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June 11, 2015

Subject: Quarterly Report for Coastal Monitoring Data through April 2015

Mr. Duncan:

This is the seventh quarterly report with updates on the attached groundwater level and salt concentration plots at coastal monitoring wells where protective elevations have been defined. These wells include five wells in the Purisima area (SC-1A, SC-3A, SC-5A, SC-9C, and SC-8D) and five well clusters in the Aromas area (SC-A1A and B, SC-A8A and B, SC-A2A and B, SC-A3A and B, and SC-A4A and B). These wells are the key wells for assessing risk of seawater intrusion and the status of basin recovery in the Soquel-Aptos basin. Protective elevations estimated to protect productive aquifer units from seawater intrusion and secondary drinking water standards (MCLs) for chlorides and total dissolved solids (TDS) are shown on the plots. Data through April 2015 are included, which includes groundwater level soundings at least quarterly at the wells. At the Aromas area monitoring wells, quarterly sampling for chlorides and TDS occurred in March. At SC-1A, sampling for chlorides and TDS is quarterly for the cooperative monitoring and adaptive management agreement with the City of Santa Cruz and occurred in April. Sampling at the other Purisima area monitoring wells occurs semi-annually including a sampling event in April.

GROUNDWATER LEVEL TRENDS

The only SqCWD coastal monitoring well in the Purisima area with groundwater levels above protective elevations continues to be SC-1A. There has been a multi-year recovery trend in the Purisima area groundwater levels over the last five to ten years. Previous quarterly reports noted a decline in groundwater levels at SC-1A, SC-3A, and SC-5A in 2012 and 2013. The recovery in 2014 from this short term decline at these wells and continued recovery at SC-9C and SC-8D shown in the previous two quarterly reports continued into the spring at these wells. Groundwater levels at SC-3A, SC-9C and SC-8D are at or near its highest level since the 1980s. Although the groundwater level at SC-3A is above the protective level of 10 feet in April 2015, the average annual groundwater level is still below 10 feet so recovery is not yet achieved at this well.

Recovery since 2014 likely relates to lower pumping in 2014-2015 related to drought curtailment. Over this time scale of several months, coastal groundwater levels have a greater response to reduced pumping than reduced recharge caused by the four year drought through Water Year 2015. This is due to the much closer proximity of pumping wells compared to aquifer outcrops.

In the Aromas area, the groundwater level rise from October to December 2014 was reversed in the first quarter of 2015 and groundwater level trends over the last five years are increasing or stable. Over the last year, the data show that groundwater levels have been above protective elevations at the SC-A1 and SC-A2 wells and near protective elevations at the SC-A3 well.

In previous quarterly reports and the annual report, we have displayed equivalent freshwater head for Aromas area monitoring wells with high salt concentrations. We are evaluating whether it is appropriate to compare equivalent freshwater heads that are elevated due to high salt concentrations to protective elevations for preventing seawater intrusion. Until we resolve this issue, we will conservatively use measured groundwater levels for comparison to protective elevations.

SALT CONCENTRATION TRENDS

There are no notable changes in salt concentration trends over the last few quarters in the Purisima or northwestern area of the Aromas. In the southeastern area of the Aromas, where the long term (> 5 years) salt concentration trend has generally been increasing, the recent trends (3-5 years) in chloride and TDS at

SC-A2B has been decreasing and the recent trend for chloride and TDS at SC-A4A has been a faster increase than the long term trend. Over 2014, there were also declining TDS concentrations measured at SC-A2A, SC-A3A, and SC-A4A, but chloride concentrations were stable or rose slightly at these wells so conclusions about the movement of the seawater interface cannot be made.

It is also notable that concentrations at SC-A3B have risen since equipment was installed in 2012. The concentrations are lower than concentrations prior to 2012 as the new equipment appears to have samples only the well's upper screen. The rise in concentrations from the new equipment may indicate salt water has moved higher into the upper screen. We recommended ordering a new drop tube to sample the bottom screen of the well to better monitor the freshwater-seawater interface at this location, but silt had covered up the bottom screen. Attempts at redeveloping the well did not fully remove the silt so our recommendation was to place the drop tube at the top of the bottom screen. The two most recent samples are from this lower depth and show a higher concentration than measurements from the upper screen, but do not necessarily represent an increasing trend from prior samples. The most recent concentration is still lower than measurements from before 2012.

ADDITIONAL NOTES

Although a previous quarterly report included groundwater level logger data for several of the Purisima wells, we have decided to wait until data get uploaded into the data management system the District has purchased before providing updated plots of logger data for all the wells in the quarterly report. This will prevent duplication of effort. When the new data management system is up to date, future quarterly reports will include the following based on the logger data:

- Plots of available groundwater elevation data recorded by groundwater level loggers at all coastal monitoring wells. The current equipment was installed at most of these wells in 2012.
- Average groundwater elevations will be calculated based on the logger data for the quarter, water year to date, and preceding four quarters. Average equivalent freshwater heads will be estimated for the three time periods at wells where chloride concentrations are above the MCL of 250 mg/L.

Page numbers for the water quality plots are consistent with the Annual Report and Review figure sections 3B, 4B, and 5B, and therefore are not in consecutive order.

Thank you to District staff for making the data available expeditiously. Please let me know if you have any questions.

Sincerely,



Cameron Tana, Vice President
HydroMetrics Water Resources Inc.

Attachment: Coastal monitoring well hydrographs and chemographs





























