Section 1
Introduction

1.1 Problem Statement

California's Central Valley is one of the most productive agricultural regions in the world and is home to almost 20% of California's population (estimated at over 38 million in 2015). By 2030 the state population is expected to increase by more than 13% to over about 44 million people and by 2050 the population is expected to be close to 50 million people. This steady growth will put significant, increased demands on state and regional water resources (Central Valley Water Board 2010a).[1] Communities in the Central Valley rely on surface and groundwater for many beneficial uses, including agriculture and drinking water supplies. However, elevated salt and nitrate concentrations in portions of the Central Valley impair or threaten to impair the region's water and soil quality which, in turn, adversely affects agricultural productivity and/or drinking water supplies. An economic study completed in 2009, projected that if salt management did not change, direct economic costs would exceed $1.5-billion/year within the Central Valley by 2030 (Howitt et al. 2009).

Water imported from the Sacramento-San Joaquin Delta brings an average of 250 tons of salt a day into the San Joaquin Valley via the State and Federal water project canals. With limited or no outlet to the ocean, more salt is being imported into the San Joaquin Valley than is being exported; estimates are that approximately 2 million tons of salt accumulate in the San Joaquin Valley every year (Central Valley Water Board 2006). In addition, excessive nitrates are a significant issue for public health and safety in some areas and render drinking water supplies unusable. Numerous communities in the Central Valley have nitrate levels that exceed the maximum contamination level that is protective of drinking water (Central Valley Water Board 2010a). Accordingly, the Central Valley faces the following challenges for the long-term management of salt and nitrate:

- Highly managed hydrology resulting in greater imports than exports of salts in the Lower San Joaquin and Tulare Lake Basins;
- Increased use of groundwater in order to meet water demands;
- Nitrate impacted drinking water supplies;
- Increased salinity in groundwater;
- Limited economically feasible options for salt removal/export out of the Central Valley;
- A highly managed water supply system that impedes the natural removal of salts in the valley; and

[1] http://www.dof.ca.gov/research/demographic/reports/projections/P-1/

- Loss of agricultural productivity due to salinization of soils.

Given these significant challenges, the Central Valley faces a future where rising salt levels threaten to turn this productive basin into a region where the water is not fit to drink and land is not capable of growing crops. It will not happen tomorrow, or even next year, but salts are slowly and steadily impacting water and soil, which are vital to the regional economy.

1.2 Regional Water Quality Goals & Priorities

The salinity and nitrate problems in the Central Valley are complex and multi-faceted, and present a daunting challenge for the Central Valley Regional Water Quality Control Board (Central Valley Water Board or Board) to confront alone. To assist in the Board's long-term planning efforts, a broad group of agriculture, cities, industry, and regulatory agencies joined together in 2006 to form the Central Valley Salinity Alternatives for Long-Term Sustainability initiative (CV-SALTS). The CV-SALTS Executive Committee is a decision-making body with 30 voting members that represent diverse stakeholder groups, including agriculture, cities, industry, regulatory agencies, and community and environmental justice representatives. In addition, dischargers participating in CV-SALTS formed the non-profit Central Valley Salinity Coalition to manage and fund the effort, and have entered into a Memorandum of Agreement with the State Water Board and the Central Valley Water Board to formalize their commitment. Goals adopted by CV-SALTS include (www.cvsalinity.org):

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

CV-SALTS participants, including the Central Valley Water Board, have worked together to develop this Salt and Nitrate Management Plan (SNMP) to address salinity and nitrate concerns in the Central Valley Region in a comprehensive, consistent, and sustainable manner, both environmentally and economically. CV-SALTS participants are also committed to evaluating, promoting, and initiating options to provide safe drinking water to communities already impacted by salt and nitrates.

The Central Valley is comprised of three hydrologic regions and the Sacramento-San Joaquin Delta (**Figure 1-1**). Each of the three Regions faces its own salt and nitrate management challenges with the Delta serving as the distribution point to move water (and therefore salt) throughout the state and supply over 25-million people (LWA et al. 2013):

Figure 1-1. Central Valley Hydrologic Regions and Surrounding Geography

- Sacramento River Hydrologic Region – This northern part of the Central Valley has relatively few salt or nitrate impaired areas; however, the salt exported to the San Joaquin-Sacramento River Delta via the Sacramento River is distributed to the San Joaquin and Tulare Lake Basins as well as throughout the state by the State Water Project and/or the Central Valley Project (**Figure 1-2**).
- San Joaquin River Hydrologic Region – This region has extensive salt and nitrate impaired areas. Salt imports to the San Joaquin River Basin exceed the export capacity of the San Joaquin River, the Basin's sole outlet.
- Tulare Lake Hydrologic Region – This southern area has extensive salt and nitrate impaired areas. The Tulare Lake Basin is normally a closed basin and has no reliable outlet for salt imported into the basin.

