# Memorandum

*To:* *CV-SALTS Executive Committee*

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*Date:* *September 13, 2016*

*Subject:* *Concept Level Tasks and Costs for the SAMP Implementation*

## Background

The Central Valley Salinity Alternatives for Long Term Sustainability (CV-SALTS) is in the process of developing a comprehensive regulatory and programmatic approach to the management of salt and nitrate as nitrogen[1] in the Central Valley that is not only consistent with the State Recycled Water Policy (SRWP) but meets the broader goals of CV-SALTS to develop a workable, comprehensive plan to address salinity, including nitrates, throughout the region in a comprehensive, consistent, and sustainable manner. The CV-SALTS participants have established these goals:

- Sustain the Valley's lifestyle
- Support regional economic growth
- Retain a world-class agricultural economy
- Maintain a reliable, high-quality urban water supply
- Protect and enhance the environment

Fundamentally, CV-SALTS must ensure that safe, affordable water is available to all, that the agricultural economy is sustained, and that Central Valley communities remain viable. The work of CV-SALTS is being executed in cooperation with the Central Valley Regional Water Quality Control Board (Central Valley Water Board), the State Water Resources Control Board (State Water Board), the Central Valley Salinity Coalition (CVSC), and other stakeholders.

Among other things, the SRWP requires that development of the SNMP include the following element (SRWP Section 6.b.3 (a)): "A basin/sub-basin wide monitoring plan that includes an

[1] By convention, nitrate is expressed in terms of nitrate as nitrogen in the NIMS. "Nitrate," "nitrate," and "$NO_3$-N" all refer to nitrate as nitrogen, with a maximum contaminant level (MCL) of 10 milligrams per liter (mg/L).

appropriate network of monitoring locations. The scale of the basin/sub-basin monitoring plan is dependent upon the site-specific conditions and shall be adequate to provide a reasonable, cost-effective means of determining whether the concentrations of salt, nutrients, and other constituents of concern as identified in the salt and nutrient plans are consistent with applicable water quality objectives." Furthermore, "Salts, nutrients, and the constituents identified in paragraph 6(b)(1)(f) shall be monitored. The frequency of monitoring shall be determined in the salt/nutrient management plan and approved by the Regional Water Board pursuant to paragraph 6(b)(2)." The SAMP report (CDM Smith, 2016) describes the CV-SALTS Surveillance and Monitoring Program (SAMP), which was developed to meet the monitoring requirements of the SRWP.

CV-SALTS is currently developing a groundwater management zone policy and any management zones delineated in the future could be linked with the SAMP. The SAMP domain is the Central Valley as a whole, but local monitoring programs associated with individual WDRs or the execution of Management Zone Implementation Plans established for newly defined management zones could be linked with the SAMP. In addition, the SAMP monitoring network may be adapted as information is collected; changes to the network will not require a Basin Plan amendment, but can be accomplished under the signature authority of the Central Valley Water Board Executive Officer.

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 (GSAs). 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 management zone – agency(ies), joint powers authority, or coalition(s) or other entities – can implement the SAMP at that scale and report back to the Central Valley Water Board. Data generated by SAMP entities will ultimately be uploaded to the GeoTracker GAMA Database.

## Proposed Tasks, Budget and Schedule for the SAMP Implementation

Implementation of the SAMP will require completion of a number of tasks – both to start-up and implement the program. **Table 1** summarizes the tasks that could be included in this phase and provides an estimate of the ranges of concept-level costs associated with these activities, depending on the actual scope of work and level of effort. These costs are purposely conservative to take into account the range of services and expertise needed and assume an average consultant billing rate of $200/hour. It is also assumed that consultants would complete the work in collaboration with stakeholders. The difference between the range of costs is best professional judgment and ranges between a 50% to 100% difference.

**Figure 1** provides the anticipated costs (annual and cumulative) against a 10-year schedule assuming a potential alignment of tasks (based on an assumed order/priority). **Figure 2** provides

the same information but in a Gantt Chart format to better illustrate the alignment of tasks. These two figures generally relied on an average between the low and high cost estimates.

To provide this level of planning, a contingency should be included in the costs, which would likely bring the costs toward the higher end of the estimate. Therefore, it would be appropriate to budget project cost needs between $2.7M and $5.0M for the initial 10-years of the SAMP program. With the addition of administration and contracting costs, it is likely the total is between $300K to $550K per year.

