

# SNMP Executive Summary

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## ES.1 Background and Purpose

### ES.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 2010).<sup>1</sup> 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 2010). 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
- Loss of agricultural productivity due to salinization of soils.

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<sup>1</sup> <http://www.dof.ca.gov/research/demographic/reports/projections/P-1/>

## ES.1.2 Central Valley Salinity Alternatives for Long-Term Sustainability initiative

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 (CVSC) 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](http://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 was tasked with developing a Salt and Nitrate Management Plan (SNMP)<sup>2</sup> for the entirety of the Central Valley Regional Water Quality Control Board's (Central Valley Water Board's) jurisdictional area (also referred to as "Central Valley" or "Region 5")<sup>3</sup> (**Figure ES-1**). Although broader in overall scope, the SNMP was also developed to meet requirements set forth in the State Recycled Water Policy,<sup>4</sup> adopted in 2009 by the State Water Resources Control Board (State Water Board). The Recycled Water Policy provides statewide direction regarding the appropriate criteria to be used when issuing permits for recycled water projects. In addition, the Recycled Water Policy articulates the State Water Board's policy that every groundwater basin/subbasin in California needs to have a consistent salt/nutrient management plan (i.e., SNMP). To ensure that such plans were developed in a timely manner, the Recycled Water Policy establishes criteria and timelines for their development.

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<sup>2</sup> Since salt and nitrate are of critical concern in Central Valley groundwater, the SNMP does not address constituents of emerging concern (CECs) or nutrients other than nitrate.

<sup>3</sup> The Central Valley Regional Water Quality Control Board is a state agency, organized under the Porter Cologne Water Quality Control Act at Water Code section 13200(g). The water code defines the Central Valley's jurisdictional area as "all basins, including Goose Lake Basin draining into the Sacramento River and San Joaquin Rivers to the easterly boundary of the San Francisco Bay region near Collinsville."

<sup>4</sup> State Water Resources Control Board Resolution No. 2009-0011, amended by Resolution No. 2013-0003 [http://www.waterboards.ca.gov/board\\_decisions/adopted\\_orders/resolutions/2013/rs2013\\_0003\\_a.pdf](http://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2013/rs2013_0003_a.pdf)

### ES.1.3 Salt and Nitrate Management Goals and Priorities

To achieve desired outcomes for the management of salt and nitrate within the Central Valley, this Central Valley SNMP addresses both the requirements of the Recycled Water Policy and legacy and ongoing salt and nitrate accumulation issues. The Central Valley SNMP is designed to address both salt and nitrate concerns in surface and groundwaters; however, the primary focus of early actions (first ten years) is on groundwater quality and in particular nitrate impacts to



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

drinking water supplies. Ultimately, the Central Valley SNMP is built on the following management goals and priorities:

### **Goal 1: Ensure a Safe Drinking Water Supply**

The most important management goal for the Central Valley Region is to ensure that a safe, reliable drinking water supply is available to all residents of the region. This goal addresses the findings of the state legislature approved Assembly Bill 685, which amended the California Water Code to declare that, "...every human being has the right to safe, clean, affordable and accessible water adequate for human consumption, cooking and sanitary purposes."<sup>5</sup> Access to safe drinking water is especially critical in parts of the Central Valley where several independent studies have reported that nitrate concentrations exceed the established maximum contaminant level (MCL) at numerous well locations throughout the Central Valley (see e.g., Harter et al. 2012; State Water Board 2013). The need to ensure a safe, reliable drinking water supply is the highest priority for the management of nitrate under this SNMP and shall be implemented as quickly as possible in all areas in the Central Valley Region.

### **Goal 2: Achieve Balanced Salt and Nitrate Loadings**

Goal 2 seeks to establish a balance of the mass of salt and nitrate in groundwater underlying each permitted or managed area, where reasonable and feasible. With regards to salt, balance is defined as achieving a state where inputs of salt (salt flux in) into a managed area are equal to outputs (salt flux out) from the same area. Similarly, nitrate balance means a balance of nitrate flux in and nitrate flux out of the permitted managed area. The nitrate mass balance will need to account for nitrate taken up by crops and losses of nitrate from the nitrogen cycle in soil, including denitrification in the root zone by soil microbial activity and volatilization to the atmosphere.

### **Goal 3: Implement Managed Aquifer Restoration Program**

This goal seeks, where reasonable and feasible, to restore salt and nitrate levels within groundwater basins and subbasins or locally managed areas to concentrations that comply with the applicable water quality objectives established for each constituent. As demonstrated in the technical work used to support the Central Valley SNMP, the challenge associated with simply achieving applicable salt and nitrate objectives in already impacted waters is significant. Accordingly, SNMP implementation not only focuses on restoring the beneficial use where reasonable and feasible, but also seeks to minimize or prevent further degradation of ground waters that are currently meeting water quality objectives to avoid future impairment.

CV-SALTS participants, including the Central Valley Water Board, have worked together to develop this 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. To this end, this Central Valley SNMP builds on a range of water quality management policies and implementation programs already in existence, proposes additional policies and tools needed to provide the

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<sup>5</sup> Assembly Bill No. 685 added §106.3 to the California Water Code. Signed by Gov. Brown on September 25, 2012.



Central Valley Water Board with flexibility in addressing legacy and ongoing loading of salt and nitrate in the diverse region, and presents a comprehensive regulatory and programmatic approach for the sustainable management of salt and nitrate.

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.<sup>6</sup> 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.

## ES.2 Central Valley Region

The SNMP applies to all water bodies (surface water and groundwater) within the Central Valley Region. This region encompasses about 60,000 square miles or almost 40% of the land in the State of California and stretches about 500 miles from the Oregon border to near the Kern County/Los Angeles County line. It is approximately 125 miles wide, bounded by the Sierra Nevada Mountains on the east and the Coast Range on the west. The Central Valley Floor is approximately 40-60 miles wide, 450 miles long, and is bounded by the Cascade and Trinity Mountains to the north, the Sierra Nevada mountain range to the east, the Tehachapi Mountains to the south, and the Coastal mountain ranges and San Francisco Bay to the west.

### ES.2.1 Hydrologic Regions

Four distinct hydrologic regions comprise the Central Valley Region (see Figure ES-1):

Sacramento River Hydrologic Region – This region is approximately 27,200 square miles and covers the majority of northern California (DWR 2013a). The area is located between the Sierra Nevada and Cascade Range in the east, and the Coast Range and Klamath Mountains in the west. The southern boundary roughly follows U.S. Highway 50 to the City of Sacramento where the American River meets the Sacramento River, and the northern portion extends into the southern portion of Oregon. From its source waters in the Cascade Range, the Sacramento River flows 400 miles south to meet the San Joaquin River, forming the Sacramento-San Joaquin Delta before exiting west to the Pacific Ocean. The main tributary rivers of the Sacramento River include the Pit, Feather, Yuba, Bear and American Rivers to the east; and Cottonwood, Stony, Cache and Putah Creeks to the west. 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.

San Joaquin River Hydrologic Region – This region is approximately 15,200 square miles and is located between the Sacramento River Hydrologic Region to the north, and the Tulare Lake Hydrologic Region to the south (DWR 2013b). The watershed is bordered on the east by the Sierra Nevada and on the west by the Coast Range mountains. The San

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<sup>6</sup> 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>

Joaquin River begins in the high Sierra Nevada and historically flowed approximately 100 miles to the west then turned north flowing for 260 miles where it joined the Sacramento River to form the Delta. By 1951 and the completion of the Central Valley project, San Joaquin River flows were captured at Friant Dam and diverted south into the Tulare Lake Basin. The portion of the river between Friant Dam and Sack Dam (approximately 85 miles) routinely dries out during much of the year. Continuous flows return for the final 60-miles of river, from Lander Avenue to the Delta and are comprised of ephemeral flows from the Coast Range, fresh water flows from the Sierra Nevada, and agricultural drainage. Main tributary rivers of the San Joaquin River include the Cosumnes, Mokelumne, Calaveras, Stanislaus, Tuolumne, and Merced to the east and during rare flood years, the Chowchilla, and Fresno Rivers to the southeast. 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 region is approximately 17,000 square miles and is located to the south of the San Joaquin River Hydrologic Region and is bordered on the east by the Sierra Nevada, on the south by the Tehachapi Range and on the west by the Coast Range (DWR 2013c). Surface water from the Tulare Lake Hydrologic Region only drains north into the San Joaquin River in years of extreme rainfall. In contrast, rivers that drain the Tulare Hydrologic Region do not flow out of the watershed in most years; instead, water moves in and out of the Tulare Lake Hydrologic Region by precipitation, evaporation, and/or water diversions through canals. Major rivers in the region include the Kings River, Kaweah River, Tule River and Kern River which historically drained to the center of the basin forming Tulare Lake. 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.
- **Delta Region** - Surface water from the San Joaquin and Sacramento River Valley's connects in the Delta where the combined flows of the Sacramento and San Joaquin River basins flow either to the San Francisco Bay and exits to the Pacific Ocean or is diverted into state and federal water projects (**Figure ES-2**).

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.

### **ES.2.2 Groundwater Basins/Subbasins**

The California Department of Water Resources has defined the groundwater basins/subbasins for the Central Valley 5 Region both within and outside the Central Valley Floor (DWR 2003). For the Kern County groundwater subbasin (5-22.14), the TLB Basin Plan currently divides this subbasin into three hydrographic units: Westside South (northwest portion); Poso (northeast portion) and Kern River (southeastern portion).



**Figure ES-2. Central Valley Surface Water Flows**

Groundwater basins/subbasins in the Central Valley Region encompass about 24,100 square miles; in the valley floor, these basins/subbasins comprise about 20,500 square miles, or about 85% of the total groundwater basins/subbasins within Region 5 (DWR 2003) (**Figure ES-3**):

- **Sacramento River Hydrologic Region** – The Sacramento Valley Groundwater Basin is the main groundwater basin located in the Sacramento River Hydrologic Region, and is divided into 18 groundwater subbasins, based on hydrologic, geologic, and political boundaries, covering 6,057 square miles of the Central Valley Floor.
- **San Joaquin River Hydrologic Region** – The San Joaquin Groundwater Basin is the main groundwater basin that covers both the San Joaquin River and the Tulare Lake Hydrologic Regions. The portion of the San Joaquin Groundwater Basin within this hydrologic region is divided into nine groundwater subbasins, based on hydrologic, geologic, and political boundaries, covering 5,830 square miles of this portion of the Central Valley Floor.





Figure ES-3. Central Valley Region Valley Floor Groundwater Basins/Subbasins



- **Tulare Lake Hydrologic Region** – Similar to the San Joaquin River Hydrologic Region, the San Joaquin Groundwater Basin is the main groundwater basin in this hydrologic region. This portion of the San Joaquin Groundwater Basin, which covers approximately 4,783 square miles, is divided into seven groundwater subbasins. As noted above, the TLB Basin Plan further divides the Kern County subbasin into three hydrographic units.
- **Delta Region** – Within the San Francisco Bay Hydrologic Region are two groundwater basins that are within the Delta Region on the west side of the Central Valley Region: Suisan-Fairfield Valley (2-3) and Pittsburg Plain (2-4). While these basins are not the focus of this SNMP, nitrate and salinity water quality conditions are provided in the SNMP.

### ES.2.3 Beneficial Uses and Water Quality Objectives

Two Basin Plans provide the basis for the regulation of water quality in the Central Valley:

- SRSJR Basin Plan (Central Valley Water Board 2016); and
- TLB Basin Plan (Central Valley Water Board 2015).

In addition, the San Francisco Bay/Sacramento-San Joaquin Delta Estuary Water Quality Control Plan (Delta Plan), covers the San Francisco Bay and Sacramento-San Joaquin Delta (State Water Board 2006). Developed by the State Water Board because it covers areas within two Regional Water Boards, the Central Valley Water Board implements components of the Delta Plan.

#### Beneficial Uses

The Basin Plans and Delta Plan establish beneficial uses for many surface waters and groundwaters by assigning beneficial uses to named water bodies. For water bodies not specifically identified, beneficial uses are either assigned under generally applicable designations that purport to cover all water bodies, e.g. municipal and domestic water supply (MUN), or are assigned beneficial uses on the basis of downstream designations.

Studies conducted under CV-SALTS determined that the beneficial uses most sensitive to salt and nitrate were MUN and Agricultural Supply (AGR). The Basin Plans define these uses as follows:

- MUN - “Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.”<sup>7</sup>
- AGR - “Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation (including leaching of salts), stock watering, or support of vegetation for range grazing.”<sup>8</sup>

The Central Valley Water Board has generally presumptively assigned the MUN beneficial use to all water bodies, except where it has been specifically determined that a water body does not support the MUN use, consistent the State Water Board’s Sources of Drinking Water Policy

<sup>7</sup> See Chapter II of the SRSJR and TLB Basin Plans. Note that the Tulare Lake Basin Plan does not include

<sup>8</sup> See Chapter II of the SRSJR and TLB Basin Plans (Central Valley Water Board 2016 and 2015, respectively). Note that the Tulare Lake Basin Plan does not include the phrase “(including leaching of salts)”

(Resolution No. 88-63) and the exception has been documented through a Basin Plan amendment.

The Basin Plans consider AGR to be a presumptive beneficial use applicable to all ground waters. Specifically, *"Unless otherwise designated by the Regional Water Board, all ground waters of the Region are considered suitable or potentially suitable, at a minimum, for agricultural supply..."*<sup>9</sup> The Basin Plans establish criteria for making exceptions to the presumptive application of the AGR beneficial use. Of relevance to salt management is the potential application of the following exception: *"there is pollution, either by natural processes or by human activity (unrelated to a specific pollution incident), that cannot reasonably be treated for agricultural use using either BMPs [Best Management Practices] or best economically achievable treatment practices."*<sup>10</sup>

### **MUN Water Quality Objectives**

The Basin Plans include the following water quality objective to protect the MUN beneficial use:

*"At a minimum, waters designated for domestic or municipal supply (MUN) shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels (MCLs) specified in the following provisions of Title-22 of the California Code of Regulations which are incorporated by reference into this plan..."*<sup>11</sup>

The existing nitrate water quality objective for the protection of drinking water supplies in the Central Valley is 10 mg/L (nitrate measured as nitrogen).<sup>12</sup> This SNMP reaffirms that objective for the protection of any waterbody used as a drinking water supply.

For salinity, implementation of this SNMP is based on ensuring protection within a range of total dissolved solids (TDS) or electrical conductivity (EC) concentrations established in 22 California Code of Regulations (CCR) Table 64449-B ("Secondary Maximum Contaminant Levels [SMCL] Ranges") and incorporated by reference into the Basin Plans as part of the Chemical Constituent water quality objectives. The 22 CCR Table 64449-B specifies a range of potentially applicable SMCLs expressed as either TDS or EC: Recommended (500 mg/L TDS; 900 µS/cm EC), Upper (1,000 mg/L TDS; 1,600 µS/cm EC), and Short Term (1,500 mg/L TDS; 2,200 µS/cm EC).

### **AGR Water Quality Objectives**

No numeric water quality objective has been established for nitrate to protect the AGR beneficial use; this SNMP does not change this finding. The narrative objective for Chemical Constituents (*Waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses...*[Central Valley Water Board 2016]) applies and is interpreted based on scientifically valid criteria. With the exception of selected surface waters where a site-specific objective has been established, the Basin Plans do not establish explicit numeric water quality objectives for salinity in ground waters or many surface waters for the protection of the AGR beneficial use. Instead, the

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<sup>9</sup> SRSJR Basin Plan, Pg. II-3.00; TLB Basin Plan, Pg. II-2.

<sup>10</sup> SRSJR Basin Plan, Pg. II-3.00; TLB Basin Plan, Pg. II-3.

<sup>11</sup> SRSJR Basin Plan, Pg. III-10.0 and TLB Basin Plan, Pg. III-7.

<sup>12</sup> 10 mg/L is the level set by 22 CCR §64431, consistent with the primary maximum contaminant level established under the federal Safe Drinking Water Act.

Basin Plan relies on the same narrative water quality objective for chemical constituents to protect AGR and the same process for interpretation.

## ES.3 Salt and Nitrate Conditions in the Central Valley Region

Salt and nitrate management requires an understanding of water movement on and beneath the land surface. Groundwater flows in response to multiple factors such as pumping, recharge of surface water, subsurface porosity, and interaction with surface water. The direction of surface water and groundwater flow and associated volumes of those flows dictate the movement of salt and nitrate in the subsurface, which has implications for management of these constituents at the surface. To support development of the SNMP, CV-SALTS completed assessments of salt and nitrate conditions in the Central Valley:

- **Groundwater** – Initial and final assessments of salt and nitrate conditions were completed for groundwater in the Central Valley Region. The final analysis included an assessment of ambient conditions, predicted trends for salt and nitrate out to 50 years, and information regarding potentially available assimilative capacity for nitrate or salt in groundwater (Luhdorff & Scalmanini Consulting Engineers and Larry Walker Associates 2016a).
- **Surface Water** - CV-SALTS completed a surface water assessment of nitrate and salt conditions in selected surface waters in each of the Central Valley hydrologic regions (Larry Walker Associates 2016b). This assessment provided information to inform the SNMP and support antidegradation analysis requirements.

