

Section 4

Central Valley Salt & Nitrate Management Plan

Elevated nitrate concentrations and salt accumulation in the Central Valley pose significant water quality management challenges, in particular in the groundwater underlying the Central Valley floor. These conditions have been evident since the 1970s and continue to worsen (Johnson et al. 2012). To reverse this trend, the Central Valley SNMP establishes salt and management requirements for the Central Valley Region. Based on the findings in Section 3 and those described below, this section describes the approach the Central Valley Water Board will use to manage salt and nitrate in the Central Valley to meet this SNMP's management goals, where reasonable and feasible.

4.1 Salt & Nitrate Management Plan Framework

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 that are 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 innovative salt and nitrate management strategies to improve water quality. Section 4.2.2 below summarizes these recommendations. Attachment A incorporates policy and strategy documents that provide the regulatory and technical basis for each of these recommendations. The Central Valley Water Board will propose amendments to the Basin Plans to incorporate these recommendations into the Basin Plans. Combined, the SNMP and the recommended Basin Plan amendments will establish a revised regulatory framework that will provide the flexibility necessary to make salt and nitrate management decisions at the appropriate temporal, geographic and/or management zone scales¹.

The remainder of this section describes the overall SNMP framework including the management goals and priorities for this SNMP and an overview of the general approach proposed to manage salt and nitrate throughout the Central Valley. This SNMP framework is based on the findings of technical studies that have characterized the extent of salt and nitrate concerns in the Central Valley and the technical feasibility to manage salt and nitrate in a manner that meets the SNMP's management goals. Ultimately, implementation of this SNMP will be an iterative and adaptive process that will involve periodic review and reassessment so that what has been learned by

¹ 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>

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.

4.1.1 Management Goals and Priorities

In order to achieve desired outcomes for the management of salt and nitrate within the Central Valley, this SNMP must not only address the requirements of the Recycled Water Policy, but also address legacy and ongoing salt and nitrate accumulation issues in a manner that leads to environmental and economic sustainability. To do so, implementation of the Central Valley SNMP is built on the following three management goals:

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”.² 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 MCL at numerous well locations throughout the Central Valley (see e.g., Harter et al. 2013; State Water Board 2012). Moreover, the State Water Board reported that 90 public water supply systems reported violations of the MCL for nitrate in 2012 (see Table 4.13, State Water Board 2015). 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 complied with 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, meaning that after achievement of this goal no additional degradation of the receiving water will occur. 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 are below the applicable water quality objectives established for each constituent. As demonstrated in the technical work used to support this SNMP (see Section 4.2.4), 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

² Assembly Bill No. 685 added §106.3 to the California Water Code. Signed by Gov. Brown on September 25, 2012.

reasonable and feasible, but it also seeks to minimize or prevent further degradation of ground waters that are currently meeting water quality objectives so that they do not become impaired.

4.1.2 SNMP Overview

This SNMP establishes the minimum or default requirements for the management of salt and nitrate in the Central Valley Region. These requirements, which are described in Sections 4.3.2 (nitrate) and 4.3.3 (salinity) below, will be implemented through WDRs (individual or under a General Order), Conditional Waivers, or National Pollutant Discharge Elimination System (NPDES) permits, as applicable. SNMP implementation will be phased across the Central Valley Region to allow the Central Valley Water Board to allocate resources to the most significant water quality priorities first.

For groundwater, this SNMP sets default requirements for compliance applicable to all discharges, based on existing ambient water quality conditions and estimated available assimilative capacity (see Section 3.3), but allows dischargers to develop data independently for the area under the influence of their discharge (see Section 4.3.4). Development of alternative data may be appropriate where a discharger or group of dischargers finds that the default requirements of this SNMP are not applicable to the local area influenced by their discharge, i.e., the data need to be tailored to the local area to be more representative of existing conditions where the discharge(s) will occur.

Section 4.3.2 below describes the nitrate management requirements under this SNMP. Where a group of dischargers desire to work collaboratively within a delineated area to comply with this SNMP's nitrate management requirements, these dischargers are encouraged to establish a management zone in accordance with the Management Zone Policy (See Section 4.2.2.1 and Attachment A-1). Where a management zone is established, multiple WDRs or Conditional Waivers may exist and be affected by the nitrate management requirements established for the management zone. Each individual discharger within the management zone shall still have to comply with the relevant WDR or Conditional Waiver that authorizes their respective discharge, but their respective permit will include the relevant nitrate management requirements established for the management zone. For an individual discharger or a third party group subject to a general order that chooses to not participate in a management zone, or where a management zone does not exist, a more traditional permitting approach (with some modifications) will be required to meet this SNMP's nitrate management requirements.

Section 4.3.3 below describes the salinity management requirements under this SNMP. Dischargers will be strongly encouraged to participate in this SNMP's phased Salinity Management Strategy, unless the discharger(s) opt out and their discharge(s) meet specific opt out requirements. Implementation of Salinity Management Strategy will provide the basis for the establishment of future salt management requirements to be implemented through WDRs/Conditional Waivers and NPDES permits.

4.2 SNMP Development Process

Development of this SNMP has been a multi-year process involving frequent stakeholder meetings, development of recommended modifications to the Basin Plans, and completion of

technical studies to provide the foundation for the SNMP's recommendations. Below is a summary of the key activities, documents and studies that provide the basis for this SNMP.

4.2.1 CV-SALTS

This SNMP is the product of the efforts of CV-SALTS, a broad coalition of representatives from agriculture, cities, industry, state and federal regulatory agencies, and the public (including Environmental Justice advocates on behalf of Disadvantaged Communities and populations). Initiated in 2006, CV-SALTS developed this environmentally and economically sustainable plan for the management of salt and nitrate that is consistent with the State's Recycled Water Policy and addresses long-term salt and nitrate concerns in the Central Valley Region. CV-SALTS includes support from the Central Valley Salinity Coalition (CVSC), a non-profit organization and formed in July 2008 to organize, facilitate and fund efforts needed for the efficient management of salinity and nitrates in the Central Valley.

The development of this SNMP occurred over a number of years primarily through the oversight of the CV-SALTS Executive Committee and technical support from a Technical Advisory Committee (TAC). The Executive Committee is made up of 30 members: 6 committee chairs, 6 representing non-governmental organizations, federal and state agencies and 18 members of the CVSC. The Executive Committee provides oversight of all other committees in CV-SALTS and approves all final decisions and actions, including the content of this SNMP. For many years, the committee has met twice monthly: (a) face-to-face public policy meetings in Sacramento, California where the salt and nitrate policy and management-related elements of this SNMP were developed collaboratively³; and (b) public administrative meeting teleconferences to discuss process-related items including management of contracts, progress of ongoing supporting technical work, and committee procedures. All Executive Committee meetings have been held in compliance with the Bagley-Keene Open Meeting Act; meeting agendas, notes and supporting materials are available at www.cvsalinity.org.

The CV-SALTS TAC is an all-volunteer committee comprised of stakeholders with varying interests in the technical issues associated with salt and nitrate management in the Central Valley. The TAC meets periodically via teleconference or face-to-face meetings in the Sacramento area to provide oversight and input on specific CV-SALTS technical issues. All TAC meetings are held in compliance with the Bagley-Keene Open Meeting Act; meeting agendas, notes and supporting materials are available at www.cvsalinity.org.

4.2.2 Recommended Clarifications, Policies and New Regulatory Tools

Development of this 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 amendments to the Basin Plans. The sections below provide a summary of

³ Notably, while the policies were developed with significant discussion and collaboration by all involved, there is not unanimous consensus with respect to support for all of the policies by all CV-SALTS Executive Committee participants.

CV-SALTS recommendations. The information below is supported by the cited detailed policy or strategy documents provided in Attachment A.

4.2.2.1 Groundwater Management Areas

Default Groundwater Management Areas

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). 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 (see discussion below and Section 4.3).

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. Currently, the TLB Basin Plan identifies groundwater basins and subbasins in Table II-2 that, for the most part, match those shown in Bulletin 118.⁴ However, when DWR Bulletin 118 was last updated (DWR 2003), DWR deleted several of the subbasins. TLB Basin Plan Table II-2 has not been similarly revised to reflect DWR's changes.⁵ The SRSJB Basin Plan does not currently identify or enumerate specific groundwater basins or subbasins, as identified by DWR's Bulletin 118.

