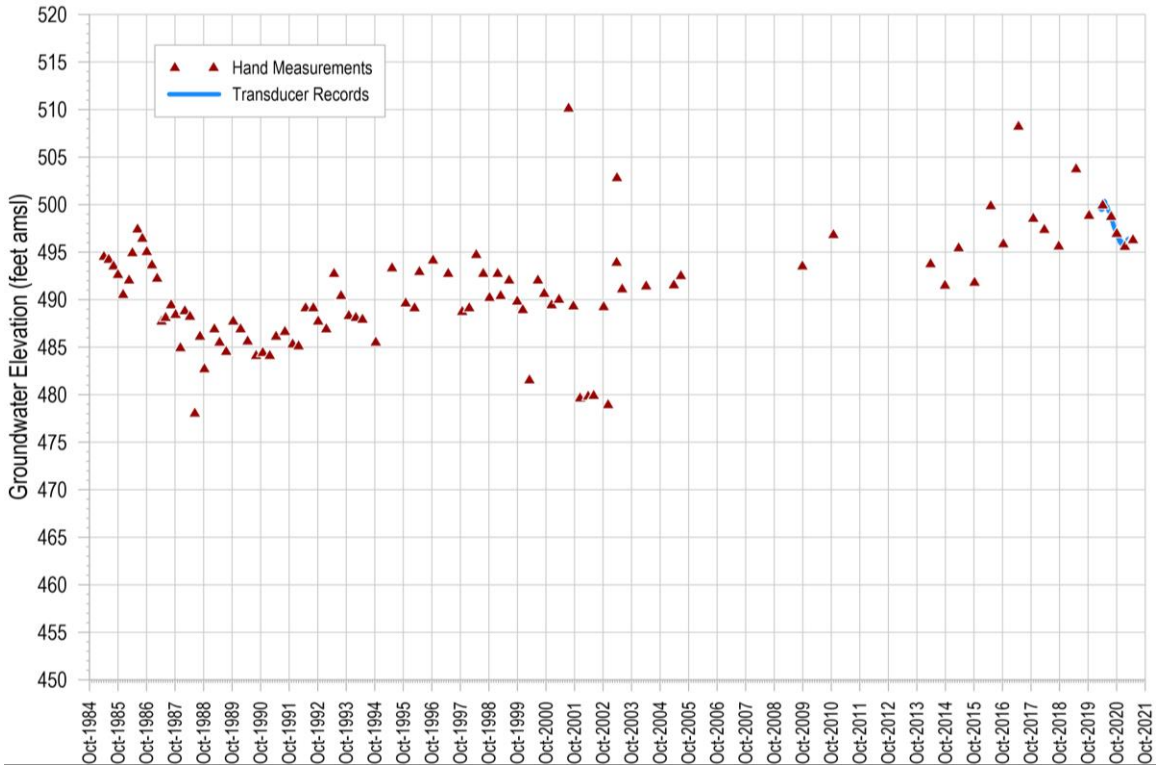

Figure 4. Hydrograph of Monitoring Well SVWD AB303 MW-1 (Santa Margarita Aquifer)