The sections below provide the key findings from each of the above assessments of salt and nitrate conditions in the Central Valley.

### ES.3.1 Groundwater

#### ES.3.1.1 Assessment Approach

The following salt and nitrate characteristics were assessed: Ambient conditions, predicted trends for salt and nitrate out to 50 years, and potentially available assimilative capacity for nitrate or salt in groundwater. This assessment focused on describing salt and nitrate conditions in the “upper,” “lower,” and “production” zones within each groundwater basin/subbasin. **Table ES-1** provides definitions for each of these zones; **Figures ES-4** and **ES-5** illustrate the vertical relationship of these zones relative to the Central Valley’s Corcoran Clay layer and well types.

The groundwater assessment relied on the following data sources for identification of the upper and lower zones:

- DWR depth to groundwater contours;
- Depth to groundwater from Groundwater Quality Assessment Reports (GAR);
- State Water Board’s Division of Drinking Water (DDW) database of location and construction information for public water systems (as provided under a confidentiality agreement); and
- USGS California Central Valley Hydrologic Model 2.0 (CVHM2; in progress):

- Modeled virtual farm well construction for agricultural pumping;
- Actual rural public well water system well construction information;
- Actual urban public well water system well construction information;
- Texture database of drillers’ logs, including domestic well construction information; and
- Corcoran Clay depth, thickness, and extent.

The CV-SALTS database provided the water quality data used to support the various water quality analyses completed to describe salt and nitrate conditions in Central Valley Region. Analyses were done for basins/subbasins within and outside the Central Valley Floor; however, outside the valley floor water quality analyses were limited to some degree by data availability. This database was most recently updated in 2014 (Luhdorff & Scalmanini Consulting Engineers and Larry Walker Associates 2014). Two types of analyses were conducted:

- *Spatial Analyses* – Using a one square mile grid as a base, spatial analyses for salt and nitrate for each vertical zone across the Central Valley included: ambient average concentrations, ambient volume-weighted concentrations, estimate of assimilative capacity, water quality trends and future predicted conditions in 10, 20 and 50 years.
- *Aggregate Analyses* – The one square mile grid data were aggregated for each groundwater basin/subbasin to describe volume-weighted salt and nitrate concentrations and estimate volume-weighted assimilative capacity.

**Table ES-1. Vertical Zones in Groundwater Basins/Subbasins**

Vertical Zone	Definition
<b>Upper</b>	<ul style="list-style-type: none"> <li>• Includes the depth from the bottom of the vadose zone to the top of the lower zone.</li> <li>• The depth of the upper zone is based on available well construction information and other comparable information that provide the best available indication of well depth; the analysis gives the highest weight to domestic well depths.</li> <li>• Where the Corcoran Clay is present, the upper zone does not extend below the Corcoran Clay.</li> </ul>
<b>Lower</b>	<ul style="list-style-type: none"> <li>• Includes the depth from the bottom of the upper zone to the depth of the bottom of the lower zone. The depth of the lower zone is based on available well construction information and other comparable information that provide the best available indication of well depth; the analysis gives the highest weight to municipal well depths (</li> <li>• Within the Corcoran Clay area, the lower zone is bounded at the bottom by the top of the Corcoran Clay layer.</li> </ul>
<b>Production</b>	<ul style="list-style-type: none"> <li>• The production zone combines the upper zone and the lower zone.</li> <li>• Represents the portion of the aquifer system where the majority of groundwater production occurs.</li> </ul>



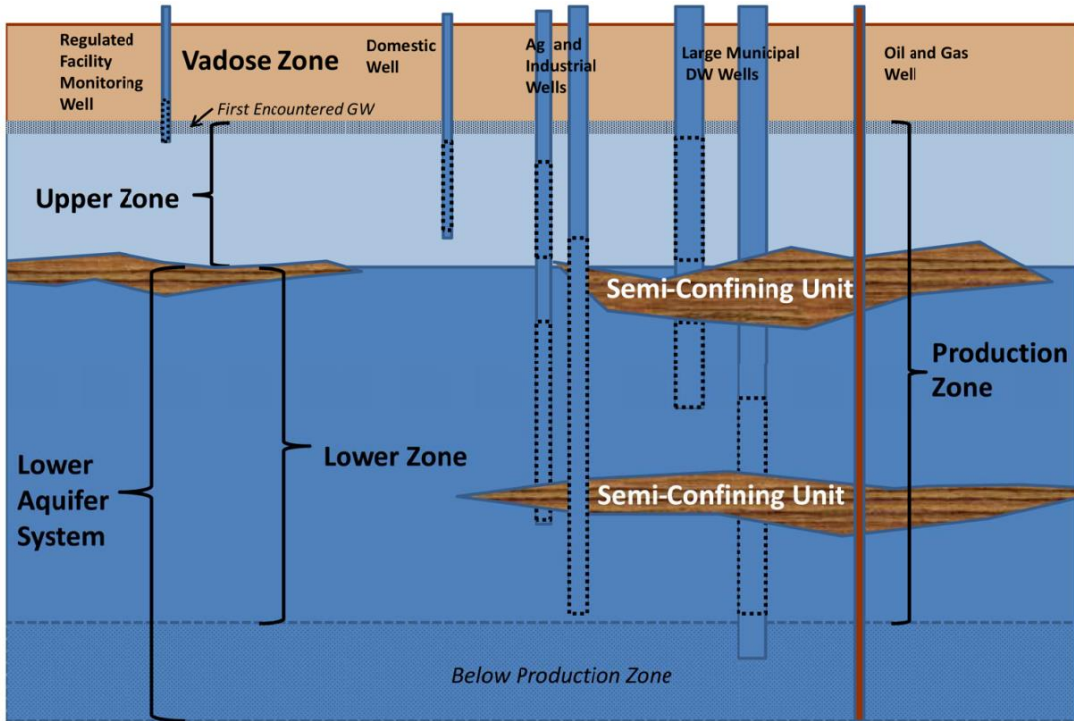


Figure ES-4. Schematic of Aquifer System (Where Corcoran Clay Absent)

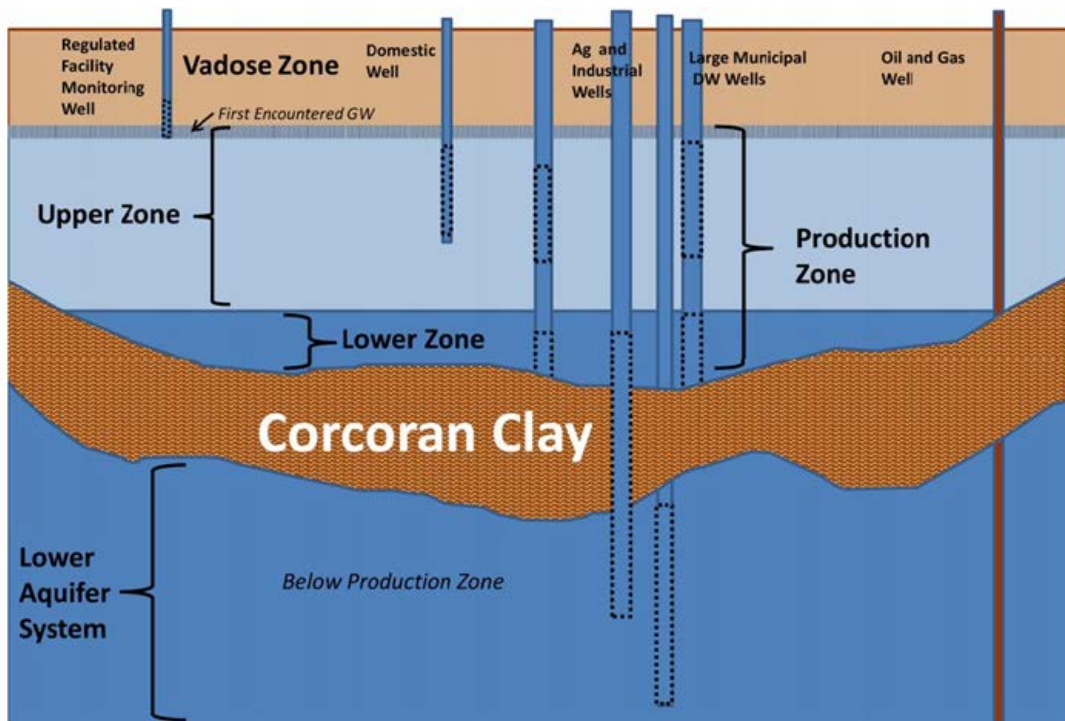


Figure ES-5. Schematic of Aquifer System (Where Corcoran Clay Layer Present)

### ES.3.1.2 Water Quality Findings

**Tables ES-2** and **ES-3** summarize the volume-weighted aggregate data and aggregated estimated assimilative capacity for nitrate and TDS, respectively, for the upper, lower and production zones for groundwater basins/subbasins within the Central Valley Floor. Nitrate and TDS concentrations are lowest in the northern part of the Central Valley Region (Sacramento River Hydrologic Region) and highest in the southern part of the Central Valley Region. Within that part of the Central Valley, TDS tends to be highest in the basins in the most southern and western portions; nitrate tends to be higher in the eastern part of the area. **Tables ES-4** and **ES-5** summarizes arithmetic average water quality characteristics for groundwater basins outside the valley floor.

### ES.3.2 Surface Water

Nitrate and salinity conditions were assessed for major surface water bodies and tributaries within the Central Valley. Available data were obtained through the California Environmental Data Exchange Network (CEDEN)<sup>13</sup> and USGS Water Quality Portal (WQP)<sup>14</sup>. To best represent current surface water quality and to capture a good representation of different water year types,<sup>15</sup> only available data from 1990 to present were included in the analysis.

#### ES.3.2.1 Salinity and Nitrate Conditions

EC is the most frequently measured and recorded salinity-related water quality parameter in Central Valley surface water databases. EC concentrations are an important consideration with regards to the protection of the MUN beneficial use and compliance with SMCLs. As noted above, the EC water quality objective for SMCLs ranges from 900  $\mu\text{S}/\text{cm}$  EC to 2,200  $\mu\text{S}/\text{cm}$ ; the evaluation of existing EC conditions in surface waters was based on this range. Nitrate (as N) is routinely measured at monitoring locations; the key threshold for protection of beneficial uses is the primary MCL of 10 mg/L as N. **Table ES-6** summarizes the findings for EC and nitrate (as N) for each hydrologic region.

#### ES.3.2.2 Impaired Waters

The state periodically updates its list of 303(d) listed water bodies that are impaired for one or more water quality constituents. The most recently approved list for the Central Valley Region is the 2012 list.<sup>16</sup> **Table ES-7** summarizes the number of water bodies impaired for salinity or nutrient-related constituents. The majority of these waters are located in the San Joaquin River hydrologic region; most are listed for a salinity-related constituent.

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<sup>13</sup> <http://www.ceden.org>

<sup>14</sup> Sponsored by USGS, US EPA, and National Water Quality Monitoring Council; integrates water quality data from the USGS NWIS database and EPA STorage and RETrieval (STORET) data warehouse <http://www.waterqualitydata.us>

<sup>15</sup> <http://cdec.water.ca.gov/cgi-progs/iodir/WSIHIST> - San Joaquin Valley or Sacramento Valley Water Year Hydrologic Classification (e.g., critical, dry, below normal, above normal, wet). Method for determining the Water Year Hydrologic Classification is defined in State Water Board Revised Water Right Decision 1641, March 2000, Figure 2, p 189.

<sup>16</sup> [http://www.waterboards.ca.gov/water\\_issues/programs/tmdl/integrated2012.shtml](http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2012.shtml)

**Table ES-2. Volume-Weighted Ambient Concentrations of Nitrate and TDS in the Lower, Upper, and Production Zones Central Valley Floor Groundwater Basins/Subbasins.**

Area	DWR B118 Groundwater Basin Code	Nitrate (mg/L as N)			TDS (mg/L)		
		Lower Zone*	Upper Zone	Production Zone	Lower Zone*	Upper Zone	Production Zone
Northern Central Valley	5-6.01	1.05	1.04	1.05	178	164	172
	5-6.02	1.36	0.95	1.16	202	149	176
	5-6.03	1.21	1.03	1.12	147	190	168
	5-6.04	1.45	0.99	1.22	159	258	198
	5-6.05	1.76	0.92	1.28	160	148	154
	5-6.06	0.89	0.85	0.87	192	162	176
	5-21.50	1.88	1.37	1.67	238	238	238
	5-21.51	2.34	1.78	2.16	264	289	272
	5-21.52	2.87	3.29	3.06	472	613	533
	5-21.53	2.20	1.23	1.77	262	234	250
	5-21.54	3.06	1.92	2.66	297	361	320
	5-21.55	1.91	1.59	1.80	223	226	224
	5-21.56	1.36	2.42	1.67	181	200	186
	5-21.57	2.08	2.83	2.28	192	204	195
	5-21.58	1.38	2.62	1.80	313	403	343
	5-21.59	0.99	1.93	1.31	310	338	320
	5-21.60	2.35	2.19	2.28	295	349	317
	5-21.61	1.90	2.91	2.30	365	430	391
	5-21.62	1.15	2.37	1.67	918	992	950
	5-21.64	1.58	3.67	2.37	298	446	353
5-21.67	3.59	12.27	7.63	523	790	647	
5-21.68	6.03	2.66	4.58	635	1069	823	
Middle Central Valley	2-3	3.47	3.48	3.47	564	1400	900
	2-4	1.07	4.82	2.68	671	2896	1628
	5-21.65	1.55	2.13	1.78	222	343	270
	5-21.66	2.68	4.46	3.36	504	935	669
	5-22.01	3.69	6.07	4.72	293	506	385
	5-22.02	3.74	7.58	5.53	217	352	280
	5-22.03	4.63	10.97	7.74	211	439	322
	5-22.04	3.46	6.48	4.85	261	418	334
	5-22.05	6.64	8.88	8.21	540	874	774
	5-22.06	3.78	4.65	4.09	275	417	325
	5-22.07	3.32	5.84	5.01	928	1307	1184
	5-22.15	2.30	3.64	3.04	890	1255	1091
5-22.16	1.48	2.65	1.87	227	206	220	
Southern Central Valley	5-22.08	6.62	7.12	6.84	391	560	464
	5-22.09	2.86	1.26	1.80	1165	2038	1744
	5-22.10	0.43	2.32	1.37	846	3218	2025
	5-22.11	13.38	11.88	12.64	419	514	465
	5-22.12	1.36	5.33	3.23	740	1659	1173
	5-22.13	8.29	8.31	8.30	382	588	465
	5-22.14	3.29	5.54	3.76	561	2313	1177

\* Above the Corcoran Clay where present.

Table ES-3. Estimated Assimilative Capacity for Nitrate and TDS in the Lower, Upper, and Production Zones in Central Valley Groundwater Basins/Subbasins.

Area	DWR B118 Groundwater Basin Code	Nitrate (mg/L as N) (Based on 10 mg/L as N)			TDS (mg/L) (Based on 1,000 mg/L)		
		Lower Zone*	Upper Zone	Production Zone	Lower Zone*	Upper Zone	Production Zone
Northern Central Valley	5-6.01	8.95	8.96	8.95	822	836	828
	5-6.02	8.64	9.05	8.84	798	851	824
	5-6.03	8.79	8.97	8.88	853	810	832
	5-6.04	8.55	9.01	8.78	841	742	802
	5-6.05	8.24	9.08	8.72	840	852	846
	5-6.06	9.11	9.15	9.13	808	838	824
	5-21.50	8.12	8.63	8.33	762	762	762
	5-21.51	7.66	8.22	7.84	736	711	728
	5-21.52	7.13	6.71	6.94	528	387	467
	5-21.53	7.80	8.77	8.23	738	766	750
	5-21.54	6.94	8.08	7.34	703	639	680
	5-21.55	8.09	8.41	8.20	777	774	776
	5-21.56	8.64	7.58	8.33	819	800	814
	5-21.57	7.92	7.17	7.72	808	796	805
	5-21.58	8.62	7.38	8.20	687	597	657
	5-21.59	9.01	8.07	8.69	690	662	680
	5-21.60	7.65	7.81	7.72	705	651	683
	5-21.61	8.10	7.09	7.70	635	570	609
5-21.62	8.85	7.63	8.33	82	8	50	
5-21.64	8.42	6.33	7.63	702	554	647	
5-21.67	6.41	0.00	2.37	477	210	353	
5-21.68	3.97	7.34	5.42	365	0	177	
Middle Central Valley	2-3	6.53	6.52	6.53	436	0	100
	2-4	8.93	5.18	7.32	329	0	0
	5-21.65	8.45	7.87	8.22	778	657	730
	5-21.66	7.32	5.54	6.64	496	65	331
	5-22.01	6.31	3.93	5.28	707	494	615
	5-22.02	6.26	2.42	4.47	783	648	720
	5-22.03	5.37	0.00	2.26	789	561	678
	5-22.04	6.54	3.52	5.15	739	582	666
	5-22.05	3.36	1.12	1.79	460	126	226
	5-22.06	6.22	5.35	5.91	725	583	675
	5-22.07	6.68	4.16	4.99	72	0	0
	5-22.15	7.70	6.36	6.96	110	0	0
5-22.16	8.52	7.35	8.13	773	794	780	
Southern Central Valley	5-22.08	3.38	2.88	3.16	609	440	536
	5-22.09	7.14	8.74	8.20	0	0	0
	5-22.10	9.57	7.68	8.63	154	0	0
	5-22.11	0.00	0.00	0.00	581	486	535
	5-22.12	8.64	4.67	6.77	260	0	0
	5-22.13	1.71	1.69	1.70	618	412	535
	5-22.14	6.71	4.46	6.24	439	0	0

\* Above the Corcoran Clay where present.