Because the default level of salt and nitrate management established by this SNMP is at the groundwater basin/subbasin, it is recommended that the Basin Plans be amended to include the current DWR Bulletin 118 list of groundwater basins/subbasins in the Central Valley Region. This would require (a) minor changes to Table II-2 in the TLB Basin Plan; and (b) addition of a new table in Basin Plan Chapter II (Existing and Potential Beneficial Uses) to list the groundwater basins/subbasins for the SRSJB Basin.

Groundwater Management Zone Policy

The SNMP recommends establishment of a programmatic approach to nitrate management in the Central Valley Region. As part of the programmatic approach, 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 safe drinking water, manage nitrates to first create a balance within the defined management area (where feasible), and then ultimately to develop and implement a long-term plan for restoration of groundwater (where 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

⁴ TLB Basin Plan, pages II-5 & II-6.

⁵ The following "Satellite Basins" listed in the TLB Basin Plan were removed as groundwater subbasins in the DWR 2013 update: Squaw Valley, Cedar Grove Area, Three Rivers Area, Springville Area, Templeton Mountain Area, Monache Meadows Area, Secator Canyon Valley, Rockhouse Meadow Valley, Inns Valley (Linns Valley in TLB Basin Plan), Bear Valley

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. The justification for authorizing the establishment of management zones is expressed in various statewide and Central Valley Water Board policies (see discussion in Attachment A-1). With respect to salinity, management zones may be appropriate in the future but are not practical at this time. Rather, salinity is being addressed independently from nitrates in the Salinity Management Strategy (see Section 4.3.3 below and Attachment A-3).

4.2.2.2 Permitting and Management Strategies

Nitrate Permitting Strategy

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. Attachment A-2 provides a detailed discussion of the Nitrate Permitting Strategy that is summarized in Section 4.3.2 below.

Salinity Management Strategy

The SNMP and its associated technical documents propose long-term solutions for addressing salinity. For example, the Strategic Salt Accumulation Land and Transportation Study (SSALTS) identified and evaluated potential salt management strategies (CDM Smith 2013, 2014, and 2016a). The study's findings showed that current salinity management activities may only address about 15% of the annual salt load; long-term solutions, including development of regional de-salters and a regulated brine line are needed to address the other 85%. These long-term management strategies will require significant state and federal funding to implement. In the meantime, the Central Valley Water Board must implement the Basin Plans through the adoption of WDRs/Conditional Waivers that consider the beneficial uses to be protected and the water quality objectives associated with those beneficial uses.

Because the solutions for addressing salinity are long-term in nature, 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. This includes needing additional regulatory flexibility with respect to the issuance of WDRs/Conditional Waivers with salinity-related requirements. Some of this flexibility can be obtained through the implementation of recommended CV-SALTS policies and guidance as described below in Section 4.2.2.3. In addition, to supplement these policies or guidance, CV-SALTS has established a Salinity Management Strategy that recommends a process for moving forward with a phased long-term salinity management program. This program includes a proposed Interim Salinity Permitting Approach for salinity discharges during implementation of the Salinity Management Strategy. Attachment A-3 provides a detailed discussion of the Salinity Management Strategy that is summarized in Section 4.3.3 below.

4.2.2.3 Policies and Guidance

Exceptions Policy

Attachment A-4 provides the basis for recommendation to amend the Basin Plans to revise the existing Central Valley Salinity Exceptions Program. This program was previously established for the following reasons: Where a discharge is not better than the applicable water quality objective and no assimilative capacity is available, the Basin Plans required the Central Valley Water Board to prohibit the discharge, adopt a time schedule in the order that allows the discharger to come into compliance with needed WDR provisions, or revise the applicable water quality standard. Because these traditional remedies were not always appropriate for salt, the Board adopted an Exceptions Policy in the Basin Plans that includes a Salinity Exception Program to be in effect during the CV-SALTS process.

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 allow for an exception to be authorized for nitrate water quality objectives. This SNMP recommends revising the existing Exceptions Policy by amending the Basin Plans in the following manner:

- Add nitrate to the list of chemical constituents for which the Central Valley Water Board may authorize an exception;
- Expand/revise conditions or authorization of an exception to reflect the goals of the SNMP;
- Remove the existing sunset provision that prohibits the granting of exceptions beyond June 30, 2019; and
- 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. Terms for exceptions shall generally not exceed 10 years, however, the Central Valley Water Board shall have the discretion to adopt an exception for longer than 10 years if the applicant(s) can demonstrate that it is necessary to further the management goals of the SNMP. Retain the Central Valley Water Board's authority to reauthorize (renew) an exception for one or more additional terms, the length of which shall be determined by the Central Valley Water Board.

Salinity Management to Provide Reasonable Protection of AGR Beneficial Uses in Groundwater (AGR Policy)

Significant challenges exist with regards to establishing permit limits to protect the AGR beneficial use. Attachment A-5 provides a detailed discussion of the issues; following is a summary. 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, there is currently no guidance on how to interpret the narrative objective in a manner that accounts for local and regional differences. As a default, a conservative approach that ensures protection of the most sensitive crop in all locations at all times (e.g., EC < 700 $\mu\text{mhos/cm}$), even

though individual crop and livestock sensitivity to salinity varies widely and potential impacts can be mitigated through management activities.⁶

The application of the existing conservative approach to protecting the AGR beneficial use creates a number of issues for resolution:

- It impacts the ability of dischargers to manage/maximize reuse of drainage water on progressively more salt tolerant crops.
- Many sub-basins and localized areas have elevated background salt concentrations that are higher than 700 $\mu\text{mhos/cm}$.
- Due to consumptive use, very high quality irrigation water would be needed to ensure 700 $\mu\text{mhos/cm}$ in drainage below the root zone under common practices.

Given the above findings, 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 AGR Policy as currently formulated recommends the Basin Plans be amended to assign AGR Classes to groundwater basins/subbasins based on ambient salt concentrations in the Production Zone of each basin/subbasin. Specifically,

- *AGR Class 1:* TDS < 600 mg/L (EC < 1,000 $\mu\text{S/cm}$)
- *AGR Class 2:* 600 mg/L < TDS < 2,000 mg/L (1,000 $\mu\text{S/cm}$ < EC < 3,000 $\mu\text{S/cm}$)
- *AGR Class 3:* 2,000 mg/L < TDS < 5,000 mg/L (3,000 $\mu\text{S/cm}$ < EC < 7,500 $\mu\text{S/cm}$)
- *AGR Class 4:* TDS > 5,000 mg/L (EC > 7,500 $\mu\text{S/cm}$)

The assignment of these potential classes and their associated TDS/EC ranges, based on ambient TDS/EC concentration in the Production Zone of groundwater basins/subbasins, will be evaluated over time as part of the implementation of the Salinity Management section of this SNMP. After completion of the Phase I – Prioritization and Optimization Study (see Section 4.3.3), these AGR classes and their ranges will be re-evaluated for potential inclusion in the Basin Plans through a future amendment process.

Salinity Variance Policy

On June 6, 2014, the Central Valley Water Board adopted amendments to the Basin Plans that included a Variance Program for Salinity (Salinity Variance Program)⁷. On March 17, 2015, the State Water Board adopted Resolution No. 2015-0010 approving Basin Plan amendments to include the Salinity Variance Program. Because the Salinity Variance Program applies to surface

⁶ 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.

⁷ Central Valley Water Board Resolution No. R5-2014-0074.

waters, and is considered a water quality standards action under the Clean Water Act, the Salinity Variance Program was subject to approval by the United States Environmental Protection Agency (US EPA). US EPA approved the Salinity Variance Program on July 8, 2016. With its approval, U.S. EPA specifically limited application of the Salinity Variance Program to effluent limitations being adopted to protect the AGR beneficial use. Further, the Salinity Variance Program applies only to municipal publically owned treatment works (POTWs) that have a situation similar to or comparable to the case study cities included in the Central Valley Water Board's supporting documents.

