

Initial Phase of the Conceptual Model - Scope of Work

Task 1 – Management and Coordination Activities

Scope Elements: Ensure close coordination with the CV-SALTS management structure and technical projects through completion of the following tasks:

- 1.1 Coordination meetings with the CV-SALTS management structure, in particular:
 - Periodic meetings with the Technical Committee
 - Periodic meetings with the Technical Program Manager and/or Executive Director
 - Periodic presentations to Executive Committee
- 1.2 Participate in development of a GIS/Database Management Policy. The Technical Committee will direct the development of policies and procedures (e.g., how to address data updates, shape file updates, QA/QC issues, etc.) for long term management of the CV-SALTS GIS/Database Platform developed under a separate CV-SALTS contract. The contractor will participate in discussions related to the development of these policies and procedures on an as needed basis.
- 1.3 As needed, coordinate with or provide support/information to other CV-SALTS-related technical projects or analyses, including, but not limited to geodatabase development and database management activities, Strategic Salt Accumulation Land Transport Study (SSALTS), archetype/prototype projects, beneficial use studies, or Lower San Joaquin River study activities.
- 1.4 Maintain relevant project documents, files and data that may become part of the administrative record for a Basin Plan Amendment in an appropriate accessible format and location.
- 1.5 Provide monthly written progress reports to document project progress on a task-by-task basis. Each report will include information on (a) work completed during the month completed, (b) work planned for the next month, and (c) any project concerns that may affect the project scope of work, deliverable schedule, or project budget.

Task 2 – Workplan Development

Scope Elements: Develop detailed Workplan (including schedule and budget) that describes the approach that will be used to develop the Initial Phase of the Conceptual Model (IPCM), as required to complete Tasks 3 through 8 below. This effort will include, at a minimum, procedures for coordinating with CV-SALTS management, new data sources to be developed or used to populate the Conceptual Model, approach for coordinating with other CV-SALTS technical activities that relate to the development of the model, addressing data gaps, data analysis methods, preparation of task deliverables and technical approach to assessment and prioritization tasks. The outcome of Task 2 is an approved Workplan and authorization to implement the remainder of this Scope of Work (Tasks 3 through 8).

Task 3 – Data Development

Scope Elements: Complete all necessary data compilation and development activities associated with the establishment of the IPCM. This effort includes the following key subtasks (Questions 11, 19):

- 3.1 Review ongoing CV-SALTS geodatabase and mapping activities to ensure that development of the IPCM is consistent with the existing GIS/Database Platform.

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- 3.2 Identify all relevant data sources or types to complete this Scope of Work. To the extent these data have not already been gathered or compiled as part of other CV-SALTS technical activities, including Phase I BUOS or subsequent efforts, gather and compile these data for the purposes of this project. At a minimum, this effort shall include, or evaluate for inclusion, the following data sources or types (consult CV-SALTS Conceptual Model Summary Description for additional information):
- Central Valley Hydrologic Model (CVHM) geodatabase
 - Land use-based estimation of primary salt sources, e.g., Department of Water Resource (DWR) data
 - Existing region-wide databases or data sources, including, but not limited to:
 - Drinking Water Policy Technical Working Group
 - DWR applied water data for irrigated agriculture
 - SBX2 1 Nitrate Project data
 - CV-SALTS Pilot Study data sources
 - Dairy General Order representative groundwater monitoring data
 - Resources to validate salt and nitrate source data (see CV-SALTS Conceptual Model Summary Description for additional information for minimum data list to consider)
- 3.3 For newly compiled data that will be incorporated into the IPCM, create a data source record that provides the metadata associated with each data source.
- 3.4 Perform data QA/QC activities, as needed, and verify that compiled data are in usable formats. If any data conversions are necessary, these conversions shall be documented.
- 3.5 Where data gaps exist or information is lacking that may impact implementation of subsequent tasks and to the extent possible, identify representative default values that may be used in their place and prepare a justification for their use. Where default values cannot be developed using existing data, prepare recommendations to address the data gaps. Recommendations may include development of new data (with information regarding scope, budget and schedule provided), implementation of work-around solutions that address the data need through alternative means, or identification of data surrogates that address the data need.
- 3.6 Per the outcome of Task 3.5, complete any new data development activities as directed by the Technical Committee.
- 3.7 Prepare data availability summary for each Management Zone based on the outcome of Task 4. This data summary should summarize the appropriate uses and limitations associated with the available data (Note: this task would be completed following identification of Management Zones).

