CALIFORNIA
Water Boards

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

Colorado River Basin Regional Water Quality Control Board

November 5, 2014

Ms. Patti Reyes
Coachella Valley Water District
P.O. Box 1058
Coachella , CA 92236

RE: COACHELLA VALLEY GROUNDWATER BASIN SALT AND NUTRIENT MANAGEMENT PLAN

Thank you for the opportunity to review and comment on the Coachella Valley Salt and Nutrient Management Plan (SNMP) Technical Memo #1 (TM-1) received August 18, 2014, and TM-2 received October 9, 2014. We understand that these two TM's are the foundational underpinnings in the effort to produce a SNMP. We note that TM-1 states it describes the methodology to be used to develop the SNMP, and that TM-2 analyzes ambient water quality (AWQ), and identifies salt and nutrient sources and sinks. We observed that TM-2 did not identify salt and nutrient sources and sinks, but presumably leaves that important task to the larger SNMP.

Regional Water Board staff (staff) is appreciative of the efforts the Coachella Valley Water District (District) has put forth to develop a SNMP for the Coachella Valley, the population hub of the Colorado River Basin Region however we are very concerned with the Districts' approach. You may recall we met face-to-face on several occasions with MWH (your consultant) and the District to voice these concerns. Specifically, the methodology proposed by your consultant to determine AWQ for the Coachella Valley Groundwater Basin (Basin) appears scientifically flawed, employing a statistical approach that blends waters from different areas, rather than treating waters of different character discretely, thereby minimizing water quality impacts from anthropogenic activities. Lack of sufficient raw and relevant data is also a significant concern. If developed as proposed, this SNMP will not adequately characterize current conditions in the Basin, nor protect groundwater resources for current and future generations of Coachella Valley residents. This correspondence formalizes these concerns for your consideration and action.

Management Zone Modeling

While we agree with the concept of separating the Basin into management zones (MZ) due to variations in water quality and/or geologic conditions, we do not agree with the number of proposed MZs or the methodology for determining AWQ conditions within each MZ. The resulting single concentration value to represent the water quality within an entire MZ for a particular constituent is of little value.

The five MZs are too complex and heterogeneous to be treated as single entities. Rather, the MZs should be further characterized and divided into "subzones", and managed on a smaller

scale, with AWQ concentrations and assimilative capacities assigned to *each* "subzone". Like the five major MZs, subzones should be defined by similarities in geology and/or water quality.

Using the West Valley as an example, TM-2 indicates that TDS decreases significantly with depth, and that higher TDS appears in the shallower part of the aquifer down gradient of the Whitewater Recharge Facility, and in wells from Rancho Mirage to Palm Desert, and also within the Thousand Palms Subarea at the very east end of the management zone. At a minimum, each of these areas should be managed independently as distinct subzones, *each* with a discrete AWQ and assimilative capacity for *each* constituent of concern.

Applying the volume-weighted average approach to a groundwater basin as heterogeneous as Coachella Valley to generate a single numeric (mean) constituent concentration applicable everywhere within a MZ is unrealistic because it assumes MZs behave like bathtubs with instantaneous mixing. Single number (mean) constituent concentrations for the different MZs are at best, rough approximations that portray overly simplistic views of AWQ that are not representative of "true" water quality, especially when insufficient recent data exists.

Numeric groundwater models (i.e., fate and transport models) are more suitable for complex hydrogeologic conditions like Coachella Valley, as they take into consideration aquifer characteristics (porosity, hydraulic conductivity, hydraulic gradient, etc.) pollutant concentration and attenuation, rate of recharge, and other factors affecting constituent concentrations through time and space. Numeric models can reasonably replicate aquifer conditions at any given time. We strongly believe that a more complex numeric modeling approach should be applied to each MZ that generates data driven concentration contours illustrating both horizontal and vertical variability for any given constituent, at any given location/time. This approach will allow the District to identify areas (subzones) within MZs that possess or lack assimilative capacity as it provides more accurate approximation of mean constituent concentrations.

Ambient Water Quality

As discussed above, the District's proposal to produce a single AWQ for each constituent of concern, applied throughout the entire vertical and horizontal expanse of each MZ is far too simplistic to be considered a realistic representation of AWQ conditions.

The majority of water quality data used to assess AWQ is collected from the lower section of the aquifer, typically characterized by better water quality. This data is not representative of water quality in the upper aquifer where impacts from surface discharges (agricultural wastewater, septic tank effluent, recycled water, etc.) first occur. Averaging data that are not representative of the different zones of the aquifer can skew AWQ to the extent that it bears little resemblance to reality. The District has indicated on several occasions that little data exists for the shallow, upper aquifer. If this area of the aquifer is not adequately represented, the AWQ may be skewed toward the higher quality water in the deeper areas of the aquifer, where anthropogenic effects may be absent. This may give the *appearance* of a higher water quality; hence, a greater assimilative capacity throughout the entire vertical and lateral extent of the MZs. Staff believes this may be the case for the AWQ the District provided for the West Valley MZ, for instance.

In short, the application of statistics to homogenize a heterogeneous groundwater basin is not appropriate. This is exemplified in TM-2, Table 3-5, which provides descriptive statistics used to determine the volume-weighted TDS AWQ for the East Valley MZ.

Table 3-5, Descriptive Statistics of Filtered Data for Total Dissolved Solids (mg/L) in the East Valley (1994-2013)

	Upper	Lower
Count	53	222
Mean	643	350
Median	523	215
Mode	665	160
Standard Deviation	484	391
Range	1 to 2,210	19 to 4,582

Based on the values above, the mean TDS for the upper aquifer (643 mg/l) is almost 100 % greater than the mean TDS of the lower aquifer (350 mg/l). This is a very significant difference that suggests all or part of the upper aquifer has been impacted by waste discharges or recharge water. Whatever the case, these two aquifers need to be treated individually with different AWQs and assimilative capacities, not averaged into a single data set.