When it adopted the Salinity Variance Program, the Central Valley Water Board recognized that management of salinity in surface and ground waters is a major challenge for dischargers. The Central Valley Water Board further determined that during the development and initial implementation of the SNMP, in preparation by CV-SALTS, it was appropriate to allow municipal and domestic wastewater dischargers that qualified to apply for a variance from salinity water quality standards if they have, or will have, water quality based effluent limitations for salinity that they are unable to meet.⁸

The 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. See Attachment A-6 for additional information.

Offsets Policy

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 (see Attachment A-7), 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. 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

⁸ Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins and the Water Quality Control Plan for the Tulare Lake Basin To add Policies for Variances from Surface Water Quality Standards for Point Source Dischargers, Variance Program for Salinity, and Exception from Implementation of Water Quality Objectives for Salinity, Final Staff Report, June 2014 (Final Staff Report), at p. 45.

available assimilative capacity or an exception (see Nitrate Permitting Strategy [Attachment A-2] and Exceptions Policy [Attachment A-4], respectively). Ultimately, the decision to pursue an offset is voluntary. They must be (1) proposed by discharger (individual or group of dischargers) as an Alternative Compliance Project (ACP, see Attachment A-10 and summary below); (2) approved by the Central Valley Water Board; and (3) enforceable through a WDR or other orders issued by the Board.

Drought and Water Conservation Policy

The effects of drought and the implementation of encouraged water conservation practices can significantly impact effluent quality in dischargers to surface water or groundwater. Attachment A-8 provides a detailed discussion of these issues. The text below provides an overview and summary of recommendations to support implementation of this SNMP.

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. However, extended periods of below normal precipitation (i.e., “droughts”) can create compliance issues for some dischargers because of increased TDS/EC and other salinity-related constituents in influent and effluent. This problem is caused by the following conditions associated with periods of drought:

- When less high quality (low TDS/EC) surface water is available, water agencies may increase reliance on lower quality (higher TDS/EC) groundwater to augment supplies. Most treatment systems are not designed to remove TDS/EC; thus higher salinity in the water supply can result in higher salinity in effluent.
- Mandatory conservation measures during prolonged drought may significantly alter the behavior of water users. The cumulative effect is reduced water use, which previously helped dilute average TDS/EC concentration in raw sewage and treated wastewater.
- Drought-related changes in water quality may temporarily aggravate the more permanent long-term trend towards increased TDS/EC in influent caused by adoption of high efficiency, low-flow fixtures and appliances, and greater use of in-home water softeners.
- Even where wastewater facilities are able to handle a long-term trend of rising TDS/EC in the influent, drought-related conditions may temporarily eliminate the small but critical buffer needed to assure consistent compliance with salinity-based permit discharge requirements.
- Drought conditions create similar concerns for agricultural operators. Reduced availability of high quality (low TDS/EC) surface water forces increased reliance on lower quality (high TDS/EC) sources (e.g., groundwater and/or reuse of irrigation return flows), resulting in temporarily higher TDS/EC concentrations recharging to groundwater below the root zone. The inability to assure consistent permit compliance for salinity discourages the use of recycled water for landscape or crop irrigation and may create disincentives to greater implementation of more efficient (drip-style) irrigation systems.

- Finally, permit effluent requirements for TDS/EC are typically evaluated using relatively short-term averaging periods (e.g., daily, weekly, monthly averages or means). Since droughts typically persist for several years, even permit limits expressed as an annual average may be practically impossible to meet.

Given the above 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. Specifically,

- For discharges to groundwater, calculate compliance with the applicable narrative or numeric salinity objectives using a long-term (10+ year) flow-weighted average while also taking into consideration the expected recharge and potential dilution from natural precipitation and streambed percolation to the same basin or sub-basin.
- Authorize the use of offset projects consistent with this SNMP's Offsets Policy (see Attachment A-7), particularly increased stormwater capture and recharge, to demonstrate compliance with WDRs governing salinity discharges. Allow offset credits to be created and banked by constructing and operating such projects or by discharging well below the WDR threshold in non-drought years. Recognize that the credits needed to achieve compliance during periods of drought must be generated at times of above normal precipitation (especially El Niño winters) and, as such, must remain valid over a sufficiently long planning horizon, i.e., at least 20 years in order to be useful.
- Consider amending the Basin Plans to establish a temporary variance/exception from salinity-related standards during certain drought conditions. The variance/exception would be automatically activated when one of the following triggers occurs: (a) a drought emergency is declared by an authorized federal or state authority;⁹ (b) during an extended dry period in Reach 83 of the Lower San Joaquin River (Merced to Vernalis) as defined by the SRSJR Basin Plans;¹⁰ or (c) declaration of a local emergency consistent with the California Emergency Services Act.¹¹ At such times, more appropriate interim WDRs or effluent limits would apply.
- Consider amending the Basin Plans to establish a temporary variance/exception from salinity-related standards where the TDS/EC concentration in the permitted discharge is better (lower) than the TDS/EC concentration in the receiving water and will improve receiving water quality (even when the receiving water quality is higher than the SMCL) because it promotes maximum use/reuse of available water supplies. Potential impacts to downstream/downgradient water quality must also be evaluated as part of this demonstration.

⁹ California Government Code Section Title 2, Division 1, Chapter 7, California Emergency Services Act; also see <http://www.water.ca.gov/waterconditions/declaration.cfm>

¹⁰ See proposed Basin Plan amendment: *Establishment of Salinity Water Quality Objectives in the Lower San Joaquin River, from the Mouth of the Merced River to Vernalis*. http://www.waterboards.ca.gov/centralvalley/water_issues/salinity/upstream_salt_boron/index.shtml

¹¹ California Government Code Section Title 2, Division 1, Chapter 7, California Emergency Services Act.

- In lieu of authorizing a temporary variance/exception, consider pre-authorizing an automatic allocation of assimilative capacity (where it exists, or can be provided by the discharger, e.g., via an offset project) to accommodate higher TDS concentrations in the discharge/recharge during drought conditions.

Guidance to Implement Secondary Maximum Contaminant Levels

The SNMP includes recommendations for the incorporation of guidance into the Basin Plans to support and clarify implementation of SMCLs in permits for discharge to surface water and groundwater (see Attachment A-9). Following are the areas where clarification is recommended:

- SMCLs established by 22 CCR (the drinking water regulations) are incorporated by reference in the Chemical Constituent sections in the Water Quality Objectives Chapter of the Basin Plans. The only portions of 22 CCR related to SMCLs and incorporated into the Basin Plans are Tables 64449-A and 64449-B. Table 64449-B includes “Recommended”, “Upper”, and “Short Term” concentrations for TDS or Specific Conductance or EC, chloride and sulfate. While the SMCLs were included in the Basin Plans for the purpose of protecting drinking water use, neither the text providing context for the tables nor guidance for utilizing the applicable “Recommended”, “Upper”, or “Short Term” concentrations were included when the 22 CCR tables were adopted as water quality objectives. The use of SMCLs to regulate water provided to consumers at the tap as well as to regulate source water quality has led to confusion and inconsistencies between intent and application of the values provided.
- Unlike primary MCLs that are set at levels to protect public health, SMCLs are drinking water standards,” set to protect the odor, taste, and appearance of drinking water”.¹² Attainment with SMCLs in drinking water, as it is served to consumers, is measured in the groundwater source or at distribution system entry points. This means that for water purveyors, SMCLs are evaluated after the water has been treated, which in many cases means that water has been filtered. Comparatively, when SMCLs are applied directly in the water body or at a point of discharge as water quality objectives, these practices do not account for the natural treatment the soil substrate or treatment through a water treatment facility (including filtration). This means that a water body, such as a river, must meet the SMCL in its untreated state even though the untreated water would not be served to consumers without some form of treatment or filtration. It can be difficult for dischargers to meet SMCLs when applied directly to treated wastewater; accordingly, it is recommended that the Basin Plans be amended to state that compliance with SMCLs shall be determined from a filtered water sample, but only for metals, color and turbidity.
- The Basin Plans also do not currently provide guidance with regards to the assessment period that should be used to determine compliance with SMCLs. Per 22 CCR §64449, compliance with the SMCLs in Table 64449-A is based on a long-term average (running annual average) rather than the results of an individual grab sample. It is recommended that the Basin Plans be amended to incorporate text that defines the assessment period for determining compliance with SMCLs. Specifically, language should be added to the

¹² 22 CCR §64481(b)(2)

implementation section of the Basin Plans to state that an evaluation of compliance with SMCLs in 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. This approach is similar to 22 CCR §64449(c)(1) as it applies to Table 64449-A. 22 CCR §64449 does not provide a compliance determination approach for Table 64449-B constituents; regardless, the same compliance assessment approach is recommended for the constituents in both Table 64449-A and 64449-B constituents.