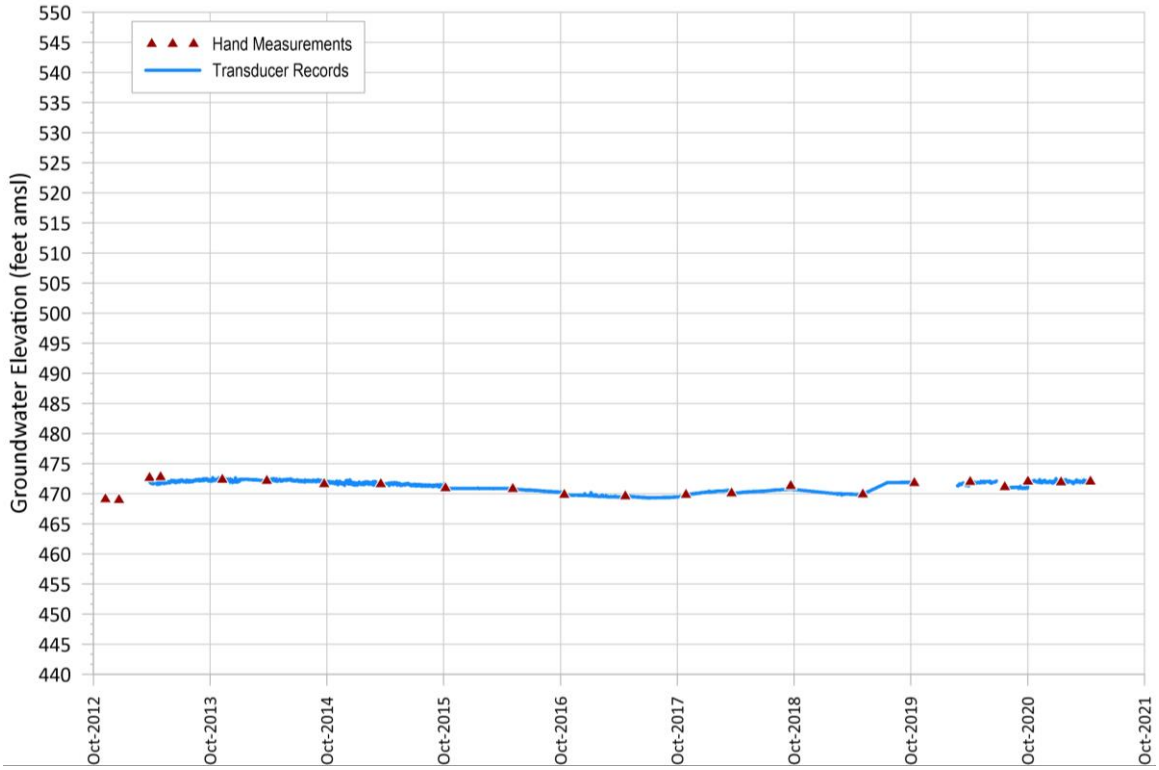

Figure 5. Hydrograph of Monitoring Well TW-18 (Santa Margarita Aquifer)