**Table 1. SAMP Implementation: Proposed Tasks**

| Task | Description | Range of Costs | Level of Effort (days) |
|---|---|---|---|
| 1 | **Field Verification of Wells.** In this task, the stakeholders implementing the SAMP for each groundwater basin, subbasin or management zone will work with local agencies to verify that the wells selected in the SAMP process exist and are the most appropriate wells to include in the SAMP, based on local hydrogeological and water quality knowledge**.** Wells that are locally-verified will fall into one of three categories.<br><br>1. Wells that are routinely sampled and reported.<br>2. Wells that are sampled, but that are not reported.<br>3. Wells that are in the CV-SALTS database, and hence were sampled at least once during the study period (2003 to 2014), but are not routinely sampled.<br><br>**Category 1**. For wells in Category 1, database queries will be designed to extract the requisite data from the centralized database (GeoTracker GAMA or equivalent). These data will undergo data quality assurance/quality control (QA/QC) protocols for evaluating data quality prior to the uploading of data to the SAMP database, in order to ensure that only data of sufficient quality are used in the statistical analyses.<br><br>**Category 2**. A determination of the appropriate stakeholder will need to be made concerning Category 2 wells – wells that are sampled, but not reported. Once identified, the stakeholder sampling the Category 2 well can either initiate the upload and incorporation of this well into GeoTracker GAMA, or they can report the data to the SAMP database. The data exchange will utilize an electronic data deliverable (EDD) request form for each of the identified Category 2 data sources. These data will be QA/QC'd using the same protocols as Category 1 wells.<br><br>**Category 3**. Category 3 wells are not currently routinely monitored. An assumption is made that 50 percent of these wells will need to be physically verified in the field. Category 3 wells will require the following steps: a. A SAMP Sampling and Analysis Plan, Quality Assurance Plan and Health and Safety Plan will be developed. b. The well owner will be contacted and written permission will be obtained to sample the well every five years, at a minimum. c. An agent representing CV-SALTS will collect the samples from the well(s) per the Sampling and Analysis Plan and Quality Assurance Plan. d. The samples will be analyzed by a laboratory certified through the State Water Board's Environmental Laboratory Accreditation Program (ELAP). e. The laboratory will generate a SAMP-specific EDD, which will be submitted to GeoTracker GAMA as the data are generated. | $197K – $394K | 112 – 224 |
| 2 | **Sampling and Analysis Plan**. A Sampling and Analysis Plan (SAP) will be developed according to guidance documents, for example from EPA Region 9[2]. The SAP will include sections that describe the background, data quality objectives, sampling rationale, request for analyses, field methods and procedures, sample containers, preservatives, packaging, investigation-derived waste, sample documentation, chain-of-custody, and shipment | $53K – $106K | 30 - 60 |

[2] https://www.epa.gov/quality/sampling-and-analysis-plan-guidance-and-template-v4-general-projects-042014

**Table 1. SAMP Implementation: Proposed Tasks**

| Task | Description | Range of Costs | Level of Effort (days) |
|---|---|---|---|
| **3** | **Quality Assurance Plan**. The Quality Assurance Program (QAP) includes data quality objectives, criteria for measurement data, documentation and records, certification and training, sample handling and chain-of-custody, quality control, instrument/equipment testing, inspection, and maintenance requirements, assessment and oversight, and data validation and usability. | $70K – $141K | 40 - 80 |
| **4** | **Health and Safety Plan.** The Health and Safety Plan (HASP) will include a description of the known hazards and evaluations of the risks associated with program, a list of key personnel and alternates responsible for site safety, response operations, and protection of public health, description of levels of protection to be worn by personnel in work area, establishment of procedures to control site access, description of decontamination procedures for personnel and equipment, establishment of site emergency procedures, prevention of heat stress, slip trip and fall hazards, and driving safely. | $53K – $106K | 30 - 60 |
| **5** | **Sampling and Analysis.** Per the SAP and QAPP, samples will be collected and analyzed at an ELAP-certified laboratory. | $614K – $856K | 276 - 138 |
| **6** | **Report Data to the State Database**. Data from Category 2 and 3 above will report data to the state's GeoTracker GAMA relational database, using already developed upload templates. | $70K – $141K | 40 – 80 |
| **7** | **Query Data from the State Database.** The consultant retained by CV-SALTS for Task 8 will download the requisite data from the GeoTracker GAMA relational database. The SAMP database will be hosted on the Central Valley Water Board servers. Recall that the source groundwater quality database, GeoTracker GAMA or equivalent, will be hosted by the State Water Board (independent of the SAMP. GeoTracker GAMA has its own protocols for internal data security, and robust data backup. The intent is to query GeoTracker GAMA periodically to perform the ambient water quality/assimilative capacity recalculations, hence, an incremental backup system is not warranted. Likewise, the SAMP database will be used by the Central Valley Water Board staff and the consultant performing the recalculation of AWQ on a periodic basis, so the database can be disconnected from the Internet. A copy of the SAMP database will be archived so that the raw data used for the ambient water quality recalculation for each period is preserved | $118K – $135K | 10 - 20 |
| **8** | **Ambient Water Quality, Assimilative Capacity Determination, and Trend Analysis.** A consultant will be retained by CV-SALTS every five years to used utilize groundwater elevation and water quality data to assess the volume-weighted average concentrations of TDS and nitrate in each groundwater basin, subbasin or management zone; this is the ambient water quality. Assimilative capacity is the difference between the groundwater basin water quality objective and the current ambient water quality. The final work product will be a report that includes the requisite maps and tables delineating the area of interest and depicting the ambient water quality and assimilative capacity. | $1.5M – $3.1M | 880 - 1760 |
| | **Totals** | **$2.7M – $5.0M** | **1280 – 2560** |