Guidance for Developing Alternative Compliance Projects for Nitrate Discharges

When an individual or group of dischargers is unable to demonstrate that their discharge is not causing or contributing to nitrate degradation above the triggers identified in the Central Valley SNMP (see Section 4.3.2 and Attachment A-2), 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 capacity¹³ or an exception in these circumstances will trigger the need for 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 management zone. While the Central Valley Water Board has the discretion to deny such a request, any proposed Alternative Compliance Project(s) must contain specific components for it to be considered. Attachment A-10 provides guidance of the minimum components required for submittal of an ACP for approval.

Factors to Support a Maximum Benefit Finding

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 existing water quality:

- (1) “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.
- (2) 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” (emphasis added).¹⁴

¹³ 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 as defined at Section 3.

¹⁴ State Water Board. Statement of Policy with Respect to Maintaining High Quality of Waters in California. Resolution No. 68-16 (October 28, 1968).

To support implementation of this SNMP, its proposed management strategies and policies, Attachment A-11 provides 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:

4.2.3 Related Basin Plan Amendments

In parallel with the development of this SNMP and recommendations for Basin Plan amendments to support its implementation, 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 linkages to this SNMP are summarized below.

4.2.3.1 MUN Beneficial Use Project – Agriculturally Dominated Water Bodies Evaluation

Per the State’s Sources of Drinking Water Policy (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 Policy 88-63 does contain exceptions for the MUN designation, to utilize the exception the Basin Plans require a formal Basin Plan amendment.

During NPDES permit adoptions there have been challenges to protecting the MUN beneficial use designation in agricultural drains due to the requirements of State Policy 88-63. Concurrently, CV-SALTS identified the need to evaluate the protection of MUN beneficial uses in agriculturally dominated water bodies. CV-SALTS has conducted its MUN evaluation of these types of water bodies in two phases:

- *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. The cost for wastewater facilities to comply with protecting the MUN beneficial use had been estimated at \$3 - \$7 million (e.g., City of Willows) and these same POTWs challenged the MUN designation during renewal of their NPDES permits. Following the completion of required analyses and consistent with State Policy 88-63 to propose removal of MUN from the receiving water, Central Valley Water Board staff prepared the documentation to support a Basin Plan amendment to remove MUN from selected water bodies downstream of these four POTWs. This Basin Plan amendment, which was approved by the Central Valley Water Board and State Water Board in 2015 (April 15 and August 18, 2015, respectively)¹⁵ was approved by the Environmental Protection Agency on April 21, 2016.
- *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

¹⁵ Central Valley Water Board Resolution No. R5-2015-0022; State Water Board Resolution No. 2015-0055

agriculturally dominated surface water bodies and adopt a Limited MUN (LMUN) use. If adopted, the Basin Plans would be amended to:

- Establish a water body categorization framework that the Board could utilize to determine the appropriate application of, and level of protection for, the MUN beneficial use in different types of agriculturally dominated surface water bodies across the Central Valley. The proposed Basin Plan amendment distinguishes among agriculturally-dominated water bodies that have been constructed or modified to convey agricultural drainage, water bodies that have been constructed or modified to convey agricultural supply water, natural water bodies dominated by agricultural operations, and water bodies encompassed in a permanent or seasonal closed recirculating basin. The amendment proposes to utilize, where appropriate, *Sources of Drinking Water Policy 88-63* Exception 2b to de-designate the MUN beneficial use.
- Establish a new LMUN beneficial use, defined as: “Uses of water for municipal and domestic supply in agriculturally dominated surface water bodies where the use is limited by water body characteristics such as intermittent flow, management to maintain intended agricultural use and/or constituent concentrations in the water body.” To interpret the narrative objective and to evaluate compliance with the proposed objective for LMUN, existing monitoring programs may use numeric triggers for chemical constituents, pesticides, and radionuclides concentration in their process of issuing permits or waste discharge requirements. Exceedances of the triggers would not be violations of the proposed narrative objective nor are the triggers to be used for numeric effluent limits. Triggers will be used to evaluate impacts to downstream beneficial uses and ensure appropriate management and best practical treatment actions are taken to protect those uses.

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 did not actually function as a source of drinking water. Consequently, establishment of a region-wide process to evaluate the applicability of the MUN beneficial use on agricultural drains provides an important tool to support implementation of this SNMP. The Basin Plan amendment are expected to be proposed for adoption in December 2016.¹⁶

4.2.3.2 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.¹⁷ 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

¹⁶ http://www.waterboards.ca.gov/centralvalley/water_issues/salinity/mun_beneficial_use/index.shtml

¹⁷ http://www.waterboards.ca.gov/centralvalley/water_issues/salinity/tulare_lakebed_mun_evaluation/index.shtml

closed basin, salts have been naturally deposited and accumulated since its formation and before any influence from man. The diversion of water into the basin from other watersheds to support 3 million acres of agriculture, (Sholes 2006) including three of the five most agriculturally productive counties in the United States,¹⁸ has exacerbated the accumulation of salts.

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, it 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 salt to be moved out of sensitive areas. The Basin Plan amendment is expected to be proposed for adoption in December 2016.

4.2.3.3 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 microsiemens per centimeter ($\mu\text{S}/\text{cm}$) as a 30-day running average, except during Extended Dry Periods,¹⁹ when the water quality objective would require that EC not 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.

¹⁸ http://agcomm.co.tulare.ca.us/default/assets/File/2012CensusCA_1.pdf

¹⁹ See footnote 2 in: http://www.waterboards.ca.gov/centralvalley/board_decisions/tentative_orders/1608/mun_wkshp/1608_lsjr_wkshp_mtrl.pdf

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. 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 (see Attachment A-8). 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.²⁰

The proposed water quality objectives are the result of a stakeholder-driven effort led by the LSJR Committee, which is a subcommittee of CV-SALTS. 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. The Basin Plan amendment is expected to be proposed for adoption in December 2016.

4.2.4 Technical Foundation

CV-SALTS commissioned a number of technical studies over many years to develop baseline information to support this SNMP. These projects were categorized in five areas of study: Conceptual Model Development, Data Development, Beneficial Use Designation Studies, Water Quality Objectives and Implementation Planning. The specific studies completed in each of these categories as well as specific findings are accessible through the Technical Projects Index located at the CV-SALTS website.²¹

In the sections below, summaries are provided for the key studies that have been used to (a) support development of the policies, strategies and regulatory tools described above in Section 4.2.2 and in Sections 4.3.2 (nitrate management) and 4.3.3 (salt management) below; and (b) fulfill the salt and nitrate characterization requirements described in the Recycled Water Policy, in particular Section 6.b(3)(d), and discussed in Section 3.

4.2.4.1 Nitrate Management

To support the development of this SNMP, CV-SALTS completed studies to provide the technical basis for the establishment of a nitrate management program to achieve the Central Valley's short and long-term management goals. The findings from these studies have been coupled with existing regulatory programs to manage water quality and the policy recommendations of this SNMP to provide a foundation for the development of the Nitrate Permitting Strategy to be implemented through WDRs/Conditional Waivers.

Existing nitrate monitoring and management programs include the Irrigated Lands Regulatory Program (ILRP), the Dairy General Order, and related Representative Monitoring Program, and existing WDRs, some of which may already include requirements for the management of nitrate. These programs provide the foundation upon which the nitrate implementation measures identified through CV-SALTS studies can build to achieve the goals of nitrate management for the Central Valley. For example, through the ILRP the Central Valley Water Board has adopted

²⁰ Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary, State Water Resources Control Board, December 13, 2006.