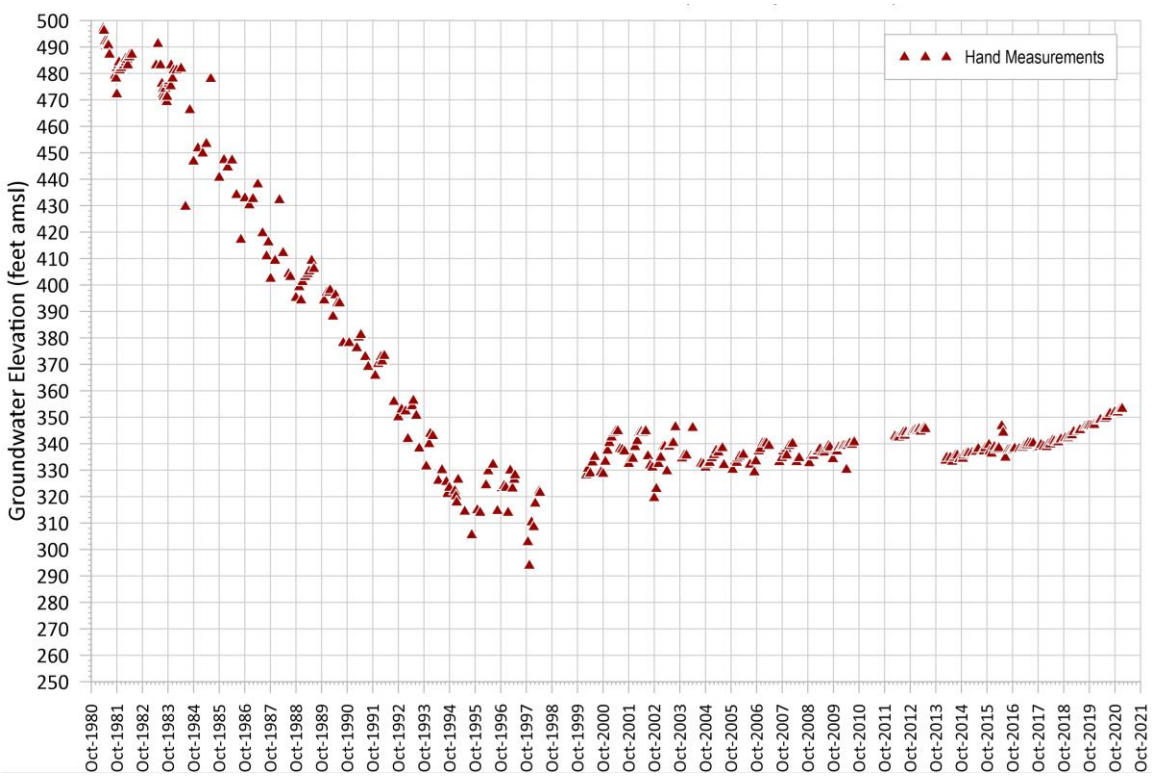

Figure 6. Hydrograph of SVWD Well #9 (Monterey Formation)

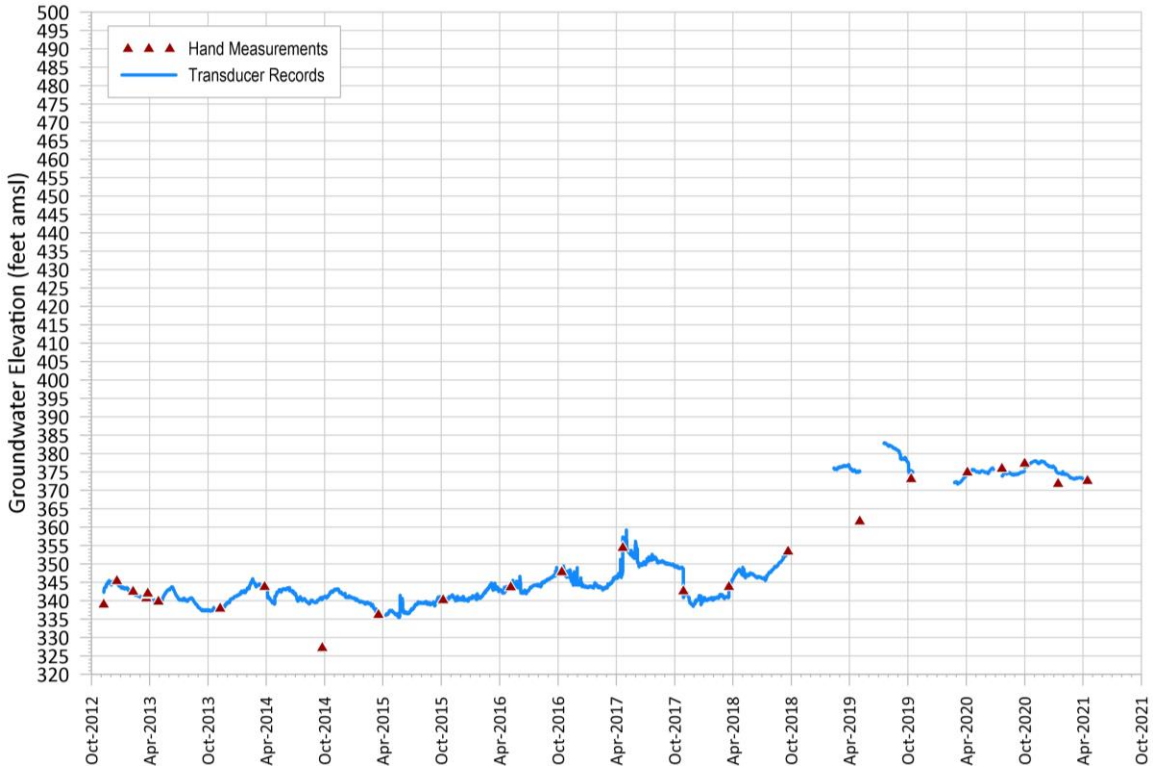

Figure 7. Hydrograph of Monitoring Well TW-19 (Lompico Aquifer)