**Table ES-4. Average and Median Nitrate Concentration Statistics<sup>1</sup> for Wells in Groundwater Basins/ Subbasins Outside the Central Valley Floor**

Area	DWR Bulletin 118 Groundwater Basin	Number of Wells	Average (mg/L as N)	Median (mg/L as N)
Northern Central Valley	5-2.01	43	0.76	0.50
	5-2.02	19	0.60	0.39
	5-4	29	0.56	0.23
	5-5	8	1.08	0.23
	5-7	12	0.25	0.21
	5-9	31	0.32	0.23
	5-10	32	0.34	0.24
	5-11	12	0.67	0.42
	5-12.01	44	0.54	0.23
	5-12.02	6	0.95	0.33
	5-13	15	1.09	0.48
	5-14	46	0.87	0.23
	5-15	26	1.35	0.23
	5-16	5	0.23	0.23
	5-17	14	1.33	0.70
	5-18	5	1.76	1.94
	5-19	13	0.56	0.23
	5-30	7	1.58	0.34
	5-35	9	1.49	0.59
	5-46	2	0.23	0.23
	5-50	4	0.88	0.17
	5-56	2	0.38	0.38
	5-60	29	0.69	0.25
5-62	5	0.34	0.24	
5-63	4	0.18	0.18	
5-66	3	0.27	0.23	
5-68	2	0.23	0.23	
5-87	9	0.22	0.23	
Middle Central Valley	5-69	5	0.16	0.23
Southern Central Valley	5-25	115	3.16	1.65
	5-27	35	4.37	3.92
	5-28	51	6.10	5.48
	5-29	8	3.47	3.91
	5-80	7	2.74	3.88
	5-82	9	3.44	2.77
	5-83	11	3.00	2.28
	5-84	19	1.28	0.48
5-85	10	0.85	0.75	

<sup>1</sup> Nitrate statistics based on arithmetic averages of well data; no spatial averaging was conducted.

**Table ES-5. Average and Median TDS Concentration Statistics<sup>1</sup> for Wells in Groundwater Basins/Subbasins Outside the Central Valley Floor**

Area	DWR Bulletin 118 Groundwater Basin	Number of Wells	Average (mg/L)	Median (mg/L)
Northern Central Valley	5-2.01	14	310	250
	5-2.02	12	252	234
	5-4	8	234	193
	5-5	4	184	153
	5-7	11	93	89
	5-9	17	129	132
	5-10	20	107	80
	5-11	6	178	188
	5-12.01	25	254	170
	5-13	9	207	163
	5-14	7	165	139
	5-15	22	394	365
	5-16	4	621	665
	5-17	4	327	311
	5-18	5	299	318
	5-19	40	1,084	384
	5-30	6	408	442
	5-35	3	42	39
	5-50	3	112	100
	Middle Central Valley	5-60	12	140
5-63		4	258	256
Southern Central Valley	5-66	4	280	271
	5-68	2	568	568
	5-87	3	167	175
	5-69	5	33	32
	5-25	106	325	326
	5-27	39	381	356
	5-28	50	393	330
	5-29	6	577	570
	5-80	8	325	346
	5-82	8	664	705
5-83	9	632	675	
5-84	13	470	410	
5-85	9	528	552	

<sup>1</sup> Nitrate statistics based on arithmetic averages of well data; no spatial averaging was conducted.

**Table ES- 6. Summary of EC and Nitrate (as N) Water Quality Conditions in Surface Waters in the Central Valley Region**

Hydrologic Region	EC Conditions	Nitrate (as N) Conditions
Sacramento River	<ul style="list-style-type: none"> <li>Water quality is good in this region, with median and 1<sup>st</sup> through 3<sup>rd</sup> quartile values at all monitoring locations below 900 <math>\mu\text{S}/\text{cm}</math>.</li> </ul>	<ul style="list-style-type: none"> <li>Nitrate water quality is very good, with median and 1st through 3rd quartile observations at all monitoring locations well below the primary MCL of 10 mg/L as N, with some sites typically below 0.5 mg/L.</li> </ul>
San Joaquin River	<ul style="list-style-type: none"> <li>Eastside Tributaries - Lower than the recommended SMCL of 900 <math>\mu\text{S}/\text{cm}</math>.</li> <li>Westside - Tributaries - EC values between the 1<sup>st</sup> and 3<sup>rd</sup> quartiles are at or above the recommended SMCL objective.</li> <li>Mainstem - Wide range of values; concentrations are dependent on water year type and the water quality and flows of the east side tributaries.</li> </ul>	<ul style="list-style-type: none"> <li>Eastside Tributaries - Lower than the primary MCL of 10 mg/L as N, with values often less than 1.0 mg/L.</li> <li>Westside Tributaries – Nitrate values are higher than eastside tributaries, but median values are still below the primary MCL.</li> <li>Mainstem – Median nitrate values generally are around 1 to 2 mg/L nitrate as N; one site with a median level near 10 mg/L has a limited dataset.</li> </ul>
Tulare Lake	<ul style="list-style-type: none"> <li>Median and calculated values within the 1<sup>st</sup> and 3<sup>rd</sup> quartiles are lower than the recommended SMCL with the exception of the Main Drain Canal, where high EC levels above 900 <math>\mu\text{S}/\text{cm}</math> are observed during irrigation events</li> </ul>	<ul style="list-style-type: none"> <li>All observations in this region are well below the primary MCL of 10 mg/L as N with median values in the 0.1 to 0.2 mg/L range.</li> </ul>
Delta Region	<ul style="list-style-type: none"> <li>EC levels rarely exceed the recommended SMCL of 900 <math>\mu\text{S}/\text{cm}</math></li> </ul>	<ul style="list-style-type: none"> <li>All observations are well below the primary MCL with median values around 0.5 mg/L.</li> </ul>

**Table ES-7. Number of Surface Waters Listed as Impaired for Salinity- or Nutrient-related Constituents**

Hydrologic Region	Impairment	No. of Impaired Waters <sup>1</sup>
Sacramento River	EC	2 Water Bodies Listed
	Salinity	4 Water Bodies Listed
	Nutrients	1 Water Body Listed
San Joaquin River	EC	14 Water Bodies Listed
	Salinity	9 Water Bodies Listed
	TDS	1 Water Body Listed
	Chloride	2 Water Bodies Listed
Tulare Lake	EC	1 Water Body Listed

<sup>1</sup> Based on State 2012 303(d) list of impaired waters.

## ES.4 Implementation Strategy

### ES.4.1 Overview

The foundation for implementation of the Central Valley SNMP is the Central Valley Basin Plans which establish the Board's existing regulatory authority to manage salt and nitrate in the region. However, the existing regulatory framework in these Basin Plans currently limits the Central Valley Water Board's ability to consider innovative salt or nitrate management strategies, including strategies consistent with the intent and purpose of the Recycled Water Policy and goals of CV-SALTS. To address these regulatory limitations, CV-SALTS developed recommendations for modifications or clarifications to the Basin Plans to facilitate implementation of salt and nitrate management strategies that will result in real improvements to water quality consistent with the SNMP's management goals. Section ES.4.2 below summarizes these recommendations.

Parallel to the development of the SNMP, CV-SALTS developed other Basin Plan amendments that support salinity-related management requirements on a water body or watershed-specific basis. The outcomes from each of these efforts supports the SNMP by providing additional salinity management tools. Section ES.4.3 summarizes these supporting Basin Plan amendments.

The SNMP establishes the implementation strategy for the management of salt and nitrate moving forward. This strategy is based on the recommendations for modifications or clarifications to the Basin Plans and the findings from a number of technical and regulatory analyses conducted to support development of the SNMP (see Section ES.4.4 below for a summary of these analyses). Sections ES.4.5.1 and ES.4.5.2 below, respectively, provide an overview of the nitrate and salt management strategy to meet the management goals established by the SNMP.

The Central Valley Water Board will propose amendments to the Basin Plans to incorporate, as appropriate, recommendations contained with the SNMP and the salt and nitrate implementation strategy. The outcome will facilitate salt and nitrate management well into the future. It is expected that implementation of the SNMP will be an iterative and adaptive process (especially with regards to salt management) that will involve periodic review and reassessment so that what has been learned by doing can be incorporated into future revised SNMPS. Where any such changes to the SNMP require additional Basin Plan amendments, these will be addressed in a timely manner.

### ES.4.2 Recommended Clarifications, Policies and New Regulatory Tools

Development of the Central Valley SNMP included an evaluation of existing policies and requirements in the region's Basin Plans and led to the development of recommended clarifications, policies and new regulatory tools (or strategies) to facilitate SNMP implementation. These recommendations are designed to facilitate implementation of this SNMP and efforts to achieve the salt and nitrate management goals. For the most part, these recommendations are not self-implementing and will require adoption of Basin Plan amendments. **Table ES-8** summarizes these recommendations.



### ES.4.3 Related Basin Plan Amendments

As noted above, CV-SALTS has been developing other Basin Plan amendments that support salinity-related management requirements on a water body or watershed-specific basis. These related Basin Plan amendments and potential relevance to the SNMP are summarized below.

#### ES.4.3.1 MUN Beneficial Use Project – Agriculturally Dominated Water Bodies Evaluation

Per the State’s Sources of Drinking Water Policy (State Water Board Resolution No. 88-63) the Basin Plans designate MUN as a beneficial use on all water bodies unless they are specifically listed as water bodies that are not designated with MUN. The Basin Plans state that waters designated for MUN must not exceed Maximum Contaminant Levels (MCLs, primary or secondary) for chemical constituents, pesticides, and radionuclides. While Resolution 88-63 does contain exceptions for the MUN designation such as water bodies constructed or modified to convey agricultural drainage, to utilize the exception the Basin Plans require a formal Basin Plan amendment. Accordingly, the Central Valley Water Board has been evaluating the applicability of the MUN beneficial use designation in agricultural drains due to the exceptions identified in State Policy 88-63. This evaluation has occurred in two phases:

- *Phase 1 - Agricultural Drains Receiving Treated Wastewater* - CV-SALTS identified receiving waters of four POTWs (Cities of Willows, Colusa, Biggs and Live Oak) as potential case studies for evaluating the appropriateness of the MUN designation. Based on the findings from required studies and considering exception criterion 2b in the Sources of Drinking Water Policy the Central Valley Water Board staff prepared the documentation to support a Basin Plan amendment to remove MUN from 12 water bodies downstream of these four POTWs. This Basin Plan amendment was approved by the Central Valley Water Board and State Water Board on April 15 and August 18, 2015, respectively)<sup>17</sup> and approved by the Environmental Protection Agency on April 21, 2016. In part, the amendment developed a standardized method for evaluating and categorizing agriculturally dominated water bodies into constructed, modified or natural.
- *Phase 2 - Region-wide MUN Evaluation Process and Adoption of a Limited MUN Beneficial Use* – The Central Valley Water Board is currently working on a second Basin Plan amendment to establish a Central Valley region-wide process for evaluating the MUN beneficial use in agriculturally dominated surface water bodies based on the process utilized in Phase 1 and adopt a Limited MUN (LMUN) use. Dischargers can find it extremely difficult to maintain agricultural operations and increase water recycling efforts while also complying with MCLs (especially for salinity-related constituents) in agricultural drains that were not constructed to supply drinking water. Consequently, establishment of a region-wide process to evaluate the applicability of the MUN beneficial use on agricultural drains would provide an important tool to support implementation of this SNMP. This Basin Plan amendment is expected to be proposed for adoption in 2017.<sup>18</sup>

<sup>17</sup> Central Valley Water Board Resolution No. R5-2015-0022; State Water Board Resolution No. 2015-0055

<sup>18</sup> [http://www.waterboards.ca.gov/centralvalley/water\\_issues/salinity/mun\\_beneficial\\_use/index.shtml](http://www.waterboards.ca.gov/centralvalley/water_issues/salinity/mun_beneficial_use/index.shtml)

**Table ES-8. Description of Policies, Strategies or Guidance Recommended by the SNMP**

Recommended Policy, Strategy, or Guidance	Description
<p><b>Default Groundwater Management Areas</b></p>	<p>The intent of Recycled Water Policy Section 6.b.(1)(a) is for every groundwater basin/subbasin in the Central Valley to have a consistent salt and nitrate management plan. DWR Bulletin 118 defines, delineates, and describes the groundwater basins and subbasins in the Central Valley Region (DWR 2003).<sup>19</sup> These basins/subbasins will serve as default management areas unless a group of dischargers elects to establish a management zone, which may establish an alternative area for the management of nitrate in groundwater. The Basin Plans for the Central Valley include requirements for the protection of groundwater quality through the establishment of water quality objectives and programs of implementation to achieve the water quality objectives. As part of the implementation of this SNMP the Central Valley Water Board will consider the best approach for referencing DWR-delineated groundwater basins/subbasins in the Basin Plans.</p>
<p><b>Groundwater Management Zone Policy</b></p>	<p>The SNMP recommends that the Basin Plans be amended to allow and encourage management of nitrate through the establishment of management zones. In general, a management zone would consist of multiple dischargers working collectively to ensure first safe drinking water, then to manage nitrates to create a balance within the defined management area (where reasonable and feasible), and ultimately to develop and implement a long-term plan for restoration of groundwater (where reasonable and feasible) to meet applicable water quality objectives. Although the Basin Plans do not currently prevent the management of nitrates through the creation of management zones, the SNMP recommends the inclusion of a Groundwater Management Zone Policy within the Basin Plans so that what constitutes a proper management zone is clearly defined and to ensure that criteria for approval of a management zone by the Central Valley Water Board are properly established in regulation.</p>
<p><b>Nitrate Permitting Strategy</b></p>	<p>The SNMP provides the basis for the management of nitrate in the Central Valley. For dischargers regulated by the Central Valley Water Board, these management efforts must ultimately be implemented in discharge permits issued to dischargers. WDRs and Conditional Waivers must ensure that the receiving water will meet the water quality objective, and that discharges do not cause or contribute to an exceedance of the water quality objective. In some areas of the Central Valley, and for some types of dischargers, the traditional permitting approach for nitrates may not be feasible, reasonable or practicable. Accordingly, CV-SALTS developed an SNMP Nitrate Permitting Strategy that sets forth recommendations with respect to permitting nitrate discharges in WDRs and Conditional Waivers under the traditional permitting approach as well as providing for alternative permitting approaches, e.g., through establishment of a management zone.</p>
<p><b>Salinity Management Strategy</b></p>	<p>CV-SALTS technical studies show that current salinity management activities may only address about 15% of the annual salt load; accordingly, long-term solutions, including development of regional de-salters, a regulated brine line, or other projects that would allow containment or removal of salt, are needed to address the other 85%. Because the solutions for addressing salinity are long-term in nature and will require considerable state and federal funding, the Central Valley Water Board needs be able to consider innovative salt management strategies for both the short term and the long term that move the region toward salt balance and restoration of impacted areas, where reasonable and feasible. To this end, CV-SALTS has established a Salinity Management Strategy that recommends a process for moving forward with a three-phased long-term salinity management program that includes adoption of a proposed Interim Salinity Permitting Approach for salinity discharges during implementation of the first phase of the Salinity Management Strategy.</p>

<sup>19</sup> The TLB Basin Plan further divides one of these groundwater basins into three hydrographic units, see TLB Basin Plan Figure III-1.