²¹ <http://www.cvsalinity.org/index.php/committees/technical-advisory/technical-projects-index.html>

regulatory requirements for discharges from irrigated lands through issuance of General WDR Orders. Under this program, growers may join third-party groups (i.e., coalitions of growers), which may be geographic or commodity-based. WDRs issued to growers that are members of a third-party already include requirements to implement best management practices with respect to nitrogen applications in order to manage nitrogen in the permitted area. As another example, the Central Valley Water Board already regulates over 1300 dairies through a General Order that “serves as general waste discharge requirements for discharges of waste from existing milk cow dairies of all size.” These General Orders provide the foundation upon which implementation of the SNMP will occur.

CV-SALTS conducted the Nitrate Implementation Measures Study (NIMS) to provide input to policymakers regarding implementation measures to reduce current ambient nitrate concentrations in groundwater to protect and restore beneficial uses, consistent with this SNMP’s management goals (CDM Smith 2016a). Findings from this study that reviewed literature sources and developed independent estimates showed that the management of nitrate to achieve nitrate balance and to restore the beneficial use where nitrate currently exceeds the water quality objective represents a significant challenge that will require both short-term and long-term implementation measures.

The NIMS evaluated requirements to achieve nitrate balance using CV-SALTS data developed as part of the ICM project (LWA et al. 2013). The analysis showed that the nitrate loading to the shallow groundwater zone valley-wide ranges from 97,500 to 311,000 tons annually. Between 78 and 86 percent of the total nitrate loading occurs in the Southern Central Valley. These findings illustrate the amount of nitrate loading that will need to be controlled to achieve nitrate balance. Moreover, the large legacy nitrate load in the vadose zone, which was not considered in these findings, will exacerbate further nitrate water quality concerns.

With regards to managed restoration, King et al. (2012) estimated that the range of annualized remediation costs to pump and treat the volume of groundwater that exceeds 10 mg/L in the Tulare Lake Basin alone to be \$12 to \$27.6 billion. This estimate did not include the pipeline or pumping costs for transport of water from remote locations to a centralized treatment facility. NIMS performed the same analysis for the groundwater underlying the Central Valley floor – Sacramento River Valley, San Joaquin River Valley, and the Tulare Lake Basin. Again, without including the costs for extraction wells, raw and treated water pipelines (and other necessary infrastructure) and using the same unit treatment costs and assumptions as King et al. (2012), the cost for treating groundwater that exceeds 10 mg/L in the Central Valley would range from 36 to \$81 billion. The costs for managed restoration would certainly be lower at a smaller scale, e.g., within a defined management zone, but would still be in the range of tens of millions of dollars for capital costs and millions for annual operation and maintenance costs (CDM Smith 2016a, see Table 5-6).

In addition to the findings of potential significant costs associated with achieving restoration, NIMS developed an estimate of the time required to achieve various levels of restoration (nitrate concentrations at or below the 10 mg/L MCL) within a specific study area, i.e., the Alta Irrigation District (AID) in Kings County. For example, under a pump, treat, and reinject scenario at a specified extraction rate, it was estimated that it would take more than 70 years to achieve 10

mg/L nitrate in the groundwater; doubling the rate of extraction would lower this time frame to 37 years. Other scenarios were evaluated, e.g., pump, treat and serve, but the time to restoration or achieving the 10 mg/L MCL for nitrate was still significant (CDM Smith 2016a).

The NIMS evaluation regarding potential approaches to achieve restoration was supplemented by work completed under the CV-SALTS Aggressive Restoration Scenario evaluation. This study evaluated various nitrate treatment scenarios at two different local management scales (31.25 and 40.5 square miles) within AID. The purpose was to increase understanding with regards to what is required to restore groundwater quality to meet the nitrate water quality objective.

PLACEHOLDER to INSERT FINDINGS (Luhdorff & Scalmanini and LWA 2016b)

NIMS established a menu of nitrate implementation measures or nitrate remediation technologies for consideration by dischargers. These technologies fell into one of two categories: (a) *ex situ* – groundwater extraction and treatment followed by reinjection, discharge or potable reuse; and (b) *in situ treatment* - NIMS provides a comparison of the technologies based on different factors (e.g., costs, ease of permitting, or secondary impacts) and applicability of the technologies under different conditions (e.g., existing nitrate concentrations, system size or contaminant depth) (CDM Smith 2016a). This information can be used to support efforts to meet requirements to achieve nitrate balance or manage restoration where feasible in the Central Valley Region, consistent with this SNMPs nitrate management requirements.

4.2.4.2 Salt Management

To support the development of this Central Valley SNMP, CV-SALTS completed a phased study to provide the technical basis for the establishment of a salt management program to achieve the Central Valley's management goals. The findings from this work coupled with the policy recommendations of this SNMP provide a foundation for the development of the Salinity Management Strategy, a phased salinity management program to be implemented in the Central Valley.

SSALTS described examples of ongoing efforts to manage salt in the Central Valley, which may be used as archetypes for how salt could be managed by other dischargers (CDM Smith 2013). In addition, SSALTS identified the range of available Central Valley alternatives for salt management, storage or disposal considering in-valley, out-of-valley, or combinations of in and out-of-valley solutions (CDM Smith 2014). Evaluated in-valley salt management, storage, or disposal alternatives included source control BMPs, land management, application of treatment technologies, deep well injection, and supply for hydraulic fracturing. Out-of-valley alternatives focused on two strategies: (a) ocean disposal, that provides an alternative that may be applied where needed across the Central Valley Region; and (b) implementation of the San Joaquin River Real-Time Management Program within the San Joaquin River watershed.

SSALTS demonstrated that implementation of in-valley alternatives can provide short-term or local solutions to the management or treatment of salt to ensure local drinking water supplies are not impacted and local degradation is minimized or does not occur (CDM Smith 2014). These outcomes are appropriate in areas of the Central Valley Region where salinity in groundwater is not a significant concern. However, where salt accumulation is a significant concern, i.e., salinity is already elevated, is trending upward and has the potential to impact the beneficial use, or the beneficial use is already impacted, current salinity management activities may only address about

15% of the annual salt load. Long-term solutions are needed to address the other 85%. Accordingly, implementation of, or participation in, a long-term salinity management program will be necessary. Where a long-term management program is necessary, SSALTS recommends the development of a Central Valley regulated brine line to transport salt to the ocean for disposal. This finding is consistent with previous findings in the region which identified the need for a “valleywide drain” to transport salts out of the Tulare and San Joaquin River Basins.²²

Similar to nitrate, the time and cost to achieve salt balance, so that no more degradation occurs, or managed restoration is significant, especially within areas of the southern part of the Central Valley. For example, the capital cost to design and construct a Central Valley regulated brine line to discharge brine to San Francisco Bay would be more than \$7 billion plus an additional \$0.7 - \$0.8 billion to operate and maintain the system (CDM Smith 2014). Once operational such a system would produce valuable water that could be sold to offset annual implementation costs. These costs were developed based on a conceptual approach to the development of a brine line. Costs would vary depending on actual outfall location, system configuration and environmental permitting which will be challenging.

SSALTS provides a conceptual level view of the challenges that will be faced in the Central Valley to achieve salt balance, i.e., no more degradation, and ultimately restoration, where it is deemed reasonable and feasible. Not only are their engineering and permitting challenges to identified solutions, but there are significant funding and governance issues to be addressed (CDM Smith 2016b). With these uncertainties in mind, CV-SALTS developed a Salinity Management Strategy that established a phased approach to salt management where the first phase, expected to require approximately 10 years to complete, would focus on addressing the key governance and funding issues associated with long-term salt management, and conducting the additional technical studies needed to further develop short/long-term solutions for salt management at regional and sub-regional scales (see Attachment A-3 and Section 4.3.3 below).