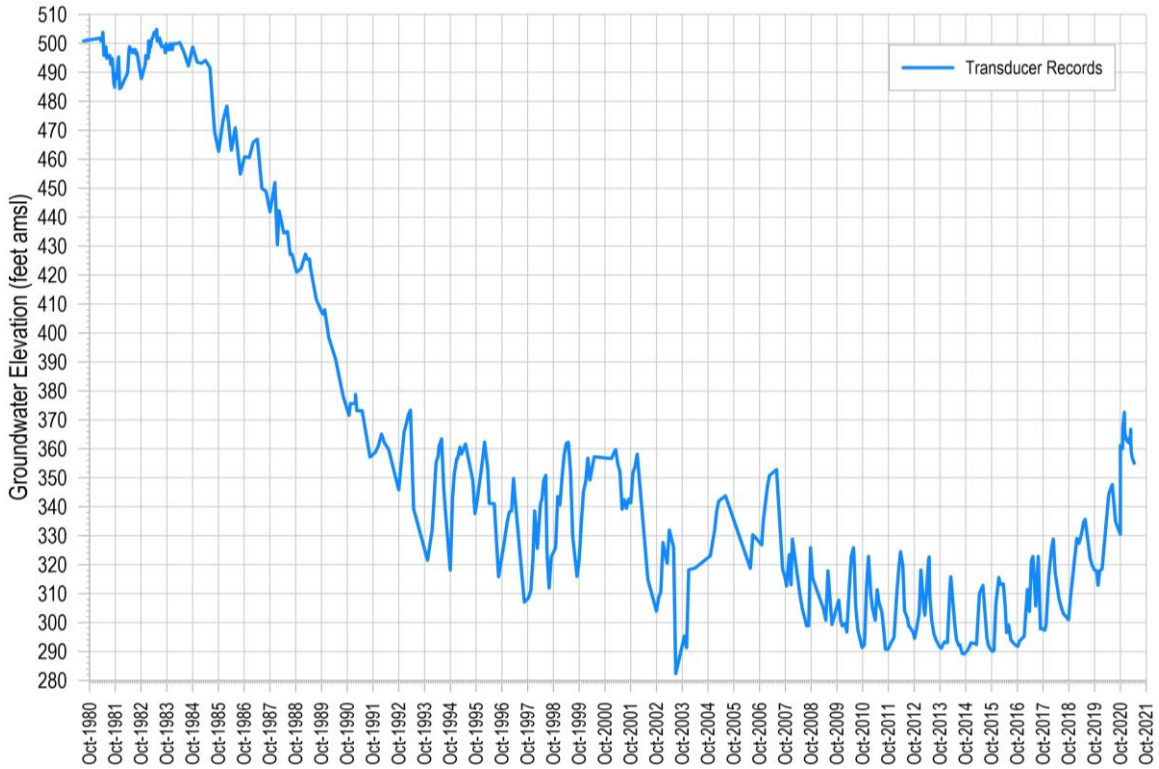

Figure 8. Hydrograph of SVWD Well #10 (Lompico Aquifer)