**Table ES-8. Description of Policies, Strategies or Guidance Recommended by the SNMP**

Recommended Policy, Strategy, or Guidance	Description
<p><b>Exceptions Policy</b></p>	<p>The SNMP recommends amendments Basin Plans to revise the existing Central Valley Salinity Exceptions Program. The existing Exceptions Policy prohibits the Central Valley Water Board from authorizing new exceptions or reauthorizing previously approved exceptions after June 30, 2019. In addition, the Salinity Exception Program applies only to TDS/EC, chloride, sulfate and sodium and does not identify guidelines for an exception to be authorized for nitrate water quality objectives. This SNMP recommends revising the existing Exceptions Policy by amending the Basin Plans to (a) add nitrate to the list of chemical constituents for which the Central Valley Water Board may authorize an exception; (b) expand/revise conditions or authorization of an exception to reflect the goals of the SNMP; (c) remove the existing sunset provision that prohibits the granting of exceptions beyond June 30, 2019; and (d) delete the current provision limiting the term of an exception to no more than 10 years and add a new provision stating that when authorizing an exception, the Central Valley Water Board shall adopt a term for the exception.</p>
<p><b>Salinity Management to Provide Reasonable Protection of AGR Beneficial Uses in Groundwater (AGR Policy)</b></p>	<p>The AGR beneficial use was designed to protect both crop irrigation and livestock watering and has been designated in the majority of surface waters and groundwater throughout the Central Valley. Although the water quality objectives to protect the AGR beneficial use are narrative, currently no guidance exists on how to interpret the narrative objective in a manner that accounts for local and regional differences. As a default, a conservative approach ensures protection of the most sensitive crop in all locations at all times (e.g., EC &lt; 700 µS/cm) has been utilized, even though individual crop and livestock sensitivity to salinity varies widely and potential impacts can be mitigated through management activities.<sup>20</sup> Clarification is needed regarding how salinity will be managed within each groundwater basin/subbasin to provide the appropriate level of protection of the AGR beneficial use and establish procedures to minimize degradation and where needed reduce salt loading to achieve balance and ensure long-term protection of the AGR use. Accordingly, the CV-SALTS AGR Policy developed recommended AGR Classes for assignment to groundwater basins/subbasins based on current ambient salt concentrations in the Production Zone of each basin/subbasin. While the policy defines these AGR classes, the SNMP does not propose their incorporation into the Basin Plans at this time. Instead, the potential application of these classes will be evaluated over time as part of the implementation of the Salinity Management Strategy of this SNMP. After completion of the Phase I – Prioritization and Optimization Study (see Section ES.4.5.2.1), these AGR classes and their ranges or other approaches will be re-evaluated for potential inclusion in the Basin Plans through a future amendment process.</p>
<p><b>Salinity Variance Program</b></p>	<p>The existing Salinity Variance Program applies to salinity water quality standards that are defined to include water quality standards for only the following constituents: electrical conductivity, total dissolved solids, chloride, sulfate and sodium. The current Salinity Variance Program prohibits the Central Valley Water Board from approving any salinity variance after June 30, 2019. The sunset date was included because the Central Valley Water Board intended that any extension, or permanent, long-term Salinity Variance Program should be developed through the CV-SALTS process and that stakeholders needed to make appropriate recommendations for such a policy in the SNMP. In accordance with the Central Valley Water Board’s direction in developing the current Salinity Variance Program, this SNMP recommends that the Salinity Variance Program be extended for an additional 15 years.</p>

<sup>20</sup> In State Water Board Order WQO 2004-0010, the State Water Board recognized that use of the most conservative value for the protection of the most salt sensitive crop may not be appropriate and that the Regional Board must consider site-specific conditions and allow some relaxation as determined appropriate.

**Table ES-8. Description of Policies, Strategies or Guidance Recommended by the SNMP**

Recommended Policy, Strategy, or Guidance	Description
<p><b>Offsets Policy</b></p>	<p>An offset is an alternative means of achieving compliance with a WDR, either alone or in combination with other actions, for a given pollutant or pollutants. An offset allows for the management of other sources and loads (not directly associated with the regulated discharge) so that the combined net effect on receiving water quality from the discharge and the offset is functionally-equivalent to (and potentially better) than that which would have occurred by requiring the discharger to comply with its WDR at the point-of-discharge. In this regard, an offset project must be located within the same groundwater basin/subbasin or management zone as the regulated discharge. The SNMP includes an Offsets Policy, which recommends that the Basin Plans be amended to provide authority for the Central Valley Water Board to allow the use of offset projects to comply with WDRs, but only for groundwater. In addition to an offset project being used to support compliance with a WDR, offsets may be proposed to support a request for either an allocation of available assimilative capacity or an exception (see Nitrate Permitting Strategy and Exceptions Policy above). Ultimately, the decision to pursue an offset is voluntary. Offsets must be (1) proposed by discharger (individual or group of dischargers) as an Alternative Compliance Project (ACP, see below); (2) approved by the Central Valley Water Board; and (3) enforceable through a WDR or other orders issued by the Board.</p>
<p><b>Drought and Water Conservation Policy</b></p>	<p>The effects of drought and the implementation of encouraged or mandated water conservation practices can significantly impact effluent quality in discharges to surface water or groundwater. Historically, WDRs/Conditional Waivers rarely have included any special provision or consideration for variations in effluent quality, directly or indirectly related to recurrent drought conditions that are beyond the control of the discharger or for ongoing, expanding and sometimes mandated conservation practices. However, extended periods of below normal precipitation (i.e., “droughts”) as well as extensive conservation practices can create compliance issues for some dischargers because of increased TDS/EC and other salinity-related constituents in influent and effluent. This problem is exacerbated by changes in the source, use or management of that water that increases the salt content in wastewater influent. Given these concerns, the SNMP proposes amendments to the Basin Plan that specifically address salinity-related concerns associated with the impacts of drought or increased implementation of water conservation practices.</p>
<p><b>Guidance to Implement Secondary Maximum Contaminant Levels</b></p>	<p>The SNMP includes recommendations for the incorporation of guidance into the Basin Plans to support and clarify implementation of SMCLs (22 CCR) in permits for discharge to surface water and groundwater. These recommendations include:</p> <ul style="list-style-type: none"> <li>■ Guidance for utilizing the applicable “Recommended”, “Upper”, or “Short Term” concentrations included in 22 CCR tables and adopted as water quality objectives.</li> <li>■ Guidance for determining compliance with SMCLs by amending the Basins Plans to state that compliance with SMCLs shall be determined from a filtered water sample, but only for metals, color and turbidity.</li> <li>■ An evaluation of compliance with SMCLs in 22 CCR Tables 64449-A and 64449-B shall be at a minimum based on an annual average of collected samples from all analytical results collected from where compliance is determined.</li> </ul>

**Table ES-8. Description of Policies, Strategies or Guidance Recommended by the SNMP**

Recommended Policy, Strategy, or Guidance	Description
<p><b>Guidance for Developing Alternative Compliance Projects for Nitrate Discharges</b></p>	<p>When an individual or group of dischargers is unable to demonstrate that their discharge is not individually or collectively causing or contributing to nitrate degradation above the triggers identified in the Central Valley SNMP, they have an opportunity to request either allocation of available assimilative capacity or an exception. In most cases, the request for the granting of assimilative capacity<sup>21</sup> or an exception in these circumstances requires submittal of a proposed ACP. This request may be made as an individual discharger (which includes a third party group subject to a general order) or dischargers working collaboratively as part of a groundwater management zone. Any proposed ACPs submitted for consideration must contain specific components; accordingly, the SNMP recommends the adoption of guidance that describes the minimum components required for submittal of an ACP for approval.</p>
<p><b>Factors to Support a Maximum Benefit Finding</b></p>	<p>The State Antidegradation Policy (No. 68-16) sets forth the specific conditions that must be met and demonstrations that must be made before the Central Valley Water Board can allow a discharge (or discharges) to lower water quality in an existing high quality water: (a) Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies; (b) any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.<sup>22</sup> To support implementation of this SNMP, its proposed management strategies and policies, the SNMP recommends the adoption of guidance for making a finding that a proposed project meets the test that its approval and implementation would be “consistent with the maximum benefit to the people of the state” test, as stated in the State Antidegradation Policy.</p>

<sup>21</sup> Conditions with respect to granting of assimilative capacity will vary, depending on how the receiving water is defined for the discharge(s) in question. In some cases, the receiving water will be considered to be shallow groundwater, while in others, it may be the upper zone or production zone (see Table ES-1).

<sup>22</sup> State Water Board. Statement of Policy with Respect to Maintaining High Quality of Waters in California. Resolution No. 68-16 (October 28, 1968).



### ES.4.3.2 Evaluation of MUN and AGR Beneficial Uses in a Portion of Historical Tulare Lakebed Groundwater

The Central Valley Water Board, in conjunction with CV-SALTS, is proposing to amend the TLB Basin Plan to de-designate MUN and AGR beneficial use designations from a portion of the groundwater in the historic Tulare Lakebed.<sup>23</sup> The Project Study Area is located in the southern part of the Central Valley of California in the Tulare Lake Basin. The Tulare Lake Basin essentially functions as a closed basin except during extreme flood years, when some Kings River water moves north through Fresno Slough into the San Joaquin River. Because the Tulare Lake Basin is a closed basin, salts have been naturally deposited and accumulated since its formation and before any influence from humans. The diversion of water into the basin from other watersheds to support 3 million acres of agriculture, including three of the five most agriculturally productive counties in the United States,<sup>24</sup> has exacerbated the accumulation of salts (Sholes 2006). The application of MUN and AGR in the center of the historic Lake Bed has impeded efforts to consolidate and manage salt in evaporation basins.

In addition to the potential de-designation of MUN and AGR beneficial uses from a portion of the groundwater under the Tulare Lakebed, another important outcome of this effort is the establishment of a framework for evaluating the applicability of the MUN and AGR beneficial uses and associated water quality objectives, including implementation provisions applicable in specific groundwater basins. This framework which may be incorporated into the Basin Plans, can provide an additional tool for to support SNMP implementation. Specifically, the framework may be appropriate under certain circumstances to evaluate the applicability of MUN and/or AGR beneficial uses in groundwater to encourage reuse and recycling. Establishing tools to determine the applicability of these uses may also provide regulated entities with more flexibility in managing limited water supplies, and the ability to identify potential salt management areas that would help move salt out of sensitive areas. This Basin Plan amendment is expected to be proposed for adoption in 2017.

### ES.4.3.3 Lower San Joaquin River Salinity Water Quality Objectives

The Central Valley Water Board is proposing amendments to the SRSJR Basin Plan that would establish salinity water quality objectives in Reach 83 of the Lower San Joaquin River (LSJR), which is defined as the LSJR from the mouth of the Merced River to Vernalis. If adopted, the proposed amendment would:

- Define salinity water quality objectives that are protective of beneficial uses in the LSJR. Specifically, the amendment would establish a water quality objective that would require that EC (at 25 degrees Celsius) not exceed 1,550  $\mu\text{S}/\text{cm}$  as a 30-day running average, except during Extended Dry Periods,<sup>25</sup> when the water quality objective would require that EC not

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<sup>23</sup> [http://www.waterboards.ca.gov/centralvalley/water\\_issues/salinity/tulare\\_lakebed\\_mun\\_evaluation/index.shtml](http://www.waterboards.ca.gov/centralvalley/water_issues/salinity/tulare_lakebed_mun_evaluation/index.shtml)

<sup>24</sup> [http://agcomm.co.tulare.ca.us/default/assets/File/2012CensusCA\\_1.pdf](http://agcomm.co.tulare.ca.us/default/assets/File/2012CensusCA_1.pdf)

<sup>25</sup> See footnote 2 in:

[http://www.waterboards.ca.gov/centralvalley/board\\_decisions/tentative\\_orders/1608/mun\\_wkshp/1608\\_lsir\\_wks\\_hp\\_mtrl.pdf](http://www.waterboards.ca.gov/centralvalley/board_decisions/tentative_orders/1608/mun_wkshp/1608_lsir_wks_hp_mtrl.pdf)

exceed 2,470  $\mu\text{S}/\text{cm}$  as a 30-day running average and 2,200  $\mu\text{S}/\text{cm}$  as the average of the previous four consecutive quarterly samples at a minimum.

- Incorporate into the SRSJR Basin Plan an implementation program to achieve proposed salinity water quality objectives.
- Set a performance goal of 1,350  $\mu\text{S}/\text{cm}$  during certain months and water year types, based on modeling results of expected water quality.
- Require the implementation of a monitoring and surveillance program to evaluate the effectiveness of the implementation program.

These proposed amendments would set objectives that would be protective of the two beneficial uses in the LSJR that are most sensitive to salinity impacts: AGR and MUN. MUN and the irrigation supply component of AGR were determined to be the most salt sensitive used after completion of separate studies on salinity impacts to aquatic life (Buchwalter 2014) and stock watering (Kennedy/Jenks Consulting 2013). In addition, setting an EC performance goal will promote achievement of the best possible water quality under variable conditions, consistent with the SNMP Drought and Water Conservation Policy.

The proposed amendments do not change or replace the EC water quality objectives for the San Joaquin River at the Airport Way Bridge near Vernalis established for water entering the southern Delta.<sup>26</sup> The outcome of this SRSJR Basin Plan amendment effort will guide salt management in the San Joaquin River watershed, consistent with the goals of the SNMP and its proposed Salinity Management Strategy. In addition, the proposed amendment provides guidance on: interpreting narrative objectives to protect AGR; adjusting regulation to account for extended dry periods; and managing salt at a basin-wide scale. The Basin Plan amendment is expected to be proposed for consideration in 2017.<sup>27</sup>

#### ES.4.4 Regulatory and Technical Studies to Support the SNMP

**Table ES-9** summarizes the regulatory evaluations and technical studies completed to support the development of the SNMP. Section 6b(3)(d) of the Recycled Water Policy identifies specific technical components required for inclusion in the SNMP: “*Salt and nutrient source identification, basin/sub-basin assimilative capacity and loading estimates, together with fate and transport of salts and nutrients.*” **Table ES-10** summarizes the studies that provide information on each Recycled Water Policy required component. All referenced documents in Tables ES-9 and ES-10 are available at <http://www.cvsalinity.org/index.php/committees/technical-advisory/technical-projects-index.html>.

<sup>26</sup> *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary*, State Water Resources Control Board, December 13, 2006.

<sup>27</sup> [http://www.waterboards.ca.gov/centralvalley/water\\_issues/salinity/upstream\\_salt\\_boron/index.shtml](http://www.waterboards.ca.gov/centralvalley/water_issues/salinity/upstream_salt_boron/index.shtml)

**Table ES-9. Regulatory and Technical Studies to Support SNMP Development and Implementation.**

Study	Purpose	Key Reference <sup>1</sup>
<b>Regulatory Studies to Support SNMP Development</b>		
<b>Salinity Effects on MUN-related Uses of Water</b>	Define what constitutes reasonable protection of existing and probable future MUN uses by evaluating the state of knowledge regarding the effects of elevated salinity concentrations on drinking water supply, including human health concerns, and other domestic uses of water, e.g., impacts of salinity on residential, commercial and industrial water-using devices	CDM Smith. 2016d. <i>Salinity Effects on MUN-related Uses</i> .
<b>Salinity Effects on Agricultural Irrigation Uses</b>	Define what constitutes reasonable protection of existing and probable future use of water for agricultural irrigation by evaluating the state of knowledge regarding the effects of elevated salinity concentrations on crop yields, wetland plants and vegetation commonly used for landscaping	CDM Smith. 2016c. <i>Salinity Effects on Agricultural Irrigation-related Uses</i> .
<b>Stock Watering Protection</b>	Identify water quality criteria that may be used to establish salinity and nitrate-related water quality objectives to protect stock watering supplies	Kennedy/Jenks Consultants. 2013. <i>Salt and Nutrients: Literature Review for Stock Drinking Water Final Report</i> .
<b>Aquatic Life Protection</b>	Evaluate potential water quality criteria that could be used to establish salinity-related water quality objectives to protect aquatic life	Buchwalter 2014. <i>Aquatic Life Study Final Report</i> .
<b>Technical Studies to Support SNMP Implementation</b>		
<b>Nitrate Implementation Measures Study (NIMS)</b>	Identify implementation measures to reduce current ambient nitrate concentrations in groundwater to protect and restore beneficial uses, consistent with the SNMP's management goals	CDM Smith. 2016a. <i>Nitrogen Implementation Measures Study Final Report</i> .
<b>Aggressive Restoration Modeling Scenario</b>	Understand better the types of nitrate control measures that would be necessary to meet the SNMP management goal to implement a managed aquifer restoration program	Luhdorff & Scalmanini Consulting Engineers and Larry Walker Associates. 2016b. <i>Alta Irrigation District Management Zone: Aggressive Restoration Alternative Modeling Scenario Results</i> .
<b>Alta Irrigation District Management Zone Archetype</b>	Facilitate the development of the CV-SALTS Groundwater Management Zone Policy by evaluating issues that might affect the development and implementation of a management zone.	Larry Walker Associates et al. 2016. <i>Management Zone Archetype Analysis Report: Alta Irrigation District</i> .
<b>Strategic Salt Accumulation Land and Transportation Study (SSALTS)</b>	Phased study to provide the technical basis for the establishment of a salt management program to achieve the Central Valley's SNMP management goal and support implementation of the recommended Salinity Management Strategy	<ul style="list-style-type: none"> <li>• CDM Smith. 2013. <i>SSALTS Final Phase 1 Report: Identification and Characterization of Existing Salt Accumulation Areas</i>.</li> <li>• CDM Smith. 2014. <i>SSALTS Final Phase 2 Report: Development of Potential Salt Management Strategies</i>.</li> <li>• CDM Smith. 2016b. <i>SSALTS Final Phase 3 Report: Evaluate Potential Salt Disposal Alternatives to Identify Acceptable Alternatives for Implementation</i>.</li> </ul>

