Appendix E

Frequently Asked Questions (FAQs)

The Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) Executive Committee accepted the SAMP Report at its October 14, 2016 Administration Meeting. As part of the acceptance of the report, the Committee requested the inclusion of an FAQ section to address commonly asked questions regarding the objectives, framework and methodology associated with the SAMP. This section provides answers to these FAQs.

1. **What is the objective of the Surveillance and Monitoring Program (SAMP)?**

   The objective of the SAMP is to develop a monitoring program that will allow for statistically-representative Ambient Water Quality (AWQ) determinations and analysis of water quality trends in the Central Valley Region. The SAMP, as part of the Salt and Nitrate Management Plan (SNMP), is a required element for the adoption of the Basin Plan amendments.

2. **How will data that are generated and compiled by the SAMP be used?**

   The data generated and compiled by the SAMP will be used to estimate the AWQ – for total dissolved solids (TDS) and nitrate – for groundwater basins, subbasins, or other areas. The AWQ determinations will be done using the methodology described in the CV-SALTS High Resolution Mapping Report.[1] *The SAMP is intended to be used to provide the requisite data to perform the AWQ determinations and trend analyses in order to assess the effectiveness of salt and nitrate implementation measures planned for implementation in the Central Valley Region under the SNMP.*

3. **Does the SAMP incorporate surface water monitoring?**

   No, the SAMP applies only to groundwater. CV-SALTS has not developed a comparable program for surface waters; instead, the Central Valley Water Board intends to rely on existing monitoring and assessment programs already established for surface waters in the region.

4. **Will the SAMP integrate other groundwater monitoring programs, both existing and future?**

   Yes, the SAMP is intended to be integrated with other groundwater monitoring programs to minimize duplication of monitoring efforts and reduce potential for new monitoring costs in the region. In that regard, to the extent possible the SAMP will utilize existing monitoring programs and existing monitoring stations in order to be cost-effective and consistent. During the start-up of SAMP implementation, other monitoring programs that are being carried out – or will be in the future – will be identified and evaluated, including the Irrigated Lands Regulatory Program (ILRP) trend monitoring, the Groundwater Ambient Monitoring and Assessment (GAMA) shallow domestic well monitoring program, the Central Valley Dairy Representative Monitoring Program, routine Title 22 sampling program, and Waste Discharge Requirements (WDR) sampling programs. These monitoring programs, or portions

[1] Luhdorff & Scalmanini Consulting Engineers and LWA. 2016a. *Region 5: Updated Groundwater Quality Analysis and High Resolution Mapping for Central Valley Salt and Nitrate Management Plan*. Report prepared for CV-SALTS. June 2016. Available at: http://www.cvsalinity.org/index.php/committees/technical-advisory/conceptual-model-developments/171-updated-groundwater-quality-analysis-for-central-valley.html

of the monitoring programs, are intended to be incorporated into the SAMP to the maximum extent practicable. The SAMP is meant to be flexible and adaptive to new information and changed conditions.

5. Who will be the stakeholders in implementing the SAMP at the local level?

SAMP stakeholders will likely include overlying cities and counties, water districts, irrigation districts, drainage districts, POTWs, food processors, other industries, agriculture, nongovernmental organizations, environmental groups, and regulatory agencies. SAMP stakeholders may include, coordinate with, or be Sustainable Groundwater Management Act (SGMA) Groundwater Sustainable Agencies. The SAMP can be implemented through the Central Valley Water Board as a valley-wide program. Alternatively, the governance structure for each groundwater basin or other subareas such as a management zone (e.g., agency(ies), joint powers authority, or coalition(s) or other entities) can implement elements of the SAMP at the relevant scale for their area and report back monitoring program findings to the Central Valley Water Board, or its designee.

6. How will local knowledge inform the SAMP?

CV-SALTS is developing a regional SNMP that meets the requirements of the State Recycled Water Policy. It is anticipated that in some areas stakeholders will establish management zones as the pathway to comply with the SNMP. When developing a Management Zone Implementation Plan for a management zone, which must incorporate a monitoring component, it is anticipated that the SAMP, as applied to that area, would be evaluated and possibly modified to be consistent with the monitoring needs for the management zone. This step is intended to minimize duplication of effort and allow consideration of local factors including local knowledge of hydrogeology (including recharge areas and surface water and groundwater interconnections), historical and future land and water resource uses, existing monitoring programs (including refinement of existing local/regional programs in response to the SGMA), and consideration of disadvantaged communities.

7. Can the SAMP be modified and can wells be added and/or removed?

The SAMP is designed to be a dynamic network that can be expanded to meet future monitoring needs. Similarly, the SAMP is intended to be flexible to account for changes in water quality conditions and the monitoring network may be reduced in the future based on on-going data analyses (e.g., if it is determined that fewer wells are needed to meet the program objective). Ideally, these changes in the monitoring program would not require a Basin Plan amendment, but could be accomplished under the signature authority of the Executive Officer of the Central Valley Water Board, based on the review and approval of a petition to modify the SAMP.

8. Will there be a separate SAMP network for TDS and nitrate?

No, the intention is to have one network of wells for both TDS and nitrate.

9. How did the SAMP determine the locations and orientations of each of the grid cell networks, which range from 1 square mile to 16 square miles?