**Figure 1. Concept Level Tasks and Costs for Phase 1 – Salinity Prioritization and Optimization Study: Schedule and Expected Task Expenditures**

| Tasks | | Task Cost | Year of the Prioritization and Optimization Plan | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Task 1 | Field Verification of Wells | $295,680 | $295,680 | | | | | | | | | |
| Task 2 | Sampling and Analysis Plan | $79,200 | $79,200 | | | | | | | | | |
| Task 3 | Quality Assurance Plan | $105,600 | $105,600 | | | | | | | | | |
| Task 4 | Health and Safety Plan | $79,200 | $79,200 | | | | | | | | | |
| Task 5 | Sampling and Analysis | $975,270 | | $243,818 | $243,818 | | | | $243,818 | $243,818 | | |
| Task 6 | Report Data to the State Database | $105,600 | | $26,400 | $26,400 | | | | $26,400 | $26,400 | | |
| Task 7 | Query Data from the State Database | $126,400 | | | $63,200 | | | | | $63,200 | | |
| Task 8 | Ambient Water Quality, Assimilative Capacity | $2,323,200 | | | | $580,800 | $580,800 | | | | $580,800 | $580,800 |
| | | | | | | | | | | | | |
| | **Annual Costs** | **$4,090,150** | **$559,680** | **$270,218** | **$333,418** | **$580,800** | **$580,800** | **$0** | **$270,218** | **$333,418** | **$580,800** | **$580,800** |
| | **Cumulative Costs** | **$4,090,150** | **$559,680** | **$829,898** | **$1,163,315** | **$1,744,115** | **$2,324,915** | **$2,324,915** | **$2,595,133** | **$2,928,550** | **$3,509,350** | **$4,090,150** |

**Figure 2. Concept Level Tasks and Costs for Phase 1 – Salinity Prioritization and Optimization Study: Schedule and Expected Task Expenditures (Gantt Chart Format)**

| Tasks | | Task Cost | Year of the Prioritization and Optimization Plan | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Task 1 | Field Verification of Wells | $295,680 | | | | | | | | | | |
| Task 2 | Sampling and Analysis Plan | $79,200 | | | | | | | | | | |
| Task 3 | Quality Assurance Plan | $105,600 | | | | | | | | | | |
| Task 4 | Health and Safety Plan | $79,200 | | | | | | | | | | |
| Task 5 | Sampling and Analysis | $975,270 | | | | | | | | | | |
| Task 6 | Report Data to the State Database | $105,600 | | | | | | | | | | |
| Task 7 | Query Data from the State Database | $126,400 | | | | | | | | | | |
| Task 8 | Ambient Water Quality, Assimilative Capacity | $2,323,200 | | | | | | | | | | |
| | | | | | | | | | | | | |
| | **Annual Costs** | **$4,090,150** | **$559,680** | **$270,218** | **$396,618** | **$580,800** | **$580,800** | **$0** | **$270,218** | **$270,218** | **$580,800** | **$580,800** |
| | **Cumulative Costs** | **$4,090,150** | **$559,680** | **$829,898** | **$1,226,515** | **$1,807,315** | **$2,388,115** | **$2,388,115** | **$2,658,333** | **$2,928,550** | **$3,509,350** | **$4,090,150** |