



February 5, 2015

Mr. Daniel Cozad
Central Valley Salinity Coalition
(888) 826-3635
dcozad@cvsalinity.org

SUBJECT: CENTRAL-VALLEY SNMP REGION 5 DATA ANALYSIS

Dear Mr. Cozad:

Luhdorff & Scalmanini, Consulting Engineers (LSCE) is pleased to respond to your request on February 3, 2015 to excerpt the “data analysis section” from our Monitoring and Surveillance Proposal¹ submitted on December 19, 2014 for discussion with the CV-SALTS Technical Committee and recommendations as appropriate.

The proposed data analysis is a crucial component of completing the Central Valley SNMP as a programmatic document for all of Region 5 and informing the development of the monitoring surveillance plan. There are three main categories of data analysis that LSCE proposed:

- 1) Characterize Groundwater Quality Data
- 2) Determine Ambient Groundwater Quality and Assimilative Capacity at Higher Resolution for Region 5
- 3) Prioritize Basins/Subbasins in Region 5

Each of these three categories is summarized below.

Characterize Groundwater Quality Data

The groundwater quality data collected and documented for CV-SALTS Phase I is currently outdated. There were issues with groundwater quality data from GeoTrackerGAMA that LSCE uncovered during the Phase I analysis and helped the State Water Board resolve. However, the issues with the data could not be resolved until after the deadlines for CV-SALTS submittals passed. As a result, the analyses of ambient groundwater quality and assimilative capacity on the “IAZ” scale were performed on a dataset that has since been updated and corrected as part of the CV-SALTS SNMP Phase II, Task 3 work. Also, the Phase I analysis was limited to data within the Central Valley Floor, which ignores the portions of Region 5 that lie beyond the Valley Floor.

Task 3.3 (Characterize Data) from the LSCE Monitoring and Surveillance Proposal is excerpted below:

This task will be an assessment of the groundwater data that are available for different spatial scales, such as basin/subbasin/local areas, inside and outside of the Central

¹ The LSCE Team submitted a Statement of Qualifications and a Proposal “Central Valley Salinity Alternatives for Long Term Sustainability for *Central Valley Salt and Nitrate Management Plan, Programmatic Surveillance and Monitoring Program.*”

Valley Floor, and within Region 5. The groundwater data will be further characterized by availability for shallow, deep, and unknown well completion. Lastly, the groundwater data will be assessed to determine the temporal sufficiency. GIS maps and sophisticated tables will be presented that summarize the groundwater and surface water data in terms of availability and suitability for determining ambient groundwater quality and assimilative capacity.

This assessment would be performed on the recently updated groundwater quality dataset that LSCE has completed as part of the CV-SNMP Phase II, Task 3 work.

Determine Ambient Groundwater Quality and Assimilative Capacity at Higher Resolution for Region 5

This portion of the LSCE proposal was the largest ‘data analysis’ section and is a very important piece of work that is recommended to have a defensible and robust SNMP as well as informing the monitoring and surveillance plan. Again, the only existing salt and nitrate groundwater analysis for the CV-SALTS SNMP is the Phase I IAZ-scale analysis. This coverage is incomplete for purposes of the development of a programmatic SNMP for Region 5. The Phase I IAZ analysis does not include salt and nitrate conditions outside the Valley Floor. A higher resolution analysis is warranted to determine ambient groundwater quality and assimilative capacity for smaller scale areas within the entirety of Region 5; this analysis would result in the use of the most updated and complete groundwater quality dataset that was developed as part of Phase II. Otherwise, there is no task in Phase II that would use these data, except in the Alta Irrigation District area for the archetype analysis. As a result, LSCE’s proposal included higher resolution groundwater quality analyses of salt and nitrate for shallow and deep groundwater at the following scales:

- Central Valley Groundwater Basins and Subbasins
- Basins and Subbasins in Region 5 but outside the Central Valley Floor;
- Local areas in Region 5 but not explicitly in a basin or subbasin (pending data availability and data density).