Figure 1-2. Central Valley Surface Water Flows

The widely varying characteristics of these hydrologic regions pose challenges to the management of salt and nitrate in the Central Valley. The best approach or solution to minimize water quality impacts in one region may not be the best approach in another region. The CV-SALTS planning process has strived to develop an SNMP that considers this variability. In addition, this planning effort has focused on complying with State Water Board Resolution 2009-0011 (Recycled Water Policy, as amended by State Water Board Resolution 2013-0003).

The purpose of the Recycled Water Policy is to increase the use of recycled water from municipal wastewater sources in a manner that implements state and federal water quality laws. Policy implementation is intended to encourage the use of recycled water, stormwater, water conservation, conjunctive use of surface and groundwater, and improve the use of local water supplies. Within the Recycled Water Policy is a requirement for the development of salt and nutrient management plans for each groundwater basin in California. Specifically:[2]

> *"It is the intent of this Policy that salts and nutrients from all sources be managed on a basin-wide or watershed-wide basis in a manner that ensures attainment of water quality objectives and protection of beneficial uses. The State Water Board finds that the appropriate way to address salt and nutrient issues is through the development of regional or sub-regional salt and nutrient management plans rather than through imposing requirements solely on individual recycled water projects."*

In order to achieve the goals established by CV-SALTS for the Central Valley, this SNMP must not only address the requirements of the Recycled Water Policy but also address legacy and ongoing salt and nitrate accumulation concerns. To address these concerns, implementation of this SNMP is built on achieving the following prioritized Central Valley Region management goals for salt and nitrate:

- Goal 1: Ensure a Safe Drinking Water Supply
- Goal 2: Achieve Balanced Salt and Nitrate Loadings
- Goal 3: Implement Managed Aquifer Restoration Program

These management goals recognize the need to focus limited resources first on health risks associated with unsafe drinking water. Subsequent but important goals that will require longer implementation timelines include balancing salt and nitrate loading and restoring water quality where reasonable and feasible. Activities leading to salt and nitrate balance to minimize degradation are currently being implemented through existing programs (e.g., nutrient management plans, improved irrigation practices, real-time management of discharges, pilot studies, etc.) and these efforts are anticipated to continue and improve throughout SNMP implementation. Water quality restoration, particularly for impacted groundwater basins, will be a time and resource intensive effort for which the SNMP provides a framework for implementation where reasonable and feasible with milestones and timelines.

[2] State Water Resources Control Board Resolution No. 2009-0011; amended by Resolution No. 2013-0003, Section 6.a.(2).

1.3 Other Regulatory Requirements

In addition to ensuring compliance with the Recycled Water Policy, the SNMP was developed and will be implemented in a manner that is consistent with other existing State Water Resources Control Board (State Water Board) policies including but not limited to:

- ***Sources of Drinking Water Policy*** (State Water Board Resolution 88-63)

  The Sources of Drinking Water Policy establishes a policy that all waters are considered suitable or potentially suitable to support the Municipal and Domestic Water Supply (MUN) beneficial use, with certain exceptions. The Basin Plans implement this policy by generally assigning the MUN beneficial use to all surface and ground waters in the Central Valley unless those waters have already been identified as not supporting the MUN use in the Basin Plans. Under existing regulations, exemptions to the MUN beneficial use can only be made in the Basin Plans themselves.

- ***Statement of Policy with Respect to Maintaining High Quality of Waters in California*** (State Antidegradation Policy, State Water Board Resolution 68-16)

  The State Antidegradation Policy applies to both surface and ground waters. This policy generally prohibits the Central Valley Water Board from authorizing discharges that will degrade "high-quality waters," unless the Board first finds that the degradation is consistent with the maximum benefit to people of the state, that the discharge will be controlled through the use of "best practicable treatment or control" methodologies, and that the discharge will not unreasonably affect present and potential beneficial uses.

1.4 Salt and Nitrate Management Plan Development

The Recycled Water Policy establishes the minimum requirements for the development of an SNMP for the Central Valley Region (**Figure 1-3**). CV-SALTS, through its stakeholder and technical processes, developed the data and information needed to support development of the Central Valley SNMP, including:

- Nitrate and salinity-related studies that provide the foundation for the development of nitrate and salinity management strategies for inclusion in the SNMP; and

- Recommended new policies, regulatory tools and clarifications to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins (SRSJR Basin Plan) and the Water Quality Control Plan for the Tulare Lake Basin (TLB Basin Plan) ("Basin Plans") to facilitate implementation of this SNMP.