4.2.4.3 Alta Irrigation District Management Zone Archetype

The SNMP includes a proposed Groundwater Management Zone Policy (Attachment A-1) to encourage the establishment of management zones as a recommended approach for regional management of nitrate within groundwater basins/subbasins. To facilitate the development of this policy, CV-SALTS commissioned the CV-SALTS Management Zone Archetype Analysis: Alta Irrigation District study (LWA et al. 2016) to evaluate a number of issues that might affect the development and implementation a management zone.

The conceptual management zone for the study was the AID within the Kings groundwater subbasin. The study, which was developed and implemented in a collaborative setting with local stakeholders, including regulatory and partner agencies, served as an example and “proof of concept” to help test, on a spatially refined basis, the application of selected policies, data analysis methods, and salt and nitrate management approaches under consideration by CV-SALTS. Local salt and nitrate management goals for the AID management zone archetype were developed by the AID stakeholders early in the project and were focused on the highest priority issues within

²² TLB Basin Plan, Pg. IV-5-6; SRSJR Basin Plan, Pg. IV-15.00

the area including supporting sustainable management of surface water and groundwater supplies and protecting surface water and groundwater quality and beneficial uses.

The local goals assisted the stakeholders in providing a context within which to test the various salt and nitrate management options and/or policies that could be established for the conceptual management zone. An analysis of several management scenarios was performed using the AID management zone model to evaluate the effects of various strategies for managing salt and nitrate in the AID management zone. This analysis indicated that, even after 100 years, the most aggressive management scenario resulted in minimal differences in ambient groundwater quality compared to the baseline.

The work performed under the AID study provided valuable information to inform this SNMP. Importantly, the study demonstrated that attainment of water quality objectives, i.e., achieving restoration, in ambient groundwater may not always be possible, assimilative capacity may not be available, and management philosophies may vary among stakeholders. While the findings from the study may not necessarily translate to all areas of the Central Valley, given the diversity of groundwater conditions, the basic methodology for characterizing conditions, performing data analysis, developing and using predictive management models, and the development of appropriate management strategies suited to local realities may be cross applied. These findings will provide support to the implementation of the Groundwater Management Zone Policy recommended under this SNMP (see Attachment A-1).

4.2.4.4 Salt and Nitrate Conditions

Section 6b(3)(d) of the Recycled Water Policy identifies the 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.”* CV-SALTS completed a number of studies to develop this information in the Central Valley and the findings from these studies provide the foundation for the nitrate and salt management sections of this SNMP (Sections 4.3.2 and 4.3.3, respectively). **Table 4-1** summarizes the studies that provide information on each Recycled Water Policy required component and where that information is summarized within this SNMP.

4.3 Salt and Nitrate Management Plan

This section represents the Central Valley SNMP. All dischargers with an existing WDR/Conditional Waiver or those seeking a new WDR/Conditional Waiver shall comply with the requirements established below for the management of nitrate and salt for discharges to groundwater.

4.3.1 Management Plan Framework

The groundwater basins/subbasins established by DWR for the Central Valley serve as the basic or default unit for the management of salt and nitrate. SNMP Sections 3.2 and 3.3 above summarized the existing TDS and nitrate water quality conditions within each of these basins and subbasins. Section 3.3.2.3 (see Table 3-17) provides the default assimilative capacity for upper or production zones for TDS and nitrate to protect beneficial uses. These default assimilative capacity findings are based on the following thresholds: Nitrate (as nitrogen) - 10 mg/L; TDS - 1,000 mg/L. Absent any other information, the Central Valley Water Board will rely on the water

quality findings presented in Section 3 as the basis for developing salt and nitrate management requirements in WDRs/Conditional Waivers.

Table 4-1. CV-SALTS Studies Completed to Satisfy Recycled Water Policy SNMP Requirements

Required Recycled Water Policy Component	Relevant CV-SALTS Studies ¹
Salt and nutrient (nitrate) source identification	<ul style="list-style-type: none"> • LWA 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. • LWA et al. 2016. <i>Management Zone Archetype Analysis Report: Alta Irrigation District</i>. July 2016. • CDM Smith. 2016a. <i>Nitrate Implementation Measures Study</i>. March 2016. • 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.
Basin/subbasin assimilative capacity	<ul style="list-style-type: none"> • LWA 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. • Luhdorff & Scalmanini Consulting Engineers and LWA. 2016a. <i>Region 5: Updated Groundwater Quality Analysis and High Resolution Mapping for Central Valley Salt and Nitrate Management Plan</i>; July 2016.
Basin/subbasin loading estimates	<ul style="list-style-type: none"> • LWA 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.
Fate and transport of salts and nutrients (nitrate)	<ul style="list-style-type: none"> • LWA 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.
Implementation measures to manage salt and nutrient loading in the basin on a sustainable basis	<ul style="list-style-type: none"> • CDM Smith. 2016a. <i>Nitrate Implementation Measures Study</i>. March 2016. • 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.

¹ See Section 5 references or referenced CV-SALTS studies may be accessed at: <http://www.cvsalinity.org/index.php/committees/technical-advisory/technical-projects-index.html>

It is recognized that the default values for existing water quality conditions or assimilative capacity applied to an entire groundwater basin or subbasin does not consider variability in salt and nitrate concentrations at the local/subregional level (e.g., see groundwater basins/subbasin figures in Luhdorff & Scalmanini and LWA 2016a). Accordingly, this Central Valley SNMP provides the opportunity for an individual discharger, dischargers permitted under a General Order, or dischargers that have formed a management zone to provide supplemental information that supersedes or replaces the default requirements established by this SNMP. The requirements for developing the data/information to supplement or supersede the default requirements of this SNMP are discussed below in Section 4.3.4.

4.3.2 Nitrate Management

Nitrate management will be implemented as described in the sections below. Attachments A-1 (Groundwater Management Zone Policy), A-2 (Nitrate Permitting Strategy), and A-4 (Exceptions Policy) provides additional supporting information.

Efforts to manage nitrate to meet the goals of this SNMP will be implemented in WDRs, which must implement relevant provisions of the Basin Plans, or Conditional Waivers, which must be consistent with the Basin Plans.²³ With respect to nitrate (as currently implemented under the Basin Plans), WDRs/Conditional Waivers must ensure that the receiving water will meet the water quality objective, or that the discharge will not cause or contribute to an exceedance of an applicable water quality objective. In addition, the issuance of WDRs/Conditional Waivers must also be consistent with relevant state and regional policies. 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. This SNMP sets forth the nitrate management approach moving forward, consistent with the recommendations contained within the policies and guidance provided in Attachment A.

4.3.2.1 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 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. However, participation in a management zone may not be appropriate for every discharger, or groups of dischargers, depending on water quality and various discharger related circumstances.

Notably, for those dischargers intending to comply via Path A, assimilative capacity may be granted by the Central Valley Water Board subject to required findings but assimilative capacity must be available in shallow groundwater²⁴ (see Section 4.3.2.3 below for discussion regarding assimilative capacity), with some limited exceptions. In contrast, for dischargers intending to comply by participating in a management zone (i.e., Path B), assimilative capacity may be granted

²³ Water Code §13263 & 13269

²⁴ For the purposes of this discussion, shallow groundwater is defined as follows: The shallowest level within the upper zone at which the 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). Shallow groundwater does not include perched water.

by the Central Valley Water Board (again subject to required findings), and the Central Valley Water Board can evaluate the availability of assimilative capacity using a volume-weighted average in the **upper zone or production zone**.

Early Action Plans (EAP)

Regardless of whether a discharger chooses Path A or B, all dischargers must assess nitrate levels in the groundwater 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 not, 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 complies with this SNMP as an individual discharger (Path A) or as part of a management zone (Path B).

Prioritization of Implementation

Implementation of the nitrate management requirements of this SNMP will be prioritized based on a combination of current groundwater quality, number of individuals or community systems that are being impacted by groundwater that exceeds nitrate drinking water standards, and trends in increasing nitrate concentrations above the drinking water standard. Prioritizing implementation is necessary so that Central Valley Water Board staff and discharger resources are focused on the most significant areas of water quality concern first, particularly with regards to nitrate levels and the protection of drinking water supplies. **Table 4-2** provides the recommended order of priority for implementation of the nitrate permitting strategy after all necessary Basin Plan amendments become effective.