<sup>1</sup> All referenced documents are available at: <http://www.cvsalinity.org/index.php/committees/technical-advisory/technical-projects-index.html>

**Table ES-10. CV-SALTS Technical Studies Completed to Satisfy Specific Recycled Water Policy SNMP Requirements for the Evaluation of Salt and Nitrate**

Required Recycled Water Policy Component	Relevant CV-SALTS Studies <sup>1</sup>
Salt and nutrient (nitrate) source identification	<ul style="list-style-type: none"> <li>• Larry Walker Associates et al. 2013. Initial Conceptual Model Final Report: Task 7 and 8 - <i>Salt and Nitrate Analysis for the Central Valley Floor and a Focused Analysis of Modesto and Kings Subregions</i>. December 2013.</li> <li>• Larry Walker Associates et al. 2016. <i>Management Zone Archetype Analysis Report: Alta Irrigation District</i>. July 2016.</li> <li>• CDM Smith. 2016a. <i>Nitrate Implementation Measures Study</i>. March 2016.</li> <li>• CDM Smith 2013 and 2014. <i>SSALTS Final Phase 1 Report: Identification and Characterization of Existing Salt Accumulation Areas; and Final Phase 2 Report: Development of Potential Salt Management Strategies</i>. December 2013 and October 2014, respectively.</li> </ul>
Basin/subbasin assimilative capacity	<ul style="list-style-type: none"> <li>• Larry Walker Associates et al. 2013. Initial Conceptual Model Final Report: Task 7 and 8 - <i>Salt and Nitrate Analysis for the Central Valley Floor and a Focused Analysis of Modesto and Kings Subregions</i>. December 2013.</li> <li>• Luhdorff &amp; Scalmanini Consulting Engineers and Larry Walker Associates. 2016a. <i>Region 5: Updated Groundwater Quality Analysis and High Resolution Mapping for Central Valley Salt and Nitrate Management Plan</i>; July 2016.</li> </ul>
Basin/subbasin loading estimates	<ul style="list-style-type: none"> <li>• Larry Walker Associates et al. 2013. Initial Conceptual Model Final Report: Task 7 and 8 - <i>Salt and Nitrate Analysis for the Central Valley Floor and a Focused Analysis of Modesto and Kings Subregions</i>. December 2013.</li> </ul>
Fate and transport of salts and nutrients (nitrate)	<ul style="list-style-type: none"> <li>• Larry Walker Associates et al. 2013. Initial Conceptual Model Final Report: Task 7 and 8 - <i>Salt and Nitrate Analysis for the Central Valley Floor and a Focused Analysis of Modesto and Kings Subregions</i>. December 2013.</li> </ul>
Implementation measures to manage salt and nutrient loading in the basin on a sustainable basis	<ul style="list-style-type: none"> <li>• CDM Smith. 2016b. <i>SSALTS Final Phase 3 Report: Evaluate Potential Salt Disposal Alternatives to Identify Acceptable Alternatives for Implementation</i>. October 2016.</li> <li>• CDM Smith. 2016a. <i>Nitrate Implementation Measures Study</i>. March 2016.</li> <li>• CDM Smith. 2014. <i>SSALTS Final Phase 2 Report: Development of Potential Salt Management Strategies</i>. October 2014.</li> <li>• CDM Smith 2013. <i>SSALTS Final Phase 1 Report: Identification and Characterization of Existing Salt Accumulation Areas</i>. December 2013.</li> <li>• Luhdorff &amp; Scalmanini Consulting Engineers and Larry Walker Associates. 2016b. <i>Alta Irrigation District Management Zone: Aggressive Restoration Alternative Modeling Scenario Results</i>. Technical memorandum prepared for CV-SALTS. September 2016.</li> <li>• Larry Walker Associates et al. 2016. <i>Management Zone Archetype Analysis Report: Alta Irrigation District</i>. July 2016.</li> </ul>

<sup>1</sup> Referenced CV-SALTS studies may be accessed at: <http://www.cvsalinity.org/index.php/committees/technical-advisory/technical-projects-index.html>

## ES.4.5 Central Valley Salt and Nitrate Management Strategy

### ES.4.5.1 Nitrate Management

The SNMP sets forth the nitrate management implementation strategy, consistent with the recommendations contained within the policies, strategies and guidance summarized in Table ES. 8, particular the Groundwater Management Zone Policy, Nitrate Permitting Strategy, and Exceptions Policy.

#### ES.4.5.1.1 Overview of the Nitrate Permitting Strategy

##### *Permitting Pathways*

The SNMP implementation approach for permitting nitrate discharges to groundwater is separated into two paths:

- **Path A** describes the proposed approach when an individual discharger (or third party group subject to a General Order wishing to proceed under Path A) decides to comply with the nitrate components of the SNMP as an individual/third party, or where there is no management zone. This pathway follows more closely with the Central Valley Water Board's traditional permitting approach, with some additional flexibility.
- **Path B** describes the proposed approach when an individual intends to participate in a management zone in order to comply with the nitrate components of the SNMP. The SNMP encourages dischargers to participate in management zones as the preferred method for complying with the nitrate components of the SNMP.

##### *Early Action Plans (EAP)*

Regardless of whether a discharger chooses Path A or B, all dischargers must assess nitrate levels in groundwater used for MUN that may be impacted by nitrate in their discharge(s) to ensure it is a safe, reliable source of drinking water with respect to nitrates. If impacted, and where the discharger is causing or contributing to an exceedance of nitrate in the groundwater, then the discharger shall submit an EAP that includes specific actions and a schedule of implementation to address the immediate needs of those drinking groundwater from public water supply or domestic wells that exceed the drinking water standard for nitrate. The timing of the submittal of the EAP depends on whether a discharger chooses permitting Path A or B.

##### *Prioritization of Implementation*

Considering the size of the Central Valley Region, and the varying degree of nitrate concentrations found in groundwater basins/subbasins throughout the region, it is impractical and unreasonable to expect that the nitrate management requirements will be implemented by everyone, everywhere, at the same time. Rather, it is appropriate for this SNMP to recommend an initial priority ranking of groundwater subbasins and time schedule for implementation of the nitrate management requirements. The recommended process also provides the Central Valley Water Board the discretion to consider water quality-based factors, and other relevant information, to adjust its determination of areas that should be prioritized first for implementation of the nitrate requirements and/or identify areas that would be considered lower priority. In general, the process is described as follows:



- **Step 1** – This step identified spatially higher priority areas at both one square mile grid and aggregate level (groundwater basin/subbasin) scales. **Table ES-11** lists the Initial Prioritization Scores for the Central Valley floor groundwater basins/subbasins based on the use of ambient nitrate water quality data for the upper zone in groundwater basins/subbasins. Based on these scores, CV-SALTS developed a recommendation for which basins/subbasins should be prioritized as Priority 1 and 2 – the first two tiers recommended for implementation. Notably, the identification of priority areas based on available water quality data and at this large of a scale may not accurately portray which areas in a basin/subbasin are truly at risk for nitrate contamination in drinking water. Therefore, it is appropriate for the Central Valley Water Board to have discretion to adjust the initial findings based on additional factors/criteria and information.
  
- **Step 2** – To revise the initial water quality-based prioritization in Step 1 for the groundwater basin/subbasins, the Central Valley Water Board has the discretion to consider additional factors and information to adjust the prioritized basins/subbasins, or parts of thereof, and schedule for implementing the nitrate requirements in those prioritized areas. In exercising this discretion, the Central Valley Water Board may conduct this additional analysis under its own initiative, or upon receiving information relative to the factors identified below by any interested persons. Further, the CV-SALTS Executive Committee may continue to evaluate additional data and information based on the factors identified below, and may provide the Central Valley Water Board with an updated recommendation for prioritization in the future. Any such recommendation or request for re-prioritization from the CV-SALTS Executive Committee or any interested persons, needs to be provided to the Central Valley Water Board prior to the close of any public comment period related the Central Valley Water Board’s adoption of Basin Plan amendments to implement the SNMP. The additional factors include but are not limited to:
  - (a) Degree to which areas (or subareas) with known drinking water supply contamination in groundwater in the upper zone in groundwater basins/subbasins will be addressed in a timely manner through the current order of priority based on water quality factors alone (Table ES-11).
  - (b) Additional data/information provided by discharger(s) and/or other stakeholders within a basin/subbasin (or subarea) that demonstrates that the nitrate concerns as identified in Tables ES-11 have been addressed or will be addressed via another program or activity.
  - (c) Additional data/information provided by discharger(s) and/or other stakeholders within a basin/subbasin (or subarea) that demonstrates that the ranking in Table ES-11 is not representative of groundwater drinking water conditions and that the basin/subbasin (or subarea) does not need to be prioritized because there are not concerns or risks for nitrate contamination to be found in groundwater relied on for drinking water purposes.

**Table ES-11. Ranking and Priority for Groundwater Basins/Subbasins Based on Step 1 of Prioritization Process Using Ambient Nitrate Concentrations in the Upper Zone<sup>1</sup>**

Groundwater Basin/Subbasin (DWR Bulletin 118) <sup>2</sup>			Initial Prioritization Score
Priority	Number	Name	
Priority 1	5-22.11	Kaweah	5.35
	5-22.03	Turlock	4.27
	5-22.05	Chowchilla	3.78
	5-22.13	Tule	3.48
	5-22.02	Modesto	3.09
	5-22.08	Kings	3.02
Priority 2	5-21.67	Yolo	2.89
	5-22.04	Merced	2.76
	5-22.14	Kern County (Westside South)	2.70
	5-22.12	Tulare Lake	2.44
	5-22.14	Kern County (Poso)	2.37
	5-22.07	Delta-Mendota	2.13
	5-22.01	Eastern San Joaquin	1.98
	5-22.06	Madera	1.93
Not Prioritized by SNMP <sup>3</sup>	2-4	Pittsburg Plain	1.70
	5-21.66	Solano	1.37
	5-22.15	Tracy	1.35
	2-3	Suisun-Fairfield Valley	1.34
	5-21.52	Colusa	1.26
	5-22.14	Kern County (Kern River)	1.21
	5-21.61	South Yuba	1.03
	5-21.64	North American	0.93
	5-21.57	Vina	0.92
	5-22.16	Cosumnes	0.87
	5-21.58	West Butte	0.83
	5-21.68	Capay Valley	0.80
	5-21.62	Sutter	0.71
	5-21.56	Los Molinos	0.70
	5-22.10	Pleasant Valley	0.64
	5-21.60	North Yuba	0.63
	5-21.65	South American	0.53
	5-21.54	Antelope	0.49
	5-21.59	East Butte	0.48
	5-21.51	Corning	0.45
	5-21.50	Red Bluff	0.27
	5-21.55	Dye Creek	0.25
	5-22.09	Westside	0.18
	5-21.53	Bend	0.18
	5-6.04	Enterprise	0.10
	5-6.03	Anderson	0.08
	5-6.01	Bowman	0.04
	5-6.06	South Battle Creek	0.00
5-6.05	Millville	0.00	
5-6.02	Rosewood	0.00	

<sup>1</sup> Water quality data source: Luhdorff and Scalmanini Consulting Engineers and Larry Walker Associates (2016a)

<sup>2</sup> The Kern County subbasin is split into three parts to be consistent with the Tulare Lake Basin Plan

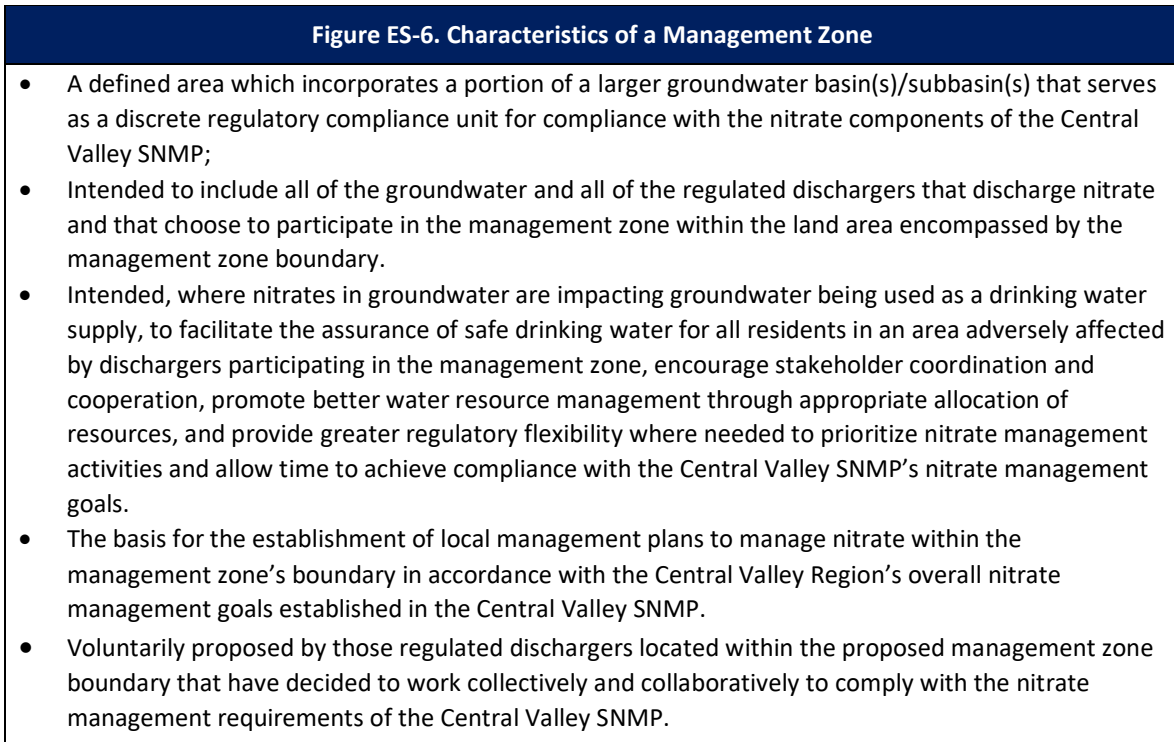
<sup>3</sup> Areas not prioritized in Priority 1 or 2 will still need to comply with the SNMP nitrate requirements in the future, but implementation of such requirements shall be phased in by the Central Valley Water Board as resources allow

- (d) Degree to which the area identified as a higher priority by water quality factors actually has impacted drinking water users (i.e., drinking water is predominately a surface water supply, or drinking water supplies are primarily groundwater).
- (e) Changes in groundwater basin/subbasin boundaries by DWR, which may affect the spatial order as presented in Table ES-11.
- (f) Maximizing efficient use of resources, which may affect the number of basins/subbasins (or subareas) that may be included on the Central Valley Water Board’s list of prioritized areas, and its schedule of implementation.

The SNMP recommends that implementation begin on the first tier of priority groundwater basins/subbasins within one year of the effective date of the Basin Plan amendments adopted to implement this SNMP and within two to four years of the effective date for the second tier priority groundwater basins/subbasins. Areas not prioritized within the first two tiers will still need to comply with the SNMP nitrate requirements in the future, but implementation of such requirements shall be phased in by the Central Valley Water Board as resources allow.

*Management Zones*

The Central Valley SNMP recommends and encourages the establishment of management zones for nitrate as an option for groundwater quality management at the local or subregional level, especially within the Central Valley floor. **Figure ES-6** summarizes the characteristics of a management zone.



<sup>1</sup> Dischargers within a management zone boundary that choose not to participate in the management zone, they must be able to provide assurance to the Central Valley Water Board that they are addressing any adverse effects directly or indirectly associated with their discharge.

The decision to establish a management zone should consider:

- A management zone is most appropriate in areas where the interactions among land use, water quality and water users are complex and significant concerns exist with meeting the nitrate water quality objectives established to protect the MUN beneficial uses in groundwater.
- A management zone may not be the best approach for management of discharges to groundwater where water management complexities or water quality concerns do not exist. This may be particularly true for dischargers located:
  - In areas where existing nitrate water quality is good, individuals and community water systems are not impacted, and long-term water quality trends are not a concern.
  - Outside of the Central Valley floor in the surrounding foothills and valleys.

In any of these situations, compliance with the nitrate management requirements of this SNMP may be best accomplished through existing water quality management programs implemented through individual WDRs/Conditional Waivers or, in some cases, through coordination with local agencies to enforce source water protection requirements.

#### ES.4.5.1.2 Permitting Pathways

**Figure ES-7** illustrates the initial activities (blue) that occur upon implementation of the nitrate management requirements of the SNMP when a prioritized area receives its notification to comply with the SNMP. Figure ES-7 also illustrates the steps to be followed by dischargers, depending on whether Pathway A (green) or B (orange) is chosen as the means to comply with the SNMP.