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Task 4 – Establish Groundwater Management Zones

Scope Elements: Delineate and recommend for approval Management Zones that provide the basis for the IPCM and subsequent analyses. This element includes the following key subtasks:

- 4.1 Considering Salt and Nitrate Management Plan requirements, CV-SALTS policy discussions, and management zone database information developed under the GIS/Database Development Project, develop alternatives for the establishment of groundwater Management Zones that consider the following: (a) existing Basin Plan groundwater basins; (b) information developed for the Groundwater Ambient Monitoring and Assessment (GAMA) Program; (c) public and private water management district boundaries; or (d) other potential sources of information that may be used as a basis for delineating Management Zones that serve the purposes of CV-SALTS.
- 4.2 Evaluate the alternatives prepared in Task 4.1 to develop pros and cons of different Management Zone constructs, including, but not limited to, (a) data availability; (b) efficacy of salt or nitrate management analyses or decisions in relation to size of the proposed zones; (c) opportunities to subdivide further Management Zone areas in the future to prepare more regionalized salt and nitrate management plans; and (d) regulatory and political implications, if any, of potential Management Zone boundaries.
- 4.3 Based on the findings from Tasks 4.1 and 4.2, prepare a recommended preferred alternative for delineation of Management Zones for approval by the Technical Committee.

Task 5 – Establishment of Methods for Salt and Nitrate Water Quality Analyses

Scope Elements: The primary outcome of this task will be the selection of methods to answer data analysis questions at the different geographic scales associated with work activities under Tasks 6 and 7. The emphasis on methods development is on how to use and analyze groundwater data and estimate interaction between surface water and groundwater. Where it is necessary to analyze surface water quality data, it is assumed for this task that any methods associated with the analysis and interpretation of surface water quality data will be consistent with methods already in use by the state to assess water quality for the purposes of implementing Section 303(d) of the Clean Water Act. The actual use of any methods developed under this task for subsequent analyses in Tasks 6 and 7 will not occur without prior Technical Committee approval of the methods. This task includes the following key subtasks:

- 5.1 Develop for Technical Committee approval water quality analysis methods for estimating ambient salt and nitrate groundwater quality that considers hydrogeology and, at a minimum, the following data characteristics:
 - Frequency of data collection, e.g., consideration of how often samples have been collected within the area and how this variability may affect data interpretation
 - Location of where water quality sample data have been collected within delineated Management Zones, e.g., highly localized, generally random, or skewed towards particular portions of the delineated zones
 - Extent to which the available water quality data vary laterally and vertically

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- Age of the data (i.e., how recently collected) and their use in estimating ambient water quality
 - Source of the data and the field and laboratories methods used to collect and analyze the data
- 5.2 In association with the development of water quality analysis methods and considering the data characteristics described in Task 5.1, prepare a matrix that provides recommendations regarding the use of data for varying purposes or decisions (e.g., management level vs. permit level) given the existing variability at different spatial and temporal scales.
- 5.3 Using the Management Zones delineated in Task 4, develop methods for calculating salt and nitrate balances for surface water and groundwater. Prepare potential methods and example calculations and document the pros and cons associated with the different methods use in salt and nitrate management decision-making. Prepare a recommended preferred method for approval by the Technical Committee (Question 20).

Task 6 – Complete High Level Salt and Nitrate Analyses for the Central Valley

Scope Elements: The purpose of this Task is to complete high level analyses of salt and nitrate conditions throughout the Central Valley to answer basic questions developed by the Technical Committee. This effort includes three parts: (a) analysis of fate and transport; (b) Management Zone-specific analyses; and (c) assessment and prioritization of Central Valley Management Zones based on the outcome of previous analyses.

6.1 Salt and Nitrate Source and Transport

Considering variation associated with different hydrologic conditions (e.g., dry, average, wet), the project team will prepare an analysis that addresses the following areas:

- 6.1.1 Establish the water, salt, and nitrate transport pattern within the Central Valley and determine the rates of transport (Question 8).
- 6.1.2 Identify the major sources of water, salt, and nitrate in the Central Valley and determine where and at what rate they enter the Central Valley (Question 9).
- 6.1.3 Determine where, how, and at what rate water, salt, and nitrate leave the Central Valley (Question 10).

6.2 Management Zone-specific Salt and Nitrate Analyses

Based on the delineation of Management Zones under Task 4 and considering (1) variation associated with different hydrologic conditions (e.g., dry, average, wet), and (2) conditions associated with surface water and vadose zone, shallow and deep groundwater, the project team will prepare an analysis that addresses the following:

- 6.2.1 Identify which Management Zones are achieving water, salt, and nitrate balance (Question 1).

