

April 22, 2020

Groundwater experts since 1984

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

# SUBJECT: REVIEW OF EARLY APRIL 2020 GROUNDWATER CONDITIONS IN THE SCOTTS VALLEY WATER DISTRICT AREA

Dear Ms. Harmon:

The Scotts Valley Water District (District) has asked Montgomery & Associates (M&A) to review March 2020 groundwater conditions in the Scotts Valley Water District (District) due to the high probablity that annual rainfall will be below average for the year thus potentially impacting the District's water supply.

This letter summarizes our review of groundwater level data from production and monitoring wells, and groundwater production data through April 6, and rainfall data through April 8.

#### SUMMARY OF RAINFALL

As of April 8, 2020, which includes the last rainfall event, the water year rainfall total measured at the Pueblo Yard Station in Scotts Valley is 19.23 inches. This is 46% of long-term average rainfall of 42.0 inches per year (Figure 1). Since the drought which ended in Water Year 2015, the Scotts Valley area has received a total of 158.5 inches of rainfall, which averages out at roughly 47.6 inches per year mostly due to Water Year 2017 having record rainfall (Figure 1).

Figure 2 shows the likelihood of receiving various amounts of rain in April, (orange line) and May (grey line). For example, Figure 2 shows that there is an approximately 65% chance that Scotts Valley receives 3.16 inches or less rainfall in April (April's total as of April 8 is 3.16 inches); meaning there is only a 35% chance of receiving more than 3.16 inches of rainfall in April. The chart shows that historical median April and May rainfall totals are 2.40 and 0.56 inches, respectively. As a worst-case scenario, if no rain falls the remainder of the month and May receives median rainfall of 0.56 inches, total rainfall for the water year will be 22.95 inches, which is 55% of average.









Figure 2. Historic 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 five 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.

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

### Table 1. Summary of Fall and Winter Production

Through March, District pumping in Water Year 2020 is the second lowest over the last five water years (Table 1). Since the addition of the Orchard Well to the water system, more groundwater has been pumped from the Lompico/Butano wells than in previous years, and less has been pumped from wells screened only in the Lompico aquifer than most previous years.

# **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.

Well	Change in Groundwater Level Since Oct 2019 (feet)	Change in Groundwater Level Since Oct 2017 (feet)	Hydrograph Figure Number
Santa Margarita Aquifer			
SVWD AB303 MW-1	+1.1	+1.4	-
SVWD AB303 MW-3B	-1.4	+1.8	-
SV4–MW	-2.7	-3.6	-
TW-18	+0.2	+2.1	Figure 4
Monterey Formation			
Well #9	+2.3	+10.4	Figure 5

#### Table 2. Summary of Groundwater Levels



Well	Change in Groundwater Level Since Oct 2019 (feet)	Change in Groundwater Level Since Oct 2017 (feet)	Hydrograph Figure Number
Lompico Aquifer			
SVWD AB303 MW-2	+1.7	+9.3	-
TW-19	+1.8	+32.3	Figure 6
SVWD Well #10	+26.6	+47.1	Figure 7
Lompico/Butano Aquifer			
Stonewood	+0.7	+1.9	-
Canham	-0.6	-1.3	Figure 10

Since October 2017, most Santa Margarita aquifer monitoring wells in the southern portion of the District show increased groundwater levels. The northernmost monitoring well, TW-18, has experienced a very slight ongoing increase in groundwater levels (Figure 4). The District has no wells pumping groundwater from the Santa Margarita aquifer.

Hydrographs for Monterey Formation SVWD Well #9 (Figure 5) and Lompico aquifer wells: TW-18 (Figure 6) and SVWD #10 (Figure 7) show increasing groundwater levels starting in the winter of 2017. This increase is in part due to Water Year 2017 being a very wet year, and increases have continued because of reduced pumping in the Lompico aquifer (Figure 8). 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 2020.

Groundwater levels in combined Lompico/Butano aquifer monitoring wells indicate that groundwater levels have not changed significantly despite this aquifer being pumped more than previously pumped (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 rate of decline being just under one foot a year (Figure 10). Groundwater levels in the Canham monitoring well dropped 0.6 feet over the past six months. Given the recent pumping from the District's Orchard Well and Well #3B, it is expected that at least an additional 0.6 foot of decline may be possible over the next six months. Since groundwater level data collected from these pumping wells is not useful for analysis because 1) the groundwater levels represent combined Lompico/Butano levels, and 2) the wells are seldom in a static state, it is recommended that a dedicated deep Butano aquifer monitoring well be installed closer to the pumping wells to monitor groundwater levels in the Butano aquifer.









Figure 4. Hydrograph of Monitoring Well TW-18 (Santa Margarita Aquifer) with Transducer Data



Figure 5. Hydrograph of SVWD Well #9 (Monterey Formation)





Figure 6. Hydrograph of Monitoring Well TW-19 (Lompico Aquifer) with Transducer Data



Figure 7. Hydrograph of SVWD Well #10 (Lompico Aquifer)





Figure 8. Annual Lompico Aquifer Pumping by Scotts Valley Water District through Water Year 2019





Figure 9. Hydrograph of SVWD Orchard Well (Lompico/Butano Aquifers)



Figure 10: Hydrograph of Canham Monitoring Well (Butano) with Transducer Data



## WATER SUPPLY CONDITIONS

It is highly likely that Water Year 2020 annual rainfall in Scotts Valley will be between 55% and 60% of average. Scotts Valley's cumulative two-year rainfall as of April 8, 2020 is 79% of average, and the cumulative three-year rainfall is 73% 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. TheDistrict's Lompico aquifer wells generally have increasing trends over the past several years, that started after the wet Water Year 2017 and have continued due to reduced Lompico aquifer pumping even though there has been cumulatively below average rainfall.

The Butano aquifer appears to have a 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 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

Below average rainfall in Water Year 2020 is not yet evident in the groundwater levels in aquifers pumped by the District. This is because the Santa Margarita Basin responds to multi-year trends more than to single-year events. Since record rainfall of 2017, rainfall has been cumulatively below average. Reduced rainfall and limited recharge in Water Year 2018 through Water Year 2020 could potentially lead to declining groundwater levels and reduced groundwater supplies if rainfall in the next few years remains low. However, based on groundwater level trends and pumping volumes in the Lompico aquifer through the drought and beyond, keeping total District 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.

Sincerely, MONTGOMERY & ASSOCIATES

Georgina King Senior Hydrogeologist