Existing Ambient Groundwater Quality

Task 4.1 from the LSCE Monitoring and Surveillance Proposal is excerpted below:

This task includes a refined analysis of ambient groundwater quality, at a finer scale (no finer than 1 square mile) compared to the Phase I ICM IAZ aggregated scale of analysis, for both shallow and deep categories of groundwater. The ambient groundwater quality analysis would follow methodologies defined in Phase II Task 4 and rely on the data from Phase II Task 3 as described above. Areas on the scales mentioned in the bullets above will be categorized by depth (shallow or deep) as either: a) areas that have relatively higher quality groundwater (low concentrations of salt and nitrate), b) areas that have lower quality groundwater (high concentrations of salt and nitrate) that may serve as sinks for salt and nitrate accumulation, and c) areas with moderate quality groundwater. These categories can also be used for final prioritization of subbasins within the Central Valley Floor and coordinated with the CASGEM prioritization conducted by DWR and the updated prioritization that DWR

will be conducting as part of the Groundwater Sustainability Management Act legislation. The Act calls for DWR to include factors such as impacts to groundwater quality degradation when it considers ranking of basins/subbasins as medium or high priority.

Existing Assimilative Capacity

Task 4.2 from the LSCE Monitoring and Surveillance Proposal is excerpted below:

Assimilative capacity estimates will be produced based on the existing higher resolution ambient groundwater quality. The emphasis of this work will be on the Central Valley Floor, where data density is the greatest, but this work would also consider basins/subbasins outside the Valley Floor within Region 5 as data allow.

Identify Data Gaps (Temporal and Spatial)

Task 4.3 from the LSCE Monitoring and Surveillance Proposal is excerpted below:

Results from the Task 3.3 Characterize Data will be combined with the high resolution ambient groundwater quality and assimilative capacity estimates to identify data gaps. Data gaps uncovered during the ambient groundwater quality calculations may include: spatial gaps for shallow and deep groundwater; gaps in concentration data availability for salt and/or nitrate data; and temporal data (only recent data, only historical data, huge gaps in time between measurements, etc.). The data gaps will be characterized for each scale mentioned in the introduction to Task 4 and will serve to inform areas of potential focus during local monitoring plan development. The methodology for determining data gaps will also consider the representativeness of wells completed in different aquifer units. For example, shallow groundwater quality can be highly variable, and one well should not be used to represent a large spatial region. In contrast, wells completed in deeper aquifer units most likely represent more regional conditions and so monitoring in deeper aquifers can utilize wells that are not located as close together.

Prioritize Basins/Subbasins in Region 5

Part of LSCE's Monitoring and Surveillance Proposal (Task 5) included the first step of prioritizing basins/subbasins in Region 5 (Task 5.1). This is the last 'data analysis' piece of the LSCE proposal that involved using the updated data from Phase II, Task 3. Task 5.1 is excerpted below:

This task will utilize the higher resolution ambient groundwater quality and assimilative capacity from Task 4 to prioritize basins and subbasins in Region 5, as data allow. The prioritization based on salt and nitrate and will aim to be coordinated with DWR's basin/subbasin prioritization and rankings (current rankings are based on CASGEM). The methodology proposed for prioritization will be developed in this task and will consider temporal trends, ambient groundwater quality, assimilative capacity, and data gaps. Basins will be assigned their Salt and Nitrate Priority and visualized using GIS maps and tables.

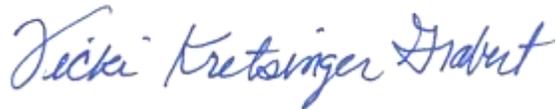
This prioritization would be used to take the Phase I coarse-scale, preliminary IAZ assimilative capacities to more refined assimilative capacities (in the Central Valley Floor and outside the Valley Floor in Region 5, where sufficient data are available) for the purpose of the programmatic SNMP.

The above summary has been prepared to convey the purpose of the 'data analysis' portions of the LSCE Monitoring and Surveillance Proposal for the Technical Committee's consideration. The data analysis described is important for completing the Region 5 programmatic scale analyses necessary for the CV-SNMP as well as informing the monitoring and surveillance plan for the CV-SNMP and future local monitoring efforts.

We would be pleased to address any questions about the above summary.

Sincerely,

LUHDORFF & SCALMANINI
CONSULTING ENGINEERS



Vicki Kretsinger Grabert
Senior Principal Hydrologist, LSCE



Barbara Dalgish, P.G.
Senior Hydrogeologist, LSCE