

6.0 CONCLUSIONS

The base case of the groundwater model predicts that, as a result of 40 years of pumping groundwater at the maximum proposed annual pumping rate of 3,000 gpm, the maximum groundwater level drawdown from the project would be 85 ft in the lower (volcanic) aquifer, less than 4 ft in the middle aquifer, and less than 0.5 ft in the upper aquifer. The predicted area of drawdown in the upper aquifer is in the vicinity of the Denton well and Banegas Ranch well No. 2. The base-case model also predicts:

- approximately 1 percent (12 gpm or 19 ac-ft/yr) reduction in the flow of water out of the Big Sandy basin at Granite Gorge
- approximately 0.2 percent (17 gpm or 27 ac-ft/yr) reduction in outflow from evapotranspiration
- approximately 2.5 percent (142 gpm or 229 ac-ft/yr) reduction in outflow at the marsh near the Denton well as a result of 40 years of pumping

These flow reductions add to a predicted maximum drop in flow rates to the river alluvium of approximately 0.5 percent (171 gpm or 275 ac-ft/yr).

For each of the sensitivity analysis groundwater model runs, a different model parameter (such as specific yield or hydraulic conductivity) was altered. Most of the sensitivity analyses produced results that were consistent with the aquifer test results and an acceptable model calibration, but some did not, and these cases were judged to be unrealistic. Of all of those model run cases that were consistent with the aquifer test results and observed heads at the site, and therefore judged to be feasible, one run showed that the maximum predicted groundwater level drawdown in the upper aquifer from the project (after 40 years of pumping groundwater at the same maximum proposed annual pumping rate of 3,000 gpm) was approximately 85 ft in the volcanic (lower) aquifer, 12 ft in the middle aquifer, and less than 1 ft in the upper aquifer. For this worst realistic case, the model also predicted:

- approximately 2 percent (23 gpm or 37 ac-ft/yr) reduction in the flow of water out of the Big Sandy basin at Granite Gorge
- approximately 0.3 percent (33 gpm or 53 ac-ft/yr) reduction in outflow as evapotranspiration
- approximately 5 percent (315 gpm or 508 ac-ft/yr) reduction in outflow at the marsh near the Denton well as a result of 40 years of pumping

These flow reductions add to a predicted maximum drop in flow rates to the river alluvium of approximately 1 percent (371 gpm or 598 ac-ft/yr).

The minimum (best case) predicted groundwater level drawdown from the project was approximately 65 ft in the lower (volcanic) aquifer, less than 0.5 ft in the middle aquifer, and less than 0.1 ft in the upper aquifer, with no reduction in the flow of water out of the Big Sandy basin at Granite Gorge as a result of 40 years of pumping.

The predicted drawdowns in the upper aquifer, and flow reductions, are predicted to be mitigated by water replenishment that matches in volume, timing, and duration the predicted drops in flow rates to the marsh near the Denton well and Granite Gorge.

The volcanic aquifer is predicted to take about 130 years for 90 percent recovery to pre-pumping heads. Observed heads in the volcanic aquifer during actual pumping will demonstrate which of the predicted cases best represents reality, and the corresponding likely water replenishment volumes required for mitigation.