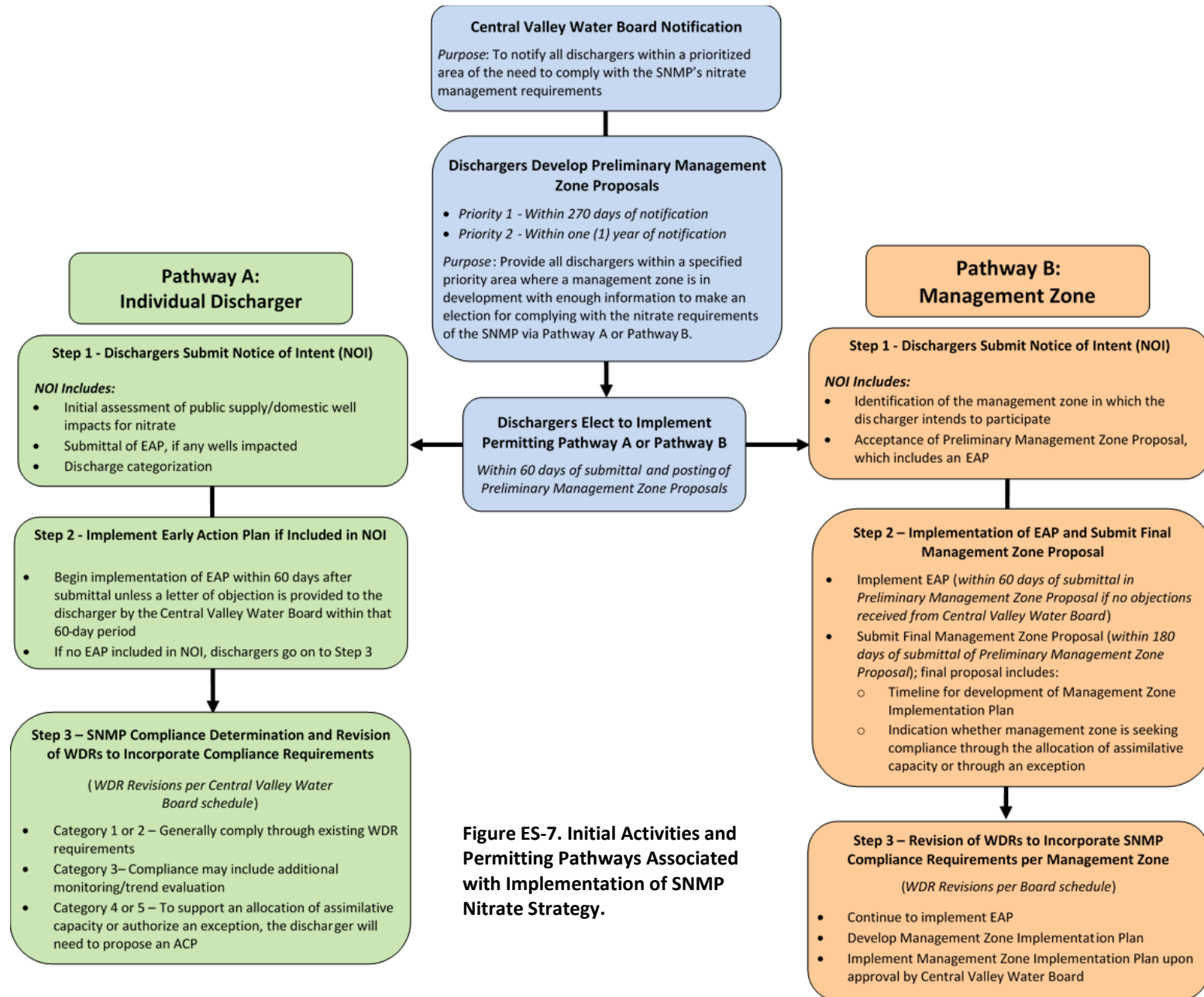
Initially dischargers within the notified priority area need to determine within a set period of time whether they plan to comply as an individual discharger (Path A) or as part of a management zone (Path B).<sup>28</sup> During this formulation period, dischargers interested in forming a management zone (or a lead entity on behalf of dischargers) should work collectively to develop a Preliminary Management Zone Proposal.

Initially dischargers within the notified priority area need to determine within a set period of time whether they plan to comply as an individual discharger (Path A) or as part of a management zone (Path B).<sup>29</sup> During this formulation period, dischargers interested in forming a management zone (or a lead entity on behalf of dischargers) should work collectively to develop a Preliminary Management Zone Proposal. The SNMP describes the required elements for this proposal:

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<sup>28</sup> For purposes of this notification, individual dischargers that are subject to General Orders that cover a specified geographic area or are commodity based, and that are administered by a Third Party (e.g., Third Party Orders for Irrigated Agriculture), the Third Party may provide notice as required in this step on behalf of its members. For individual dischargers that are subject to a General Order that is not administered by a Third Party (e.g., Dairy General Order), the individual must provide the necessary notice as indicated in this step.

<sup>29</sup> See previous footnote.



**Figure ES-7. Initial Activities and Permitting Pathways Associated with Implementation of SNMP Nitrate Strategy.**



- For dischargers within Priority Area 1 (see Table ES-11), a Preliminary Management Zone Proposal shall be submitted within 270 days of the effective date of the Basin Plan amendments that incorporate this SNMP into the Basin Plans. To support this deadline, Central Valley Water Board shall provide notice to Priority 1 dischargers in advance of the Basin Plan amendments becoming effective.
- For dischargers in Priority Area 2 (see Table ES-11), a Preliminary Management Zone Proposal shall be due within one (1) year from the notification provided by Board.

Areas not prioritized within Priority Areas 1 or 2 will still need to comply with the SNMP nitrate requirements in the future, but implementation of such requirements shall be phased in by the Central Valley Water Board as resources allow.

Regardless of the priority, the Executive Officer of the Central Valley Water Board shall retain discretion to extend the timelines for submittal of a Preliminary Management Zone Proposal if proper justification is provided to the Executive Officer at least 30 days prior to the deadline for submitting the proposal. Similarly, the Central Valley Water Board may adjust the priority of an area based on updated information.

The purpose for preparing a Preliminary Management Zone Proposal is to provide all dischargers within the specified priority area for a developing management zone with enough information to make an election for complying with the nitrate components of the SNMP via Path A (as an individual discharger/third party group) or via Path B (participant in a management zone). After conducting their own initial assessment of their discharge, and after evaluating any applicable Preliminary Management Zone Proposals, dischargers will then need to notify the Central Valley Water Board of their election of Path A or Path B. The SNMP recommends that the notification be made in the form of a Notice of Intent (NOI). The following sections below describe the steps that shall be implemented based on the selection of Path A or B.

*Path A - Individual Dischargers or Third Party Group Subject to General Order*

Figure ES-7 illustrates the steps to comply with Path A (green) beginning with the NOI submittal requirements. Developing permit requirements depends on the impact of the individual discharger to the underlying groundwater – measured in shallow groundwater.<sup>30</sup> The level of effort and the requirements imposed by the Central Valley Water Board in permitting nitrate discharges will vary depending on the impact to water quality. The SNMP recognizes that some discharges of nitrates to groundwater would be considered low-threat, and are therefore relatively simple for the Board to authorize in existing WDRs, or renewed/revised WDRs. In contrast, there may be discharges of nitrates that are above the drinking water standard and there is no available assimilative capacity. Given this range of potential conditions, the SNMP establishes five categories for dischargers choosing to comply with the SNMP via Path A (**Table ES-12**). The following steps in Path A summarize discharger requirements to comply with the SNMP:

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<sup>30</sup> For the purposes of the SNMP, shallow groundwater is defined as follows: The shallowest portion within the upper zone (e.g., uppermost 10% of the upper zone) and where groundwater would be considered to constitute an aquifer (which is defined as a “body of rock or sediment that is sufficiently porous and permeable to store, transmit, and yield significant or economic quantities of groundwater to wells and springs” [DWR, 2003]). In all cases, relevant groundwater does not include perched water.

**Table ES-12. Discharge Categories Applicable to Path A.**

Discharge Category	Central Valley Water Board Findings/Conditions
<b>Category 1</b> - No Degradation Category	Discharge <sup>1</sup> is equal to or less than the water quality objective of 10 mg/L, and the discharge is better than baseline receiving water quality.
<b>Category 2</b> - <i>De minimus</i> Category	Baseline receiving water has available assimilative capacity (i.e., is better than the water quality objective). For this category, the discharge(s) may be above the water quality objective as it enters the receiving water, but the discharge(s) will use less than 10% of the available assimilative capacity over a 20-year period and will not cause the receiving water to exceed a trigger of 7.5 mg/L in that time period. This would be considered a <i>de minimus</i> discharge.
<b>Category 3</b> - Degradation Below 75% of the Water Quality Objective Category	Discharges will be considered as part of this category if the discharge occurs in a basin where concentrations in the volume-weighted upper zone do not exceed an acceptable annual increase <sup>2</sup> and the discharger(s) anticipate using available assimilative capacity in baseline receiving water that is considered to be more than <i>de minimus</i> but will not cause the receiving water to exceed a trigger of 75% of the water quality objective for nitrate over a 20-year planning horizon. To allow use of assimilative capacity in this circumstance, the Central Valley Water Board may find it necessary to include additional monitoring and trend evaluations as part of the WDRs in order to make appropriate findings consistent with Resolution 68-16 and the SNMP.
<b>Category 4</b> - Degradation Above 75% of the Water Quality Objective Category, or Receiving Water Quality is at 50% of the water quality objective and the Discharge(s) Occur in a Basin where Concentrations in the Volume-weighted Average of the Upper Zone Exceeds the Acceptable Annual Increase. <sup>2</sup>	Discharges will be considered as part of this category if they anticipate using available assimilative capacity in the receiving water, and use of assimilative capacity will cause the receiving water to exceed the trigger of 75% of the water quality objective for nitrate over a 20-year planning horizon, or the receiving water is already at 50% of the water quality objective and the discharge(s) occur in a basin where the volume-weighted average of the upper zone exceeds an acceptable annual increase in concentration. <sup>2</sup> To allow use of assimilative capacity in this circumstance, the discharger must submit a proposed ACP to the Central Valley Water Board to be included as an additional condition in the WDRs in order to make appropriate findings consistent with Resolution 68-16 and the SNMP <sup>3</sup>
<b>Category 5</b> - Discharge Above Objective and No Available Assimilative Capacity	Discharges that exceed the water quality objective for nitrate, and where the receiving water has no available assimilative capacity, will be considered to be part of this category. Discharges in this category will need to seek an exception pursuant to the Exceptions Policy under the SNMP. or the discharge may be prohibited

<sup>1</sup> Discharge as used here is intended to mean the quality of the discharge as it enters first encountered groundwater. Thus, the quality of the discharge itself may exceed the standard but due to transformation and other variables, it meets or is better than the objective as it enters first encountered groundwater.

<sup>2</sup> Acceptable annual increase: Upper zone concentrations do not increase more than 0.1 mg/L NO<sub>3</sub>-N per year using cumulative average annual increase over a five-year period. The cumulative average refers to an Olympic average, meaning that the highest and lowest sample results are removed; average is calculated from the remaining results. This helps address statistical outliers that otherwise may skew the results.

<sup>3</sup> It is expected that an ACP will be required by the Central Valley Water Board if they agree to authorize use of assimilative capacity for dischargers that fall within Category 4 as an ACP will be an essential element of their ability to make the necessary findings pursuant to Resolution 68-16. However, the Central Valley Water Board maintains the discretion to make an exception in limited and unique circumstances to authorize assimilative capacity to discharges that fall within Category 4 without an ACP but the Central Valley Water Board will still need to make all necessary findings pursuant to Resolution 68-16.

**Step 1** - Submittal of the NOI, which shall include (Figure ES-7):

- An initial assessment of receiving water and/or discharge conditions.
- For traditional point sources, an initial assessment to determine if the discharge is impacting any nearby public water supply wells or domestic wells for nitrates based on all readily available data and information; for non-point sources, identification of areas where there are “hot spots” with respect to nitrate concentrations in groundwater based on all readily available data and information.
- As applicable, an EAP that includes specific actions and a schedule of implementation to address immediate needs of those drinking groundwater that exceeds the drinking water standard if there are public water supply or domestic wells impacted by nitrates from discharges covered by the NOI. It is anticipated that discharges in Categories 1 through 3 will not need an EAP because such discharges are arguably not causing or contributing to an exceedance of the nitrate drinking water standard. Discharges in categories 4 and 5 may need to prepare an EAP, which may be part of a proposed Alternate Compliance Plan (ACP). An EAP is just that, an identification of early actions. The EAP may not be comprehensive, and may need to be revised and supplemented with additional information as part of the ACP that is incorporated directly into the WDRs.
- Identification of Category of the Discharge (see Table ES-12).
- Information necessary to support allocation of assimilative capacity, as applicable, consistent with the requirements of the SNMP.
- Application for Exception pursuant to the SNMP Exceptions Policy, as applicable (see Section ES.4.5.1.3 below).
- If the discharger(s) is in an area that is covered by a Preliminary Management Zone Proposal, and the discharger(s) is seeking an allocation of assimilative capacity under Path A, the discharger(s) must show how allocation of assimilative capacity to the individual discharger will impact (or not) available assimilative capacity for those participating in the management zone.

**Step 2** - If the NOI includes an EAP to address immediate drinking water needs, the Central Valley Water Board will notify the discharger within 30 days if the discharger may proceed with implementing the EAP. If no EAP was submitted as part of the NOI, this Path A step is not applicable to the discharger.

**Step 3** - Based on the information in the NOI submitted in Step 1 the Central Valley Water Board shall determine if the discharger can comply with the SNMP with no further action, or if the discharger will be required to submit additional information and/or if additional WDR conditions are necessary for the discharger to comply with the SNMP for nitrates. In general, per Table ES-12:

- *Categories 1 and 2* – These discharges will be determined to comply with the SNMP for nitrates without the need for further conditions or requirements.

- *Category 3* - The Central Valley Water Board must make findings that are consistent with the State's Antidegradation Policy (Resolution No. 68-16). Depending on the level of degradation, the Central Valley Water Board may require additional conditions in WDRs to implement the SNMP, and to allocate assimilative capacity, which in the case of Category 3, may consist of additional monitoring and trend evaluations.
- *Categories 4 and 5* - To receive Central Valley Water Board approval for the allocation of assimilative capacity or approval of an exception pursuant to the Exceptions Policy, the discharger will need to propose an ACP as part of the NOI, or according to a date otherwise agreed to by the Executive Officer.

To make findings of compliance with the nitrate components of the SNMP, the Central Valley Water Board must make the findings and/or impose the conditions applicable to each individual category, as summarized in the SNMP. The findings and/or conditions shall be included in a new/revised WDR.

#### *Path B – Participants in a Management Zone*

Path B is for those dischargers that desire to work collectively to comply with the SNMP by participation in a management zone. After an area is activated for SNMP implementation based on priority, dischargers are encouraged to work together to develop the Preliminary Management Zone Proposal (See SNMP for specific requirements). Following submittal of this proposal dischargers that have selected Path B will continue to implement this SNMP per the following steps (see Figure ES-7, orange):

- **Step 1 - Submittal of Notice of Intent** – Within 60 days of availability of a Preliminary Management Zone Proposal for a specified area, dischargers within that area that intend to comply with Path B, shall submit an NOI to the Central Valley Water Board that includes: (a) identification of the management zone in which the discharger intends to participate, and (b) acknowledgement that they have reviewed and understand the commitments associated with participation in the management zone based on the Preliminary Management Zone Proposal that applies to their area of discharge. If any dischargers within the area proposed for a management zone decide not to participate in the management zone, they must comply with the requirements specified for Path A.
- **Step 2 – Implementation of EAP and Final Management Zone Proposal** - As part of participating in a management zone, dischargers will need to collectively be responsible for implementing the EAP that was submitted as part of the Preliminary Management Zone Proposal. The time for beginning to implement the EAP shall be based on Central Valley Water Board acceptance of the EAP, which shall be indicated through a notice to proceed from the Central Valley Water Board to the lead entity responsible for the management zone Within 60 days after submittal of the Preliminary Management Zone Proposal to the Central Valley Water Board and if no objections to the EAP are provided in writing by the Central Valley Water Board, the management zone must begin implementing the EAP. Further, although WDRs for dischargers participating in a management zone will not yet be revised at this step in the process, the SNMP recommends that the Central Valley Water Board find participating dischargers in compliance with nitrate components of the SNMP as long as the participant is timely, and in good faith, participating in the management zone.

Participating in the management zone includes assisting in the implementation of the EAP, and assisting in developing the Final Management Zone Proposal. For dischargers that are subject to a General Order as a member of a Third Party Group, Third Party Group participation on behalf of its members shall constitute discharger participation. Third Party Groups shall make all reasonable efforts to inform its members of participation in any Groundwater Management Zone.

Within a 180 days after submittal of a Preliminary Proposal, the management zone must submit a Final Management Zone Proposal. The SNMP summarizes the requirements for submittal of this proposal. The Final Management Zone Proposal shall include a timeline for preparation of a detailed Management Zone Implementation Plan and indicate if the management zone is seeking compliance through the allocation of assimilative capacity or through an exception to meeting the water quality objective. The SNMP summarizes the minimum requirements for the Management Zone Implementation Plan.