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- 6.2.2 Identify which Management Zones are accumulating water, salt, and nitrate, and determine the rates of accumulation (Question 4).
- 6.2.3 Identify which Management Zones are depleting water, salt, and nitrate, and determine where the water, salt, and nitrate are going and at what rates (Question 6).
- 6.2.4 Determine the rate of change for concentrations of salt and nitrate in the groundwater and vadose zone (Question 18).

6.3 Preliminary Salt and Nitrate Assessment

Considering the information developed under Task 7 and in coordination with the (SSALT) Study, complete the following activities:

- 6.3.1 Develop a preliminary salt and nitrate assessment for the Central Valley that identifies areas or hotspots with elevated salt and/or nitrate (regardless of the source of elevated constituents, e.g., natural or anthropogenic). Prior to preparation of the assessment, the assessment criteria will be developed in collaboration with the Technical Committee (Question 3).
- 6.3.2 Based on the outcome of Task 6.3.1, identify the primary drivers for the accumulation of salt or nitrate in identified areas or hotspots with elevated salt and/or nitrate (Question 12).
- 6.3.3 Based on the outcome of Tasks 6.3.1 and 6.3.2, prioritize the assessed areas to identify high priority areas for implementation of salt and/or nitrate management activities. Prior to implementing this activity, the project team will work collaboratively with the Technical Committee to develop prioritization criteria (Question 2).
- 6.3.4 Based on the outcome of Tasks 6.3.1, 6.3.2, and 6.3.3, evaluate whether some areas may require more regulatory oversight than others. For those identified areas, the project team shall provide the technical basis for the expectation that these areas may require increased oversight (Question 21).

Task 7 – Salt and Nitrate Analyses in Selected Subareas of the Central Valley

Scope Elements: Per the direction of the Executive Committee, the IPCM will include completion of salt and nitrate analyses in two preliminary subareas of the Central Valley: Merced/Stanslaus and Kings River areas. The purpose of this task is to develop prototype templates for the use of the data analysis methods developed under Task 5 to characterize salt and nitrate at a management level scale. The primary outcome of this task will be a characterization of water quality within the selected subareas, which provides a foundation for the future development of a Salt and Nitrate Management Plan for the Central Valley. This Task includes the following key subtasks:

- 7.1 For each subarea (Merced/Stanslaus and Kings River), delineate recommended geographical boundaries within which subsequent Task 7 subtasks will be completed.
- 7.2 Characterize each subarea, including, at a minimum, surface and groundwater hydrology, hydrogeology, land use, primary agricultural activities, location of POTWs, and municipal water sources (surface water intakes or wells).

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- 7.3 Identify the major sources of water, salt, and nitrate into and out of the selected subareas.
- 7.4 In general, identify zones within each subarea that have (a) high quality groundwater, i.e., salt and nitrate concentrations are relatively low; (b) low quality groundwater and serve as sinks for salt and or nitrate accumulation; and (c) moderate salt and nitrate concentrations generally between the identified high and low quality areas.
- 7.5 Establish the water, salt, and nitrate transport pattern within each subarea. Determine the rate of transport and, to the extent practicable, determine the degree to which the zones identified in Task 7.4 are stable or changing (getting larger or smaller).

Task 8 – Prepare Initial Phase Conceptual Model Report

Scope Elements: Prepare a report that (a) summarizes the relevant elements or findings from Tasks 3, 4, 5, 6, and 7; (b) provides recommended steps for continued development of the Conceptual Model in subsequent phases and how implementation of these next steps will support development of the Salt and Nitrate Management Plan; and (c) addresses the following issues:

- Assumptions used to develop the IPCM and data analysis methods
- How conservative nitrogen was assumed to be
- How CVHM was used to support calculation of loads
- Level of accuracy, completeness and confidence in the results
- Consistency with prior CV-SALTS pilot and source study work
- How results have been validated to date or still need to be validated by stakeholders impacted by the study findings

Note: Each of the IPCM tasks will have deliverables (to be developed) that will be reviewed by the Technical Committee. Some of the above Task 8 bullets may be addressed initially in those deliverables, rather than for the first time in the Task 8 Report. In addition, except where Technical Committee approval is required prior to implementation of a subsequent task, comments provided by the Technical Committee on draft deliverables will be addressed as part of the preparation of the Task 8 Report.