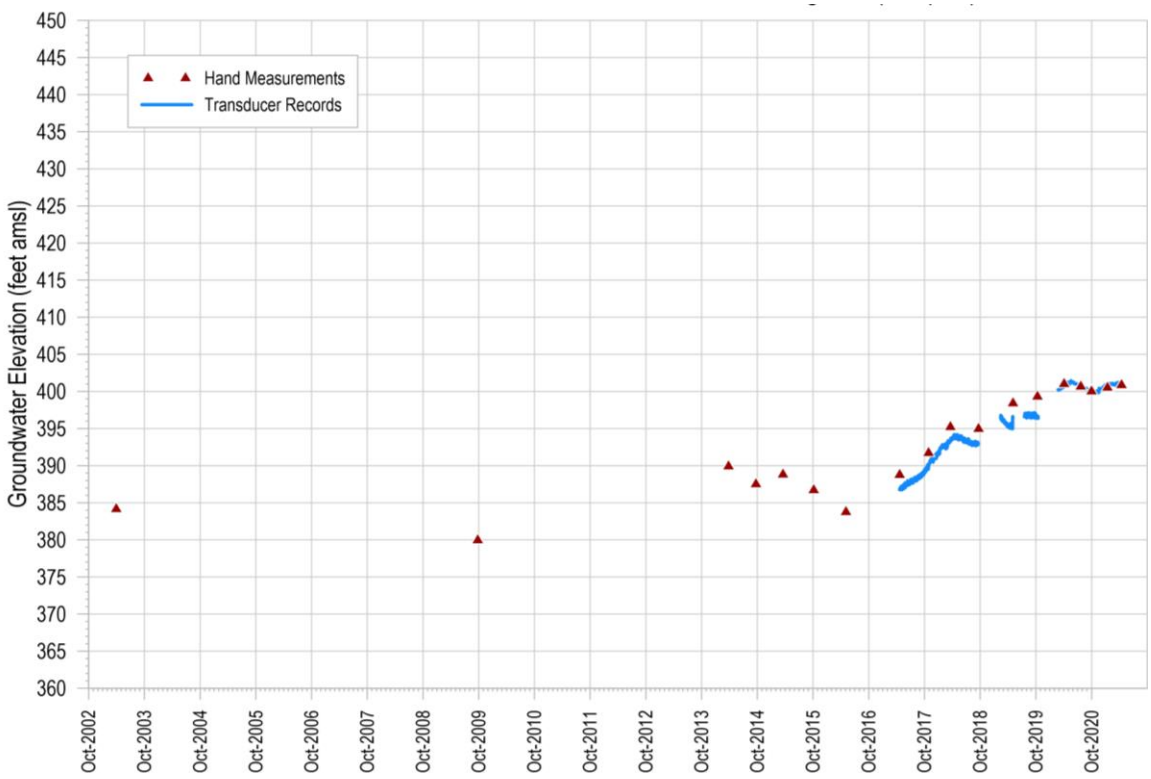

Figure 9. Hydrograph of AB303-MW2 Monitoring Well (Lompico Aquifer)

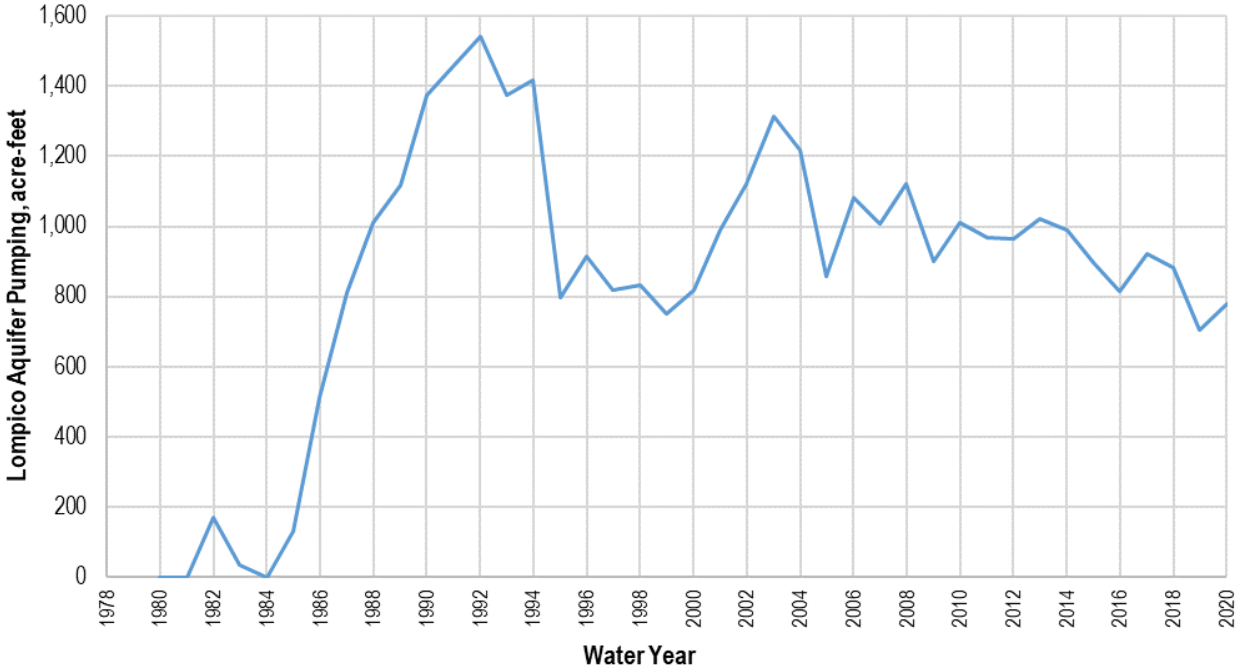

Figure 10. Annual Lompico Aquifer Pumping by Scotts Valley Water District through Water Year 2020