- **Step 3 - Revision of WDRs/Compliance with SNMP** – The Central Valley Water Board will revise WDRs/Conditional Waivers for those dischargers participating in the management zone after receiving the Final Management Zone Proposal. Revisions to relevant WDRs/Conditional Waivers may occur individually, or through a resolution that amends all applicable WDRs/Conditional Waivers. Upon timely submittal of the Final Management Zone Proposal, dischargers identified as being participants of the management zone shall be deemed to be in compliance with nitrate requirements in individual WDRs/Conditional Waivers as long as the discharger (a) continues to be an active participant in the management zone; and (b) the management zone is meeting identified timelines and milestones in a timely manner, including implementation of the EAP.

Before the Central Valley Water Board may modify any WDRs to incorporate the use of assimilative capacity on a management zone basis or to adopt an exception to meeting a water quality objective in a WDR for a discharger participating in the management zone, the Central Valley Water Board's Executive Officer must approve the establishment of the management zone and its implementation plan after providing public notice and opportunity to comment. Prior to approval of a management zone and a Management Zone Implementation Plan, the Central Valley Water Board may adopt and/or modify WDRs to include time schedules that allow dischargers participating in a management zone an appropriate amount of time before being required to comply immediately with limitations related directly to nitrate water quality objectives. Executive Officer approval of the management zone in no way changes the requirement that any modifications to WDRs must be approved by the Central Valley Water Board after public notice and hearing.

#### **ES.4.5.1.3 Allocation of Assimilative Capacity**

Overall, the SNMP recommends that the Central Valley Water Board be predisposed to allocate assimilative capacity, and allow lower water quality, where doing so assures a significantly better outcome for the people of California than would requiring strict compliance with default waste discharge requirements. Further, the SNMP recommends that the Central Valley Water Board prioritize allocations of assimilative capacity when and where it would provide a demonstrably more effective means of assuring safe drinking water than other available permitting alternatives.



However, the SNMP also recognizes the importance of protecting high quality waters and for this reason, the SNMP recommends triggers to maintain an appropriate safety factor to ensure that high quality receiving waters do not exceed the water quality objective for nitrate.

In general, to determine that the allocation of assimilative capacity “will not result in water quality less than that prescribed in the policies,” the SNMP recommends that the Central Valley Water Board require dischargers to demonstrate that the permitted discharge(s) will not cause the average nitrate concentration in the relevant groundwater to exceed 10 mg/L. The SNMP recommends that relevant groundwater be the area referred to as shallow groundwater, or be a volume-weighted average for the upper zones.

With respect to determining if assimilative capacity is available, the level of demonstration needed would vary based on a number of different factors. For example, for discharges from a single facility (often referred to as a point source discharger), the demonstration may be relatively simple if the discharger is seeking to show available assimilative capacity from looking at shallow groundwater and the discharger has the necessary data and information to show that the discharge will not cause shallow groundwater to exceed the established trigger levels over a 20-year planning horizon. At the other end of the scale, multiple dischargers seeking to show assimilative capacity available in the upper zone over a defined management zone area will likely need more extensive data and information, and/or modeling, to make the demonstration that established trigger levels will not be exceeded within a defined time frame. In general, the Central Valley Water Board should not allocate use of assimilative capacity based on a volume weighted average in the upper zone that would result in groundwater exceeding a trigger level of 75% of the nitrate water quality objective over a 20-year time frame, unless the Central Valley Water Board can properly find that use of assimilative capacity above this trigger level will not result in pollution or nuisance over the longer term.

The allocations of assimilative capacity by the Central Valley Water Board shall be determined based on the permitting strategy pathway that individual dischargers (Path A) or groups of dischargers (Path B) choose relative to nitrate permitting. Section ES.4.5.1.2 above describes in detail the two pathways, and the allocation of assimilative capacity that is applicable based on the pathway that is selected. Granting assimilative capacity based on the upper zone would typically need to be accompanied with a proposed ACP while granting assimilative capacity in shallow groundwater may not. Notably, however, there may be unique circumstances where the Central Valley Water Board finds it appropriate to consider the allocation of assimilative capacity based on the upper zone but determines that an ACP is not necessary. For example, in some areas of the Central Valley, groundwater quality is excellent with respect to nitrates and historical and present data indicates that there are limited threats to degradation of groundwater quality based on past and current practices. In such cases, the Central Valley Water Board retains its discretion to determine the availability of assimilative capacity using averages in the upper zone without triggering the need for an ACP. However, in all cases, if there are localized “hot spots,” dischargers’ causing or contributing to nitrate levels in the localized area may be required to propose an ACP for that specific area.

Where an ACP is required, the proposed ACP should be designed to mitigate the significant adverse effect(s) of the permitted discharge(s) as it relates to nitrate for which an exception is

granted. Moreover, as part of an ACP for nitrate, discharger(s) will need to show that groundwater users down-gradient of the discharge(s) have drinking water that meets applicable state and federal standards. ACPs may include both interim actions (e.g., bottled water) in the short-term, permanent solutions (such as well-head treatment or alternative drinking water supplies) in the intermediate term, and efforts to re-attain the water quality objective (where feasible and practicable) over the long-term. Any short and/or long-term drinking water solutions must be developed with participation and concurrence of those benefiting from the project(s). The SNMP provides guidelines for development of an ACP.

To permit the use of assimilative capacity, the Central Valley Water Board is required to find that the discharger, or dischargers, are implementing “best practicable treatment or control necessary to assure that a pollution or nuisance will not occur.” In cases where assimilative capacity is being granted based on availability of assimilative capacity in the upper zone, the SNMP recommends that the Central Valley Water Board next consider whether mitigation strategies applied at any other point between the discharge and all affected down-gradient water users (e.g., wellhead treatment or alternative water supply, etc.) can better assure safe drinking water to those users.

Overall, it is anticipated that the level of analysis necessary to support an allocation of assimilative capacity, and required findings relative to evaluating BPTC and compliance with the state’s Antidegradation Policy, will vary based on the relevant groundwater being used to determine if assimilative capacity is available (i.e., shallow versus upper zones). For example, to evaluate if BPTC is being implemented granting use of assimilative capacity based on the upper zone, the SNMP recommends that a complete antidegradation analysis be prepared by the discharger(s), and that such analysis include an evaluation of alternatives, which considers socioeconomic impacts of different control/treatment measures, and if different control/treatment measures are reasonable, practicable, and/or feasible.

In conjunction with evaluating BPTC, the Central Valley Water Board must determine whether allocating assimilative capacity to authorize a discharge that is expected to lower water quality is “consistent with maximum benefit to the people of the state.” To make this finding for nitrate discharges, the SNMP recommends that the Central Valley Water Board consider the following factors:

- 1) Economic and social costs, tangible and intangible, direct and indirect, of the proposed discharge compared to the benefits for both the discharger and all others that may be affected by the discharge. This includes an evaluation of the discharger's capacity to bear the cost of compliance (e.g., “affordability”) and any potential adverse impacts to the surrounding community. This is not intended to be a formal Cost-Benefit Analysis.
- 2) Environmental effects of allowing or prohibiting the proposed discharge (especially the net effect on water quality in the region and the Central Valley Water Board's long-term restoration plans). In some cases, where the net effect on receiving water quality is shown to be spatially and/or temporally-limited, the Central Valley Water Board may conclude that the discharge does not result in significant degradation.

In general, the Central Valley Water Board is less likely to allocate assimilative capacity to discharges where there is a reasonable, feasible, and practicable means for achieving compliance

with traditional waste discharge requirements. The Central Valley Water Board is also unlikely to prohibit discharges where no such means exist and considers this option only as a last resort.

Notably, if the Central Valley Water Board concludes that, even after implementing BPTC, a discharge will unreasonably affect present or anticipated beneficial uses of water, or result in water quality less than that prescribed in the Basin Plan, or cause an unmitigated pollution or nuisance to occur, or is inconsistent with maximum benefit to the people of the state, then lower water quality cannot be authorized by allocating a portion of the available assimilative capacity. However, the discharge(s) may still be permitted if the Central Valley Water Board determines that it is appropriate to grant an exception to meeting the water quality standard for nitrate.

#### **ES.4.5.1.4 Granting an Exception to Meeting the Water Quality Objective for Nitrate**

The SNMP recommends that where existing groundwater quality already exceeds the MCL for nitrate (i.e., > 10 mg/L), or where the Central Valley Water Board is unable to allocate available assimilative capacity, that the Central Valley Water Board's foremost goal should be to encourage rapid implementation of safe drinking water alternatives. To achieve this goal, the Central Valley Water Board needs additional permitting options. Specifically, the SNMP recommends that the Basin Plans be amended to extend and expand the Central Valley Water Board's current authority to authorize exceptions<sup>31</sup> under certain circumstances. This section describes how such exceptions authority should be applied with respect to permitting nitrate discharges to groundwater. See the SNMP for a more detailed description.

An “exception” allows the Central Valley Water Board to authorize a discharge to occur even where doing so may violate applicable water quality standards in the receiving groundwater basin.<sup>32</sup> Exceptions are most commonly employed when there is no feasible, practicable or reasonable means for a discharge to meet with water quality objectives and it is not feasible, practicable or reasonable to prohibit the discharge.

Exceptions are an appropriate option when state authorities determine that prohibiting a discharge would do more harm than good and allowing it to continue is in the best interests of the people of the state. Exceptions may also be an appropriate tool to authorize the time required to implement other regulatory solutions (e.g., developing site-specific objectives or reevaluating the applicable beneficial use) or to support a program of phased implementation and reasonable resource allocation including the planning and permitting activities required in such programs. However, exceptions are not intended to be a permanent waiver from compliance obligations. They are subject to specified conditions and reviewable periodically.

In granting an exception, the Central Valley Water Board must consider the three management goals, as discussed in Section ES.1.3. In addition, the SNMP recommends two overarching conditions when authorizing an exception for nitrate:

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<sup>31</sup> Central Valley Water Board Resolution No. R5-2014-0074 (June 6, 2014); subsequently approved by the SWRCB in Res. No. 2015-0010 (March 17, 2015).

<sup>32</sup> Exceptions from compliance with water quality standards in a groundwater basin is similar to the concept of a “variance” for surface waters. The key distinction is that exceptions are governed exclusively by state law and variances are subject to both state and federal authority. See, for example, Resolution. No. R5-2014-0074.

- Dischargers are still expected to make reasonable best efforts intended to comply with applicable WDRs when there exists a feasible and practicable means for doing so.
- In lieu of meeting the applicable water quality objective for nitrate, dischargers will be expected to propose an ACP designed to mitigate the significant adverse effect(s) of their permitted discharge as it relates to nitrate for which an exception is granted. Moreover, an ACP for nitrate will need to assure that groundwater users down-gradient whose groundwater is impacted by the discharge have drinking water that meets applicable state and federal standards. ACPs may include interim actions (e.g., bottled water) in the short-term, permanent solutions (such as well-head treatment or alternative drinking water supplies) in the intermediate term, and efforts to re-attain the water quality objective (where feasible and practicable) over the long-term.

The SNMP recommends that exceptions be reviewable for two reasons:

- Although the means to assure compliance may not currently exist, new source control and treatment technologies may be developed in the future. Therefore, exceptions need to be periodically reassessed.
- Permanent exceptions would be tantamount to nullifying the designated use. Therefore, where compliance cannot be assured (even over the long-term), the State Water Board has stated that the Regional Boards should consider whether the water quality standard itself is appropriate.<sup>33</sup> Exceptions are intended to complement, not replace, the water quality standards review process.

In the Basin Plans, guidance under the current exceptions policy is restricted to a limited number of salinity constituents (electrical conductivity, TDS, chloride, sulfate and sodium).<sup>34</sup> As discussed above, this policy is recommended for revision in order to provide the Central Valley Water Board additional guidance for allowing exceptions for nitrate in WDRs. The SNMP summarizes the factors that the SNMP the Central Valley Water Board should consider when evaluating a request for an exception.

Finally, to approve an exception for nitrate, the SNMP recommends that the Central Valley Water Board consider whether the ACP will result in a higher level of public health protection (e.g., greater or faster risk reduction) than is likely to otherwise occur if the discharge were prohibited or is a key part of a long-term restoration strategy. In other words, will the ACP do a better job of achieving the real-world outcomes originally sought by requiring strict compliance with WDRs to meet water quality standards.

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<sup>33</sup> State Water Board Order No. WQ-81-5: In the Matter of the Petition of the City of Lompoc for Review of Order No. 80-03 (NPDES Permit No. CA 0048127), California Regional Water Quality Control Board, Central Coast Region. (March 19, 1981).

<sup>34</sup> Central Valley Water Board Resolution No. R5-2014-0074.

## ES.4.5.2 Salt Management

### ES.4.5.2.1 Overview

Salt management under the SNMP will be guided by the Salinity Management Strategy, which provides the Central Valley Water Board with a phased process for moving forward with long-term salinity management while identifying an interim permitting approach for salinity discharges. This strategy is intended to:

- Control the rate of degradation (“managed degradation”);
- Achieve long-term sustainability (salt balance), where feasible, practicable and reasonable; and
- Protect beneficial uses by meeting applicable water quality objectives and applying appropriate antidegradation concerns.

**Table ES-13** summarizes the three-phased Salinity Management Strategy. Phase I consists of developing a Prioritization and Optimization Study for salinity management for the entirety of the Central Valley Region. The overall goal of this study is to conduct a feasibility study that identifies appropriate regional and subregional projects, including location, routing and implementation/operation of specific salt management projects. Subsequent phases of the Salinity Management Strategy will emphasize environmental permitting, engineering design and acquiring funding (Phase II) and construction of salt mitigation projects (Phase III).

**Table ES-13. Salinity Management Strategy Phases**

Strategy Phase	Key Activities
<b>Phase I</b>	<ul style="list-style-type: none"> <li>▪ Prioritization and Optimization Study:                             <ul style="list-style-type: none"> <li>• Evaluate the impact of all state policies that impact management of salinity in the Central Valley region (e.g., Bay Delta Plan) to both surface and ground waters;</li> <li>• Identify physical projects and proposed locations for long-term management of salt (e.g., regulated brine line, salt-sinks, regional/sub-regional de-salters, recharge areas, deep well injection, etc.);</li> <li>• Identify non-physical projects that help with managing salinity;</li> <li>• Develop governance structures for implementation of the physical projects;</li> <li>• Identify funding sources necessary for implementation of large-scale capital physical projects (state and federal capital expenditures);</li> <li>• Identify the various environmental permits (and time-line for obtaining the permits) needed to implement the preferred physical projects;</li> <li>• Identify and propose any necessary Basin Plan changes that may be necessary to implement the next Phase or Phases of the Salinity Management Strategy (e.g., Offset Policy in surface waters);</li> <li>• Develop the conceptual design for applicable projects; and,</li> <li>• Other related activities.</li> </ul> </li> <li>▪ Implement Interim Salinity Permitting Approach</li> </ul>
<b>Phase II</b>	<ul style="list-style-type: none"> <li>▪ Environmental Permitting</li> <li>▪ Engineering Design</li> <li>▪ Obtain Funding</li> <li>▪ Revises Interim Salinity Permitting Approach (as needed)</li> </ul>
<b>Phase III</b>	<ul style="list-style-type: none"> <li>▪ Salinity mitigation project construction including Central Valley regulated brine line</li> </ul>

**Figure ES-8** provides an illustration of anticipated key milestones to be completed during the Phase I Prioritization and Optimization Study. While it is anticipated that completion of these milestones will take approximately 10-years, the SNMPs recommends that the Executive Officer of the Central Valley Water Board be given the direct authority to extend this time frame if compelling reasons or adequate justification is provided for an extension.

Once the Prioritization and Optimization Study is completed and the Basin Plans are amended based on recommendations from the Study, Phase II of the Salinity Management Plan will be implemented. The duration of Phase II is anticipated to be approximately 10 years. As with Phase I, the SNMP recommends that the Executive Officer of the Central Valley Water Board be given the authority to extend the anticipated time frame for compelling reasons, which may include availability of adequate funding to move forward with implementation of Phase II. Actual construction of physical projects would occur in Phase III, subject to available funding, completion and approval of environmental impact studies, and other necessary approvals.

#### **ES.4.5.2.2 Interim Salinity Permitting Approach**

While the Prioritization and Optimization Study is being implemented, this SNMP recommends that the Basin Plans be amended to include an Interim Salinity Permitting Approach for discharges of salinity. This approach would allow the Central Valley Water Board to manage degradation while the long-term salinity management efforts are being implemented. Because this approach is intended to be interim in nature, this approach would likely include a sunset provision in the Basin Plans, which could be renewed depending on the efforts associated with implementing the various applicable phases of the Salinity Management Strategy. At the outset, CV-SALTS recommends that the Interim Salinity Permitting Approach be set in place for 15 years to allow for implementation of Phase I of the Salinity Management Strategy. At the end of Phase I, the Interim Salinity Permitting Approach may need to be extended to allow for implementation of Phase II, or to adjust the approach as deemed appropriate to implement Phase II. Any such change may require a Basin Plan amendment.