Areas within the upper and lower aquifers with different water quality should also be treated separately. The standard deviations for mean TDS in the upper and lower aquifers are quite large. The standard deviation for mean TDS in the lower aquifer actually *exceeds* the mean, indicating *very significant variation*. If the elevated concentrations are geographically localized, those areas should define their own MZ or subzone, and not be used to reduce the accuracy of the remaining data. If they are not localized, they likely indicate isolated pollutant impacts. In either case, averaging widely variant concentrations within and between the upper and lower aquifer is nonsensical, and produces AWQs that bear little to no resemblance to reality.

Incidentally, the ranges listed for TDS in the upper and lower aquifers suggest that poor quality data is being used in the analyses. For instance, the lowest values reported in the upper and lower aquifers are 1 mg/l and 19 mg/l, respectively; concentrations suggestive of pure (virtually distilled) water, not found in nature. The highest TDS value reported in the lower aquifer is 4582 mg/l. This datum is anomalous and should be placed in a subzone with other wells of similar water quality that are spatially co-located.

For the sake of transparency, please provide ***all*** data used for scientific interpretations (i.e., summaries of raw data, sampling locations, MZ and subzone delineation, sampling date, map, etc.) in an acceptable and usable format (digital or otherwise) in all future submittals, including the final versions of TM-1 and TM-2.

20-Year Baseline

The use of water quality data collected from 1994 to 2013 for the calculation of AWQ is unacceptable particularly in the case of Coachella Valley because it blurs the effect of recent discharge/recharge activities. The State Water Recycle policy states (and TM-1 acknowledges on page 59, paragraph 1):

> ..... *For those basins/sub-basins where the Regional Water Boards have not determined the baseline assimilative capacity, the baseline assimilative capacity shall be calculated by the initial project proponent, with review and approval by the Regional*

Water Board, until such time a s the salt/nutrient plan is approved by the Regional Water Board and is in effect. For compliance with this subparagraph, the available assimilative capacity shall be calculated by comparing the mineral water quality objective with the average concentration of the basin/sub-basin, either over ***the most recent five years of data available or using a data set approved by the Regional Water Board Executive Officer*** *(emphasis added)……..*

Accurate assessment of *current* AWQ conditions is paramount to the development of an SNMP that is protective of water quality. As implied by the Recycled Water Policy above, AWQ is the quality of groundwater *currently* in the basin (i.e., *today*), not 20 years ago, as TM-1 and TM-2 propose to use. Data collected over 20 years does not fully account for all water quality impacts from waste dischargers to the ground surface (septic tank effluent; agricultural, golf course and landscape irrigation return flows; recharge water, etc.) that have occurred since 1994, and subsequent impacts to water quality in the shallow (or deeper) aquifer. Averaging 20 years of data provides an erroneous AWQ that for the West Valley MZ may be more reflective of the high quality, low TDS pristine water present in the aquifer before any impacts from anthropogenic activities, hence, the *appearance* of better water quality, and more assimilative capacity than actually exists in the aquifer.

Data Gaps

The District's consultant (MWH) states there is insufficient recent data for statistical analysis if a 20-year data span is not utilized. If the District feels recent data (i.e., data collected in the last five years) is insufficient to develop a SNMP for the Coachella Valley Basin, then the District needs to collect more data. The use of historical data to determine ambient, current day conditions (and assimilative capacities), is not acceptable. The proper use of historical data (i.e., early 1900's to present) is to assess trends in water quality, as well as impacts to water quality from imported water and waste discharges. Graphing this data by well (concentration verses time) readily identifies and quantifies impacts and areas of concern.

Both TM-1 and TM-2 state there is insufficient water quality data within the shallow aquifer to provide a realistic, scientifically valid assessment of AWQ conditions, which is needed to properly quantify aquifer assimilative capacities. Due to a lack of basin-wide comprehensive programs designed to monitor and protect the shallow, upper aquifer of the Basin, very little information is available about past or current AWQ. These areas are more vulnerable to degradation from anthropogenic activities than the deeper aquifers because of their proximity to surface pollution sources. Based upon historical knowledge/information, the beneficial uses of the shallow aquifer are probably locally impaired.

More data exists for the lower aquifer than the upper aquifer, however long screen lengths typical of water supply wells, and their positioning in populated areas rather than throughout the groundwater basin, limits the usefulness of this data as well. Obviously, data gaps exist in both the lower and upper aquifers.

As a final note, while it is commendable the District has taken the initiative to develop a SNMP for the Coachella Valley Basin, we are concerned with the absence or limited participation by other major stakeholders in the Technical Advisory Group. The Recycled Water Policy views this endeavor as locally driven and encourages the participation of all stakeholders.

Thank you for the opportunity to review TM-1 and TM-2. If you have any questions, please call Joan Stormo at (760) 776-8982 or by email at joan.stormo@waterboards.ca.gov.

Sincerely,

Abdi Haile

Abdi Haile, PG, MSc
Supervising Engineering Geologist
Colorado River Basin Regional Water Quality Control Board

cc:
President, Riverside County Farm Bureau
General Manager, Desert Water Agency
Director of Public Works, Coachella Sanitary District
Director of Planning and Natural Resources, Agua Caliente Band of Cahuilla Indians
General Manager, CVWD
General Manager, Mission Springs Water District
General Manager, Valley Sanitary District
Executive Director, Hi-Lo Desert Golf Course Superintendants Association
General Services Manager, Indio Water Authority
Director of Public Works, City of Palm Springs
Superintendent, Bureau of Indian Affairs
Thomas D. McCarthy, MWH