Table 4-2. Prioritization for Implementation of SNMP Nitrate Management Requirements

Priority Area	Central Valley Region
Priority 1	TBD
Priority 2	TBD
Priority 3	TBD
Priority 4	TBD

Management Zones

The Central Valley SNMP recommends and encourages the establishment of management zones as an option for groundwater quality management at the local or subregional level, especially within the Central Valley floor. **Figure 4-1** summarizes the characteristics of a management zone. The establishment of a management zone, as a discrete regulatory compliance unit for nitrate for the purposes of complying with the Central Valley Region’s SNMP, 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. In areas where these complexities or water quality

concerns do not exist, establishment of a management zone may not be the best approach for managing discharges to groundwater. 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. Similarly, establishment of a management zone may not be appropriate 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.

Figure 4-1. Characteristics of a Management Zone

- A portion of a larger groundwater basin/sub-basin that serves as a discrete regulatory compliance unit;
- Intended to include all of the groundwater and all of the regulated dischargers that wish to participate in the management zone within the land area encompassed by the management zone boundary.
- Intended, where nitrates in groundwater are impacting groundwater supplies, to facilitate the assurance of safe drinking water for all residents in the zone adversely affected by dischargers participating in the management zone and that are within the zone boundary,¹ encourages more stakeholder coordination and cooperation, promotes better water resource management through appropriate allocation of resources, and provides greater regulatory flexibility where needed to prioritize nitrate management activities and allow time to achieve compliance with the Central Valley SNMP's management goals.
- The basis for the establishment of local management plans to manage nitrate within the management zone's boundary in accordance with the Central Valley Region's overall nitrate management goals established in the Central Valley SNMP.
- Voluntarily proposed by those regulated dischargers located within the proposed management zone boundary that have decided to work collectively and collaboratively to comply with the nitrate management requirements of the Central Valley SNMP.

¹ Where there are 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.

4.3.2.2 Permitting Pathways

Figure 4-2 illustrates the initial activities that occur upon implementation of the nitrate management requirements of this SNMP when a prioritized area (see Table 4-1). When the dischargers within a prioritized area are notified that they must comply with this SNMP (i.e., as determined by the prioritization provided in Table 4-1), the dischargers within the priority area will 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).²⁵ During this formulation period,

²⁵ 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.

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 that includes the elements summarized in **Figure 4-3**. The timeline for preparation of this proposal is as follows:

- For dischargers that are within Priority Area 1 (see Table 4-2), 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 not in Priority Area 1, a Preliminary Management Zone Proposal shall be due within one (1) year from the notification provided by the Central Valley Water Board.

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.

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 next 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 4-4 illustrates the steps to comply with Path A beginning with the NOI submittal requirements. Developing permit requirements under Path A depends on the impact of the individual discharger to the underlying groundwater – measured in shallow groundwater. The level of effort and the conditions/requirements imposed by the Central Valley Water Board in permitting nitrate discharges will vary depending on the impact to water quality.

Figure 4-2. Initial SNMP Nitrate Management Actions

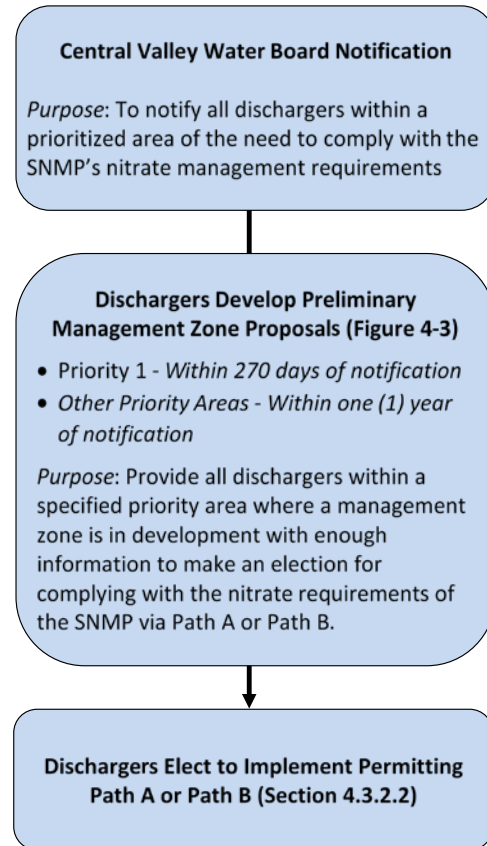


Figure 4-3. Elements of Preliminary Management Zone Proposal

- Proposed preliminary boundary areas;
- Identification of initial participants/dischargers;
- Identification of other dischargers and stakeholders in the management zone area that the initiating group is in contact with regarding participation in the management zone;
- Identification of process for coordinating with others that are not dischargers to address drinking water issues, which must include consideration of coordinating with affected communities and their representatives, the State Water Board’s Division of Drinking Water, Local County Health Officials, Sustainable Groundwater Management Agencies and others as appropriate;
- Initial identification of public supply wells, and/or domestic wells that exceed the drinking water standard for nitrate;
- An EAP that includes specific actions and a schedule of implementation to address the immediate drinking water needs of those initially identified within the management zone boundary that are drinking groundwater that exceeds nitrate standards;
- Initial assessment of groundwater conditions based on existing data and information;
- Identified constituents of concern the group intends to address with the management zone besides nitrates (the group has the option to consider other constituents of concern, but is not required to do so);
- Proposed timeline for:
 - Identifying additional participants;
 - Further defining boundary areas;
 - Developing proposed governance and funding structure;
 - Additional evaluation of groundwater conditions across the management zone boundary area, if necessary;
 - Identification of need for assimilative capacity on a management zone basis, or need for obtaining an approved exception from meeting the nitrate water quality objective for protection of the MUN beneficial use; and
 - Preparing and submitting a Final Management Zone Proposal and a Management Zone Implementation Plan.

The SNMP recognizes that there are some discharges of nitrates to groundwater that would be considered low-threat, and are therefore relatively simple for the Central Valley Water Board to authorize in existing WDRs, or renewed/revised WDRs. Specifically,

- Discharges that are better than receiving water quality and the receiving water is better than the water quality objective of 10 mg/L are considered to not lower water quality. In such circumstances, the discharge is not subject to the state’s antidegradation policies and the Central Valley Water Board is not required to make the findings as specified in Resolution 68-16 to authorize the discharge.

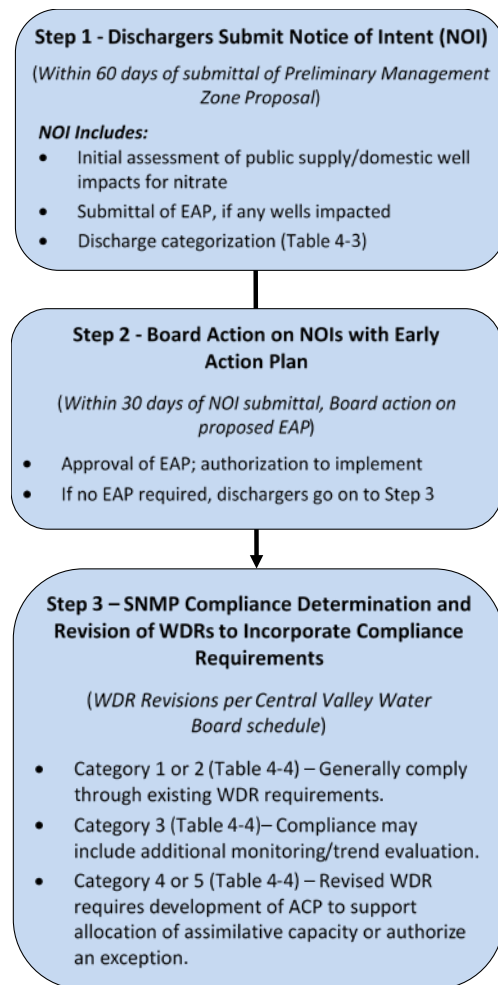
- Some dischargers may be able to demonstrate that their discharge, or collective discharges, are low threat in nature because they have data and information that demonstrates that the discharges have not degraded groundwater over a specified time-period, and that the nature of the discharge has remained constant. For example, in some areas of the Central Valley where groundwater is better than the nitrate water quality objective, and cropping and cultural practices have remained constant, data and information may be used to demonstrate the low threat nature of the discharge.

