Lisa Hunter

From: Ben King <bking@pacgoldag.com>
Sent: Monday, February 14, 2022 10:50 AM
To: Lisa Hunter
Cc: Ben King
Subject: Agenda Item No. 9 - Glenn County Well Drilling Permit Standards
Attachments: DWR 2013 US Geological Society Abstract Relating to Sacramento Valley Base of Fresh Water.pdf

Good Morning Lisa,

I wanted to submit the attached summary for the DWR's Abstract submission at the US Geological Society's May 2013 Meeting entitled "Base Of Fresh Groundwater In The Sacramento Valley, California" for the GGA Board's consideration of their consideration of Agenda Item No. 9 today.

As you can see the DWR has identified areas where the Base of Fresh Water " is well above" the 3500 feet level generally assumed in Olmstead and Davis Maps that were used for the Colusa Subbasin GSP. The DWR believes that " **This is most likely caused by high artesian pressures and upward vertical gradients in deep aquifers in the Sacramento Valley which have been documented in DWR monitoring wells**." This upconing phenomenon is consistent in what has been observed in the new DWR Monitoring Well on Hahn Road north of Arbuckle where the 1000 ft observation stage head has been measured to be approximately 30 feet above the two observations at shallower levels.

The DWR Abstract goes on to state: " **This suggests that migration of poor quality water into continental sediments that previously contained freshwater has occurred over geologic time. This finding has implications for brackish and saline upconing beneath areas of prolonged groundwater pumping in the Sacramento Valley."**

I am sharing this Abstract summary for the GGA Board's consideration in commenting on the Draft Glenn County Pumping Ordinance. It is my expectation that the DWR's BFW contour map discussed in the Abstract will be incorporated into future revisions of the GSP.

Thank you for your time and consideration.

Ben King

Cordilleran Section - 109th Annual Meeting (20-22 May 2013)
Paper No. 1
Presentation Time: 8:00 AM-12:00 PM

BASE OF FRESH GROUNDWATER IN THE SACRAMENTO VALLEY, CALIFORNIA

SPRINGHORN, Steven T., HIGHTOWER, Nicholas, BEDEGREW, Tad and BONDS, Christopher L., California Department of Water Resources, 3500 Industrial Blvd, West Sacramento, CA 95691, steven.springhorn@water.ca.gov

A base of fresh groundwater (BFW) contour map was created to identify the approximate lower limit and the thickness of the fresh groundwater aquifer system in the Sacramento Valley. The BFW map is useful for groundwater resource and storage analyses, groundwater modeling, and delineating structural geologic features in the Sacramento Valley.

Two BFW maps covering the Sacramento Valley were previously created; Olmsted and Davis (1961) and Berkstresser (1973). The BFW map in this study relies on a substantial amount of new subsurface geophysical and water quality data that has been collected since the earlier BFW maps.

Fresh groundwater is defined in this study as water containing less than 1,000 mg/l total dissolved solids (TDS), approximately 1,550 µmhos/cm specific conductance, instead of 2,000 mg/L TDS used in the earlier studies. The BFW was estimated based on a comparative analysis of geophysical logs and lithologic data from approximately 2,800 geophysical logs from water resource wells and CA Division of Oil and Gas well records. The BFW selection criteria were calibrated using water chemistry data and constrained by comparing multiple well-logs and lithologic information in the same geographic area.

The BFW boundary occurs primarily in late Tertiary to Quaternary unconsolidated sediments at depths near land surface to more than 3,500 feet below ground surface. The BFW is an uneven boundary that in some places reflects the major geologic structures underlying the Sacramento Valley, and in other areas, transgresses underlying geologic structures. In some areas, the BFW boundary is well above the base of post-Eocene marine strata. This is most likely caused by high artesian pressures and upward vertical gradients in deep aquifers in the Sacramento Valley, which have been documented in DWR monitoring wells. This suggests that migration of poor quality water into continental sediments that previously contained freshwater has occurred over geologic time. This finding has implications for brackish and saline water upconing beneath areas of prolonged groundwater pumping in the Sacramento Valley.
https://gsa.confex.com/gsa/2013CD/webprogram/Paper219191.html