##### *Basis for Interim Salinity Permitting Approach*

The proposed interim permitting approach for salinity is based on the following findings and governing principles:

- This approach applies to permitting salinity discharges to surface and groundwater in the defined interim period.
- The proposed approach for permitting salinity discharges to surface and groundwater must be implemented in a manner consistent with state and federal Antidegradation Policies (, as applicable.
- No proven means exist at present that will allow ongoing human activity in the Central Valley Region and maintain salinity levels throughout every groundwater basin.<sup>35</sup> Water conservation and increased recycled water use also increase salinity levels in groundwater.

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<sup>35</sup> TLB Basin Plan, Pg. III-8.



Therefore, the approach focuses on managing degradation while the long-term components of the Salinity Management Strategy are being implemented.

- It is reasonable to employ a long-term interim permitting approach. For example, the salt load currently existing in the vadose zone is typically unknown, but this load can impact the quality of the underlying groundwater over many years. In addition, the time required for recharge water to transit the vadose zone and return to use as groundwater at an irrigation supply well can be significant.
- Because of the long-term nature and anticipated high costs for implementation of the Salinity Management Strategy, it is reasonable to expect that dischargers will not be able to implement such strategies individually, but will need to participate in a larger region-wide collective effort. The larger collective effort would begin with implementation of the Prioritization and Optimization Study (Phase I), followed by Phases II and III. Due to the anticipated costs of these efforts, it is appropriate that discharges not be subject to extensive and/or expensive salinity permit requirements during this interim period. In particular, individual discharge efforts would have little impact on Central Valley salinity management as a whole, and as such they are not reasonable, feasible or practicable.
- It is reasonable to expect that permit requirements (e.g., WDRs/Conditional Waivers, NPDES Permits) with respect to implementing the long-term Salinity Management Strategy to allow time to address drinking water issues for nitrates first. The SNMP identifies nitrate drinking water issues as its first near-term priority. Salinity is also a priority, but due to the complexities associated with salinity, it will need to be addressed over the long-term.
- To allow for the phased approach, and the interim permitting approach described herein, the managed degradation objectives and specified salinity limitations in the TLB Basin Plan need to be deleted from the Basin Plan.
- The Central Valley Water Board retains authority to identify high priority saline discharges and/or areas where more stringent control programs must be implemented.

#### *Permitting Approach*

- To implement the Interim Permitting Approach in WDRs/Conditional Waivers, the Central Valley Water Board will need to renew/revise existing WDRs/Conditional Waivers and NPDES Permits. Further, during this interim period, there will be new dischargers, or existing dischargers seeking facility modifications, that will have salinity discharges. As noted above, the SNMP recommends a prioritization approach for addressing nitrate drinking water issues based on the severity of water quality contamination and immediate impact to users. It is not the intent of the Salinity Management Strategy to use limited available resources to revise individual WDRs/Conditional Waivers and NPDES Permits for salinity, especially where there are significant nitrate water quality issues. However, there is a need to ensure that efforts are moving forward with respect to the Phase I Prioritization and Optimization Study.

Figure ES. -8. Milestones for Implementation of Phase I of the Salinity Management Strategy

Category	Year of Implementation									
	1	2	3	4	5	6	7	8	9	10
Stakeholder Coordination	Stakeholder Coordination Meetings (as needed frequency)									
	SGMA GSA Coordination Meetings (as needed frequency)									
Strategic Planning	Regulatory and Policy Evaluations								Phase II Planning	
Governance	Governance Plan – Formation and Structure					Implementation and Refinement of Governance Plan				
Funding	Funding Plan and Financing Strategy					Implementation of the Funding Plan and Financing Strategy				
Prioritization & Salinity Management Analyses	Prioritization/Salt Management Analyses to Support Identification of Salt Management Projects				Interim Report					
Conceptual Design of Salt Management Project						Concept Design for Subregional Salt Management Projects and Regional CVBL Project				
Special Studies				Groundwater Quality Trace Constituent Stud						
			Emerging Tech Update No. 1			Emerging Tech Update No. 2			Emerging Tech Update No. 3	
						Recycled Water Imports Study				
								Stormwater Recharge Master Plan Study		

To balance these two needs, this SNMP recommends that the Central Valley Water Board, in cooperation with stakeholders, implement a process whereby a series of resolutions/orders that amend applicable WDRs/Conditional Waivers are considered for adoption by the Central Valley Water Board to implement the Interim Permitting Approach. This approach would provide for discharger compliance with salinity water quality objectives during Phase I of the implementation of the Salinity Management Strategy as long as the discharger is in compliance with Interim Permit Provisions applicable to their discharge, rather than through stringent water receiving limits and/or effluent limits. The SNMP includes recommended Interim Permit Provisions that would require dischargers to continue current reasonable, feasible and practicable efforts to control levels of salinity in their discharges while participating in efforts to conduct the Phase I Prioritization and Optimization Study.

#### **ES.4.5.1.2 Opting Out of Participation in the Prioritization and Optimization Study**

It is anticipated that the Central Valley Water Board will encourage most dischargers will choose to participate in the Phase I Prioritization and Optimization Study. However, the Central Valley Water Board does not have the authority to force dischargers into the Interim Permitting Approach, and to participate in the Prioritization and Optimization Study. Further, some dischargers have already made significant changes to their operation in order to meet restrictive salinity limitations and may decide that the Interim Permitting Approach does not provide them with an appropriate incentive to participate. Accordingly, the Salinity Management Strategy includes an option for dischargers to opt out of participating in efforts related to the Prioritization and Optimization Study. The SNMP provides specific recommendations for how the Central Valley Water Board should permit such discharges if they desire to opt of the Phase I Study.

#### **ES.4.5.1.3 Process for Development and Adoption of Resolutions/Orders to Implement Interim Permitting Approach**

To prepare the appropriate resolutions/orders that amend the salinity provisions in existing permits and that establish such provisions for future permits, CV-SALTS recommends that the Central Valley Water Board and relevant stakeholders begin the process for developing such resolutions/orders as soon as possible. It is recommended that such resolutions be prepared and ready for Central Valley Water Board consideration within one (1) year of the Basin Plan amendments adopted to facilitate implementation of this SNMP becoming effective. In the meantime, while such resolutions are being developed, CV-SALTS recommends that the Central Valley Water Board permit salinity discharges in a reasonable manner that looks forward towards implementing the Salinity Management Strategy as set forth in the SNMP.

#### **ES.4.3.2.5 Potential Future Permitting Approach**

At the close of Phase I, or potentially at the end of Phase II, the Central Valley Water Board may determine that it is necessary to revise the Interim Salinity Permitting Approach. This may include the need to provide further guidance with respect to interpretation and application of salinity standards for protection of the AGR and MUN beneficial uses. Through the CV-SALTS process, policy documents have been prepared that address application of salinity standards for protection of AGR, as well as application of the secondary MCLs for salinity. These policy documents are part of the SNMP, and may result in Basin Plan amendments in 2017 as determined appropriate.

## ES.6 Surveillance and Monitoring Program

CV-SALTS prepared a surveillance and monitoring program (SAMP) report that may be used as a template for the establishment of a surveillance and monitoring program to support implementation of the SNMP once the Basin Plan amendment process is complete (CDM Smith 2016e). This effort only focused on (a) establishment of surveillance and monitoring program for groundwater; and (b) addressing the requirements of Recycled Water Policy Section 6.b(3)(a) as related to salt and nitrate.

The actual surveillance and monitoring program that will be established to support SNMP implementation will be further developed while the Basin Plan amendment process is underway to incorporate the SNMP into the Basin Plans. The purpose of this program is to provide the means to determine if the SNMP's programs are achieving their goals. The SAMP describes an approach that may be used to periodically assess salt and nitrate concentrations in these waters on a Central Valley-wide basis to evaluate progress toward meeting those goals. The program should be consistent with the two following key objectives: (a) utilize a statistically-representative approach for evaluating ambient water quality (AWQ) and water quality trends across the Central Valley; and (b) establish a cost-effective program that relies on existing monitoring programs and data collection efforts to the maximum extent possible.

Because the SAMP report only provided an example for the establishment of a groundwater surveillance and monitoring program to evaluate progress towards achieving the management goals of the SNMP, implementation of this program will require collaboration by Central Valley Region stakeholders to complete a number of steps. These steps, which are recommended for implementation during development of the Basin Plan amendments to implement the SNMP, include:

- *Identify Existing and Planned Monitoring Programs* - To the extent possible, the surveillance and monitoring program will utilize existing monitoring programs and existing monitoring stations in order to be cost-effective and consistent. Examples of such programs that could be incorporated into the program include the ILRP trend monitoring, the GAMA shallow domestic well monitoring program, the Central Valley Dairy Representative Monitoring Program, routine Title 22 sampling program, WDR sampling programs, and other programs as identified.
- *Select Final Wells for Inclusion in the Monitoring Program* - Stakeholders implementing the SNMP surveillance and monitoring program will work collectively to establish a well network that meets the goals and objectives of the program. This effort will consider existing monitoring programs to the maximum extent practicable and where spatial gaps exist in the Region, determine how to best address data collection needs in those areas.
- *Establish Sampling and Analysis Plan (SAP), Quality Assurance Project Plan (QAPP) and Health and Safety Plan (HASP)* - Because the surveillance and monitoring program will rely on existing data collection efforts to the maximum extent practicable, the program should establish a common SAP, QAPP and HASP to ensure that data collection efforts are consistent across the Central Valley Region.

Regional groundwater quality changes typically occur over a number of years; as such, the water quality assessment period needs to be sufficiently long to capture meaningful changes in water quality. Accordingly, it is anticipated that the first water quality assessment under the SNMP surveillance and monitoring program would begin five years after the effective date of the planned Basin Plan amendments.

## ES.7 Environmental Review and Economic Analysis

To facilitate potential changes to the Basin Plans that could result from the development of the Central Valley SNMP, the Central Valley Water Board staff held four CEQA scoping sessions in October 2013 in Fresno, Modesto, Colusa and Rancho Cordova.<sup>36</sup> These scoping sessions identified likely alternatives under consideration by CV-SALTS for the long-term management of salt and nitrate in the Central Valley and provided opportunity for public input. The outcome of the process was an SNMP that included a number of recommended clarifications, policies and new regulatory tools to facilitate the management of salt and nitrate in the Central Valley Region.

As required, CV-SALTS completed the environmental review and economic analyses to support the SNMP (Larry Walker Associates 2016a, b; RBI and CDM Smith 2016). Two alternatives were considered:

- *No Project Alternative* – This alternative represents a future scenario where there would be no amendment to the Basin Plans to incorporate recommendations of the Central Valley SNMP. The result would be regulation of waste discharges in the Central Valley according to the existing regulatory framework.
- *Preferred Alternative* – Development of the SNMP included an evaluation of existing policies and requirements in the Central Valley Region Basin Plans. The outcome of this evaluation was the development of recommended clarifications, policies and new regulatory tools (or strategies) to facilitate SNMP implementation. These recommendations are designed to facilitate implementation of the SNMP and efforts to achieve its salt and nitrate management goals. Collectively, these SNMP recommendations represent the Preferred Alternative (see Section ES.4.2 for a summary).

Based on the findings of the environmental review and economic analysis, implementation of the Preferred Alternative is recommended. This recommendation is based on the following key findings:

- Where dischargers would be able to comply with existing regulatory thresholds, implementation of the No Project Alternative would lessen some of the potentially significant impacts in areas of groundwater basins/subbasins where salt and nitrate levels are currently approaching or exceeding applicable water quality objectives. However, given the complexity and expense associated with implementing corrective actions, compliance would only be achieved over a number of years. Furthermore, widespread deployment of the advanced treatment technologies necessary to meet existing regulatory thresholds would result in extraordinary secondary impacts (additional greenhouse gas emissions

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<sup>36</sup> [http://www.waterboards.ca.gov/centralvalley/water\\_issues/salinity/index.shtml](http://www.waterboards.ca.gov/centralvalley/water_issues/salinity/index.shtml)

from reverse osmosis treatment, the creation of new waste streams, etc.). Where dischargers are unable to implement treatment or control technologies to come into compliance with existing regulatory thresholds, dischargers would be forced to discontinue commercial activities. While the discontinuation of commercial activities, such as the fallowing of agricultural lands or the abandonment of livestock operations, might reduce current pollutant loading, it would not itself rectify groundwater impairments, as significant masses of nitrates and other salts currently exist in vadose zones throughout the Central Valley, and would continue to migrate to groundwater following the cessation of economic activities. Furthermore, the extensive discontinuation of commercial activities would result in significant and widespread negative economic impacts. Water quality degradation is therefore inevitable under the No Projective Alternative both where dischargers have the technical and economic capacity to come into compliance with existing regulatory thresholds and where dischargers would be forced to discontinue commercial activities. Under both scenarios, the continued degradation would be considered a potentially significant impact. Lastly, while the No Project Alternative may somewhat lessen the potentially significant water quality impacts from salt and nitrate water quality degradation impacts identified for the Preferred Alternative, it is not expected to reduce these impacts to a less-than-significant level.

- Implementation of the No Project Alternative would not result in the long-term improvements in groundwater quality that are anticipated to occur under the Preferred Alternative. The Preferred Alternative includes three management goals, two of which would not be realized under the No Project Alternative. Specifically, the No Project Alternative does not (a) provide a pathway to providing safe drinking water to Central Valley residents, nor does it (b) establish a mechanism for the long-term restoration of groundwater basins/subbasins. Under the No Project Alternative, a greater number of vulnerable communities would likely continue to consume water of unacceptable quality, potentially resulting in extensive negative human health impacts. Under the Preferred Alternative, safe drinking water and the benefits of this effort will be realized within a reasonable time frame. Further, although the long-term goal to restore the Central Valley's groundwater basins/subbasins, where reasonable and feasible, will require many years to meet, the outcome will be a safe drinking water source for many generations. This long-term outcome would not be realized under the No Project Alternative.
- The expected cost of compliance under the No Project Alternative could not be estimated given the significant variability that exists in how dischargers may choose to comply with water quality objectives at first encountered groundwater. However, all known treatment technologies, such as the implementation of reverse osmosis treatment to reduce salinity from discharges, are extraordinarily expensive; where dischargers are able to comply with existing regulatory thresholds, compliance costs are expected to increase substantially. Where achieving compliance is determined not to be feasible, the outcome is expected to be increased land fallowing and loss of jobs as agricultural and dairy operations cease, and the economic effects would be devastating to many of the Central Valley's agricultural communities. Therefore, under the No Project Alternative, the cost of compliance will at best have mixed economic outcomes and will at worst have catastrophic local impacts. The No Project Alternative could result in a weaker economy in the Central Valley, which would



reduce the resources available to manage salts and nitrates and reduce the resources that would be available to work to ensure safe and reliable drinking water for sensitive communities. In contrast, the Preferred Alternative seeks to ensure that resources are available to manage these critical constituents, and focuses efforts to help ensure safe drinking water for communities.

- The cost to implement the salt and nitrate management requirements under the Preferred Alternative could be substantial. Given this finding, the Preferred Alternative recommends a hierarchical approach for implementation. Under this alternative, the initial primary focus is on nitrate management, in particular, to ensure that safe drinking water concerns are addressed. In contrast, salt management will be implemented in a phased manner over a number of years. Implementation of the nitrate management requirements is further prioritized under the Preferred Alternative so that groundwater basins/subbasins with the most significant water quality concerns are addressed first following adoption of Basin Plan amendments. Ultimately, under the Preferred Alternative, the proposed hierarchal, prioritized approach ensures that critical resources are allocated to the most significant Central Valley water quality concerns first. This approach allows resources to be focused initially on getting sensitive communities safe and reliable drinking water (consistent with State legislation and Water Board direction), while longer-term solutions are developed and implemented to reduce loading to groundwater and eventually reverse degradation. In contrast, the No Project Alternative would focus all resources to achieve compliance with objectives at the individual discharger level, without consideration of legacy contamination already in the groundwater that will continue with or without the discharges. The No Project Alternative would not allow prioritization of resources to ensure Central Valley sensitive communities are able to access a safe and reliable drinking water supply. Thus, the No Project Alternative does not meet the project goals.
- The Preferred Alternative proposes to alter the way in which the Central Valley Water Board will regulate discharges of salt and nitrates throughout the Central Valley. The environmental review therefore evaluated the means by which the Board's implementation of the Preferred Alternative through subsequent regulatory activities (i.e., issuance of WDRs) will nonetheless ensure compliance with federal and state antidegradation policies. The environmental analysis concludes that the proposed regulatory process has sufficient elements to ensure that the Board would not authorize discharges that would unreasonably degrade water quality or unreasonably affect present and anticipated beneficial uses, and that the Board's regulatory process would still ensure the maintenance of the highest water quality consistent with the maximum benefit to the people of the State.

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