The one-square mile grid network is precisely the same as the one used for the Initial Conceptual Model (ICM) and the US Geological Survey Central Valley Hydrologic Model (CVHM). For other SAMP grid networks (2-square mile to 12-square miles), the origin of the grid network is the upper left (northwest) corner of grid cell number one of the one-square mile grid cell network. Once the location of the first grid cell is fixed, the remaining grid cells are automatically configured, because the overall grid becomes a two-dimensional lattice. In other words, the SAMP grid cell networks – of any grid cell size – all begin at the northwest-most corner of the 1-square mile grid cell network.

10. Does each Initial Analysis Zone[2] (IAZ) include only whole grid cells?

No, when a grid cell overlies more than one IAZ, the grid cell is "split" by the boundary between the two IAZs.

11. Can the grid cell networks be oriented at a 45-degree angle, rather than north and south?

Yes, the grid cells can be oriented at any angle. However, since the area of each grid cell is much smaller than each IAZ or groundwater basin/subbasin, the SAMP well selection process would yield similar monitoring networks whether the grid cells were oriented north/south or northwest/southeast.

12. What data served as the basis for the SAMP development?

The SAMP used the most recent version of the water quality database[3] compiled by CV-SALTS, which CV-SALTS used to develop the water quality analyses in the High Resolution Mapping Report (see footnote 1 in this appendix).

13. How was the SAMP grid network used to define the monitoring well network and why are the grid cell sizes dictated by a 15 percent level of uncertainty?

Statistical tools were developed and applied to define grid cell spacings and the SAMP algorithm produced a subset of wells in the deep and shallow zones that is representative of the ambient groundwater quality in each IAZ. The goal was to minimize the number of wells needing to be sampled while maintaining confidence in the results. In this regard, the power analyses allowed the SAMP to customize the grid cell sizes based on the data variability and thereby reduce the number of wells used in the SAMP, while still developing a monitoring network that produces data results representative of ambient groundwater quality. The grid

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[2] The SAMP was originally developed at the IAZ-scale, based on the approved work plan and direction from the Executive Committee. It has been recommended that the SAMP network be redeveloped at the groundwater basin/subbasin-scale as part of efforts to implement the surveillance and monitoring program.

[3] Luhdorff & Scalmanini Consulting Engineers and LWA. 2014. *Phase II Conceptual Model - Task 3: Groundwater Data Refinements and Updates*. Memorandum to CV-SALTS. June 18, 2014. http://www.cvsalinity.org/index.php/docs/committee-document/technical-advisory-docs/conceptual-model-development/2810-phase-iitask-3technical-memorandum070814final/file.html

cell sizes were chosen to produce an acceptable level of uncertainty, given the data variability and the spatial distribution of existing groundwater wells. An uncertainty of 15 percent was deemed to be an acceptable balance between uncertainty and the number of wells in the SAMP network, which translates directly into the cost of the program. The 15 percent uncertainty threshold was described in the SAMP Report, which was reviewed by the CV-SALTS Project Committee.

14. How many wells are included in the SAMP network?

Of the 8,712 wells in the CV-SALTS database for the deep zone, 2,315 were selected by the SAMP algorithm, or approximately 27 percent of the available wells. Likewise, for the shallow zone, 1,461 of 7,285 wells (20 percent) were selected by the SAMP algorithm. This translates to a well density of about one SAMP well per 9.7 square miles in the deep zone and one well per 15 square miles for the shallow zone. The resulting average well densities for deep and shallow zones is consistent with the 15 percent uncertainty threshold established for the SAMP (see previous question).

15. Does the SAMP require a well in each grid cell?

Grid cell spacings were selected for each IAZ (as part of the SAMP, but could also be selected at groundwater basin/subbasin scales as well) to achieve a specified level of certainty, using the existing wells in the CV-SALTS database. There is no requirement to have a well in each grid cell – and with the exception of gap areas where groundwater is being used, the intent is not to drill and install new monitoring wells, but to instead use existing wells. As the response to the previous question shows, wells are not located within every one-square mile grid.

16. When multiple data observations are available for a single year from a well, how will the TDS or nitrate data be averaged to obtain a single concentration value for the well?

The TDS and nitrate concentrations will be temporally declustered, that is, if there is more than one sample for a well in a given year, an annual average value will be calculated for TDS and nitrate. These temporally-averaged values will then be used to calculate a volume-averaged concentration for each IAZ. TDS and nitrate concentrations will be calculated as a moving 10-year average for each groundwater basin/subbasin or other area. Per the SAMP, this computation of ambient TDS and nitrate will occur once every five years.

17. How will trends be measured, *e.g.*, will the evaluation of trends be based on changes in concentration in single wells, changes in the average concentration within a grid cell, or some other measure of change?

Current ambient water quality will be determined using the algorithm defined in the CV-SALTS High Resolution Mapping Report (see footnote 1 within this appendix). The recomputation of ambient TDS and nitrate will occur every 5 years, using a 10-year moving average of wells in the SAMP network for each groundwater basin/subbasin or other subareas. Trends in AWQ will be assessed at the groundwater basin/subbasin or if needed another scale. If local entities are interested, temporal trends can be assessed at a local level

on a more frequent basis by analyzing time-series data for a network of key or indicator wells. However, analysis of local trends is not part of the SAMP.