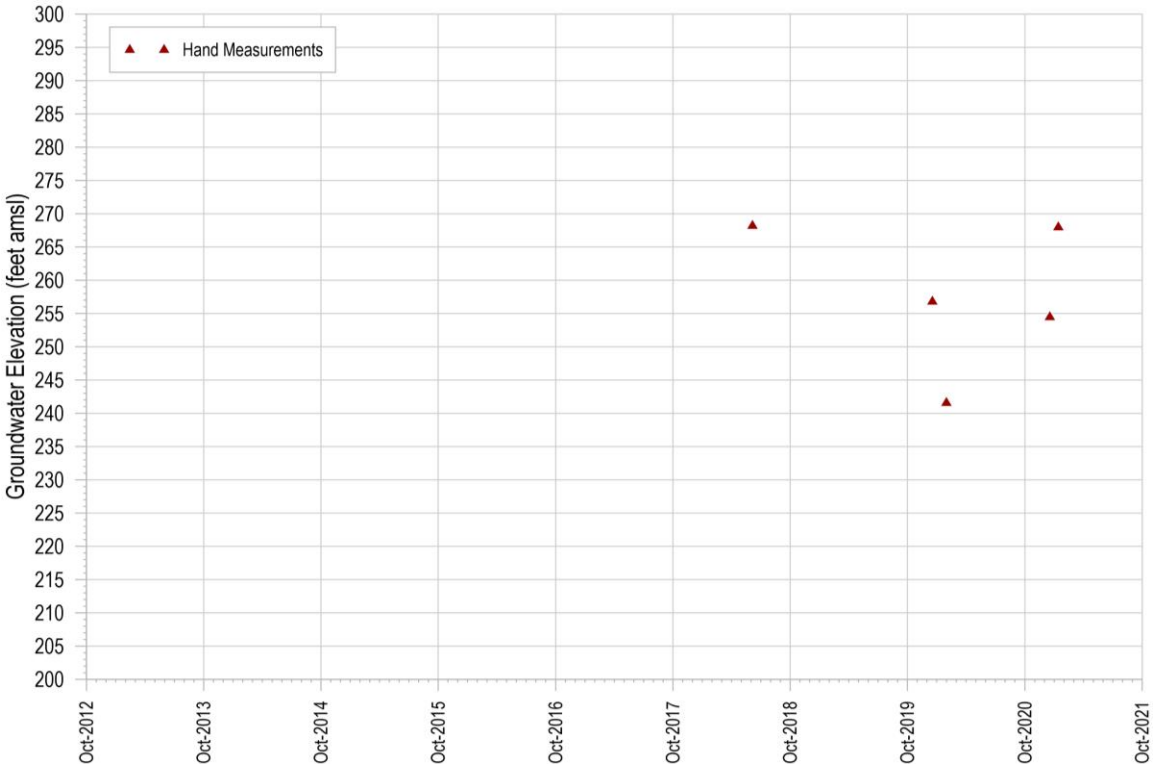

Figure 11. Hydrograph of SVWD Orchard Well (Lompico/Butano Aquifers)