To facilitate potential Basin Plan amendments to incorporate recommendations included in this SNMP, four California Environmental Quality Act (CEQA) scoping sessions were held in October 2013 in Fresno, Modesto, Colusa and Rancho Cordova, California. These scoping sessions identified likely alternatives under consideration by CV-SALTS for the long-term management of salt and nitrate in the Central Valley. Potential alternatives were identified for consideration during the CV-SALTS process.

Combined, the development of the SNMP and the proposed, corresponding Basin Plan amendments will establish a revised regulatory framework and provide the flexibility necessary to make salt and nitrate management decisions at the appropriate temporal, geographic and/or management scales.[3]

The SNMP will be reviewed and revised as needed to support state and regional policies, regulations, and/or new technical information developed during SNMP implementation.

Figure 1-3. Recycled Water Policy - SNMP Content Requirements

- Section 6.b(3)(a) - A basin/sub-basin wide monitoring plan that includes an appropriate network of monitoring locations - adequate to provide a reasonable, cost-effective means of determining whether the concentrations of salt, nutrients, and other constituents of concern are consistent with applicable water quality objectives. Salts, nutrients, and other constituents of concern shall be monitored as follows:
  - (i) The monitoring plan must be designed to determine water quality in the basin, and must focus on basin water quality near water supply wells and areas proximate to large water recycling projects, particularly groundwater recharge projects. Also, monitoring locations shall, where appropriate, target groundwater and surface waters where groundwater has connectivity with adjacent surface waters.
  - (ii) The preferred approach to monitoring plan development is to collect samples from existing wells if feasible as long as the existing wells are located appropriately to determine water quality throughout the most critical areas of the basin.
  - (iii) The monitoring plan shall identify those stakeholders responsible for conducting, compiling, and reporting the monitoring data. The data shall be reported to the Regional Water Board at least every three years.
- Section 6.b(3)(b) A provision for annual monitoring of Constituents of Emerging Concern (e.g., endocrine disrupters, personal care products or pharmaceuticals) (CECs) consistent with recommendations by CDPH [California Department of Public Health] and consistent with any actions by the State Water Board taken pursuant to paragraph 10(b) of this policy [the Drinking Water Policy].
- Section 6.b(3)(c) Water recycling and stormwater recharge/use goals and objectives.
- Section 6.b(3)(d) Salt and nutrient source identification, basin/sub-basin assimilative capacity and loading estimates, together with fate and transport of salts and nutrients.
- Section 6.b(3)(e) Implementation measures to manage salt and nutrient loading in the basin on a sustainable basis.
- Section 6.b(3)(f) An antidegradation analysis demonstrating that the projects included within the plan will, collectively, satisfy the requirements of Resolution No. 68-16.

1.5 SNMP Roadmap

This SNMP is presented in two parts: (1) primary sections that provide information regarding salt and nitrate conditions in the Central Valley Region and the salt and nitrate management strategy to achieve the salt and nitrate goals moving forward; and (2) supporting attachments that

[3] CV-SALTS Strategy and Framework http://www.cvsalinity.org/index.php/docs/committee-document/executive-committee-docs/1411-cv-salts-program-work-plan-v-8-approved-3912pdf/file.html

provide additional information and background to support the primary sections. Following is a summary of the purpose and content of each key part of this SNMP:

- ***Section 2*** – Description of the characteristics of the Central Valley Region.
- ***Section 3*** –Overview of salt and nitrate water quality in surface waters and detailed salt and nitrate water quality conditions in groundwater basins/subbasins, including conditions today, expected conditions in the future and available assimilative capacity.
- ***Section 4*** - Establishes the Central Valley salt and nitrate management strategy, which includes (a) requirements for the management of salt and nitrate throughout the Central Valley Region; (b) a discussion of the recommended clarifications, policies and new regulatory tools (or strategies) to facilitate SNMP implementation; and (c) an overview of the technical foundation for the recommendations in the SNMP.
- ***Section 5***—Recommended Monitoring and Surveillance Plan (in development)
- ***Section 6*** – References sections with links to documents, where available.

The above sections are supported by the following attachments:

- ***Attachment A, Supporting Documents for Recommended Clarifications, Policies and New Regulatory Tools*** – This attachment includes policy and strategy documents developed by CV-SALTS to provide the basis for recommended changes to the Basin Plans to facilitate implementation of the SNMP. Relevant information in these documents has been incorporated into Section 4, Central Valley SNMP.
- ***Attachment B, Regulatory and Technical Supporting Documentation*** –This attachment summarizes the regulatory evaluations and technical studies completed to support the Central Valley SNMP. Information is provided as a brief summary of the content of the document with a link to the report at www.cvsalinity.org.
- ***Attachment C, Other Supporting Information –*** This attachment includes additional SNMP supporting information, including the Substitute Environmental Document, Antidegradation Analysis and Economic Analysis.