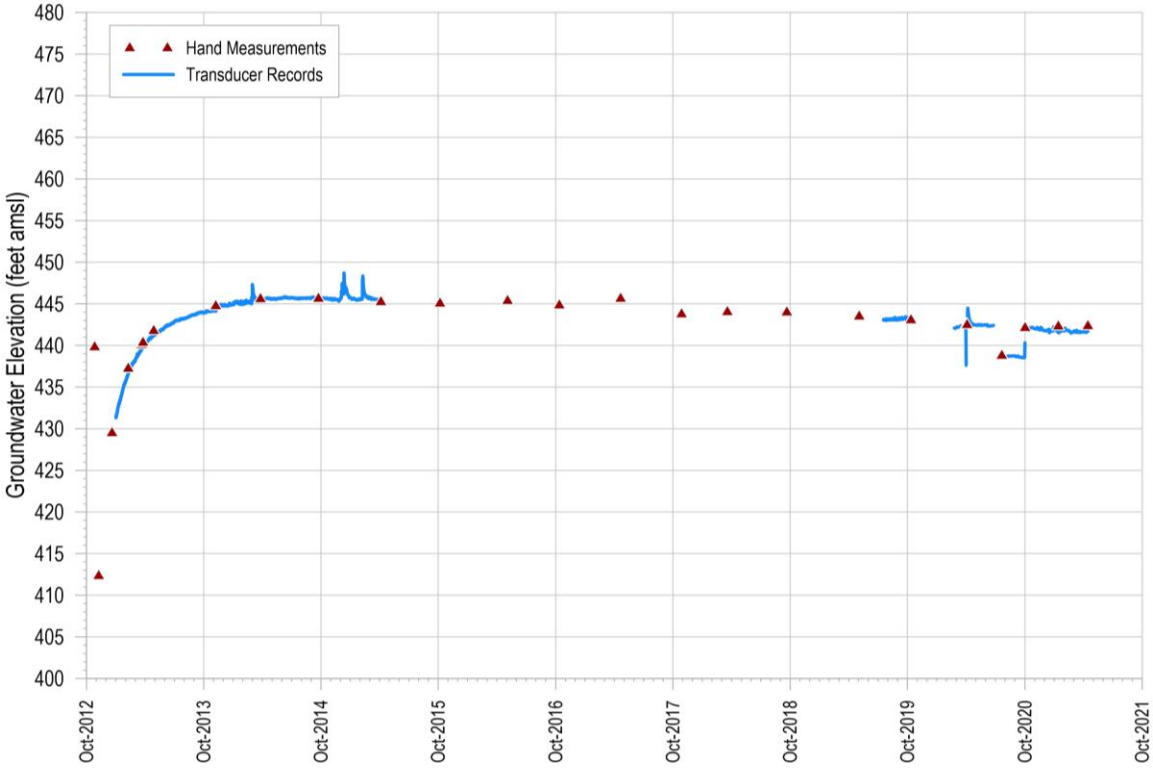

Figure 12. Hydrograph of Canham Monitoring Well (Butano)

WATER SUPPLY CONDITIONS

It is highly likely that Water Year 2021 annual rainfall in Scotts Valley will be around 41% of average given median historical May rainfall. Scotts Valley's cumulative two-year rainfall as of April 30, 2021 is 45.8% of average, and the cumulative three-year rainfall is 65.4% of average. The below-average cumulative rainfall totals will result in less groundwater recharge in all aquifers, but particularly the confined Lompico and Butano aquifers that the District depends on. Examining cumulative totals over multiple years is consistent with the practice of managing groundwater basins in response to multi-year trends rather than single year events. The District's Lompico aquifer wells generally have an overall increasing trend over the past several years, that started after the wet Water Year 2017, however, Lompico groundwater levels are stable to slightly lower now compared to the beginning of the water year in October 2020.

The Butano aquifer appears to have a very slight declining trend which has occurred relatively uniformly since 2013. The data available for analyzing the Butano aquifer, come from the Canham monitoring well that is located 0.8 miles from the District's Orchard Well. A deep dedicated monitoring well in the Butano aquifer closer to the District's Lompico/Butano aquifer pumping wells will be installed in 2022 as part of the Santa Margarita Groundwater Agency implementation of its Groundwater Sustainability Plan. This will provide an additional groundwater level data point closer to where pumping impacts are occurring and will help in managing the Butano aquifer that appears to be showing the beginnings of effects from long-term pumping.

CONCLUSIONS

It is possible that the cumulatively low rainfall over the past three years is beginning to become evident in the Lompico aquifer pumped by the District. It will be important to closely monitor Lompico aquifer groundwater levels in relation to pumping over the next six months. Last year's review of April 2020 groundwater conditions concluded that "based on groundwater level trends and pumping volumes in the Lompico aquifer through the [2012-2015] drought and beyond, keeping total District annual pumping below 1,250 acre-feet per year should not stress the aquifers being pumped even in below average rainfall years over the short-term." This conclusion still stands but if there is another year of below average rainfall, the dry conditions are no longer considered short-term and declines in groundwater levels in all aquifers may become more prevalent.

Sincerely,
MONTGOMERY & ASSOCIATES

Georgina King
Senior Hydrogeologist