In contrast, there may be discharges of nitrates that are above the drinking water standard and there is no available assimilative capacity. In these circumstances, it may be appropriate for the Central Valley Water Board to grant an exception to meeting the water quality objective rather than prohibiting the discharge (see Section 4.3.2.4 below and the Exceptions Policy in Attachment A-4). Or, a finding may be made that the discharge will degrade water quality and an allocation of assimilative capacity is required. Because of the various levels of impacts that may result from the discharge,²⁶ this SNMP establishes five categories for dischargers choosing to comply with the SNMP via Path A. **Table 4-3** defines each of these categories.

As noted above, Figure 4-4 provides a summary of the Path A steps to demonstrate compliance with the nitrate management requirements of this SNMP. **Step 1** in the process is submittal of the NOI which shall include:

- An initial assessment of receiving water and/or discharge conditions.
- An initial assessment to determine if the discharge (or collective discharges) is impacting any nearby public water supply wells or domestic wells for nitrates.
- 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

Figure 4-4. Path A Steps to Compliance with SNMP



²⁶ 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.

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 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 4-3).

Table 4-3. Discharge Categories Applicable to Path A.

Discharge Category	Central Valley Water Board Findings/Conditions
Category 1 - No Degradation Category	Discharge ¹ is equal to or less than the water quality objective of 10 mg/L, and the discharge is better than baseline receiving water quality.
Category 2 - De minimus 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.
Category 3 - Degradation Below 75% of the Water Quality Objective Category	Discharges will be considered as part of this category if they 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, or cause concentrations to increase more than 0.1 mg/L NO ₃ -N per year using cumulative average ² annual increase over a five-year period. 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.
Category 4 - Degradation Above 75% of the Water Quality Objective Category, or Receiving Water Quality is at 50% of the WQO and the Discharge(s) is Causing an Annual Increase in Nitrate > 0.1 mg/L using Cumulative Average² Annual Increase Over a Five-Year Period:	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 WQO and the discharge(s) causes the receiving water to exceed an acceptable annual increase in concentration. 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.
Category 5 - 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. (see Section 4.3.2.4 below and Attachment A-4)

¹ 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.

² 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. .

- Information necessary to support allocation of assimilative capacity, as applicable (see 4.3.2.3 below).
- Application for Exception pursuant to the Exceptions Policy, as applicable (see Section 4.3.2.4 below and Attachment A-4).
- 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.

Under **Step 2** (Figure 4-4), 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 relevant to the discharger.

Based on the information in the NOI submitted in Step 1, under **Step 3** (Figure 4-4) 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 4-3:

- *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 (see Section 4.3.2.4 below and Attachment A-4), 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 **Table 4-4**. The findings and/or conditions shall be included in a new/revised WDR.

Table 4-4. Summary of the Findings/Conditions Required to Demonstrate Compliance with the Nitrate Management Requirements Applicable to Path A

Discharge Category	Central Valley Water Board Findings/Conditions
Category 1	<ul style="list-style-type: none"> • Discharge is equal to or better than the nitrate water quality objective of 10 mg/L-N (i.e., less than 10 mg/L-N); and, discharge is better than baseline receiving water quality. • Discharge is deemed to be in compliance with SNMP.
Category 2	<ul style="list-style-type: none"> • Baseline receiving water quality has assimilative capacity. • Discharge(s) will not use more than 10% of available assimilative capacity over a 20-year planning horizon and will not cause the receiving water to exceed a trigger level of 7.5 mg/L-N over that planning horizon. • Discharge will not cause receiving water to increase more than 0.1 mg/L NO₃-N per year using cumulative average¹ annual increase over a 5-year period. • To determine amount of assimilative capacity consumed by the discharge, the Central Valley Water Board will consider the quality of the discharge as it enters the receiving water, accounting for reductions in nitrate mass or concentration as the discharge percolates to groundwater through the soil. • Discharge will not unreasonably affect present and anticipated beneficial uses.
Category 2 (cont.)	<ul style="list-style-type: none"> • WDRs will ensure that BPTC at a level that is necessary to assure that pollution and nuisance will not occur, and that the highest water quality consistent with the maximum benefit to the people of the state will be maintained. • When the discharge is in an area that is covered by a Preliminary Management Zone Proposal, the Central Valley Water Board must consider the impact that granting available assimilative capacity to the individual under Path A will have on assimilative capacity for those that are part of the management zone.
Category 3	<ul style="list-style-type: none"> • Baseline receiving water quality has assimilative capacity. • Discharge(s) will use more than 10% of available assimilative capacity over a 20-year planning horizon. • Discharge will not cause the receiving water to exceed 7.5 mg/L for nitrate as N over a 20-year planning horizon. • Discharge will not cause receiving water to increase more than 0.1 mg/L NO₃-N per year using cumulative average annual increase over a 5-year period. • To determine amount of assimilative capacity consumed by the discharge, the Central Valley Water Board will consider the quality of the discharge as it enters the receiving water, accounting for reductions in nitrate mass or concentration as the discharge percolates to groundwater through the soil. • Discharge will not unreasonably affect present and anticipated beneficial uses. • WDRs will result in BPTC at a level that is necessary to assure that pollution and nuisance will not occur, and that the highest water quality consistent with the maximum benefit to the people of the state will be maintained. • When the discharge is in an area that is covered by a Preliminary Management Zone Proposal, the Central Valley Water Board must consider the impact that granting available assimilative capacity to the individual under Path A will have on assimilative capacity for those that are part of the management zone. • Additional monitoring and periodic trend evaluation conditions are imposed to ensure compliance with SNMP.
Category 4	<ul style="list-style-type: none"> • Receiving water quality has assimilative capacity. • Discharge(s) will use more than 10% of available assimilative capacity over a 20-year planning horizon. • Discharge will cause the receiving water to exceed 75% of the WQO for nitrate (i.e., 7.5 mg/L-N) over a 20-year planning horizon but will not cause receiving water to exceed the water quality

Table 4-4. Summary of the Findings/Conditions Required to Demonstrate Compliance with the Nitrate Management Requirements Applicable to Path A

Discharge Category	Central Valley Water Board Findings/Conditions
	<p>objective for nitrate over a 20-year planning horizon; or, the receiving water is at or above 50% of the WQO and the discharge causes the receiving water to exceed an acceptable annual increase in concentration.</p> <ul style="list-style-type: none"> • To determine amount of assimilative capacity consumed by the discharge, the Central Valley Water Board will consider the quality of the discharge as it enters the receiving water, accounting for reductions in nitrate mass or concentration as the discharge percolates to groundwater through the soil. • Discharge will not unreasonably affect present and anticipated beneficial uses. • WDRs will result in BPTC at a level that is necessary to assure that pollution and nuisance will not occur, and that the highest water quality consistent with the maximum benefit to the people of the state will be maintained. • When the discharge is in an area that is covered by a Preliminary Management Zone Proposal, the Central Valley Water Board must consider the impact that granting available assimilative capacity to the individual under Path A will have on assimilative capacity for those that are part of the management zone.
<p>Category 4 (cont.)</p>	<ul style="list-style-type: none"> • Discharger required to develop and implement an ACP for the nitrate components of the SNMP, which shall include the following: <ul style="list-style-type: none"> – Identification of nitrate related drinking water supply issues in the area impacted by the discharge(s); – Time schedule with milestones for addressing newly-identified nitrate related drinking water supply issues in the area impacted by the discharge(s); – Preliminary identification of the steps that will be taken to evaluate actions necessary to implement Management Goals 2 and 3, which may be phased in over time and will likely require further evaluation and assessment to identify proposed long-term actions.
<p>Category 5</p>	<ul style="list-style-type: none"> • Receiving water has no assimilative capacity for nitrates in First Encountered Groundwater. • Discharge exceeds the water quality objective for nitrate. • No reasonable, feasible or practicable means are available for discharger to comply with WDRs that would otherwise limit the discharge of nitrate to groundwater concentrations to less than 10 mg/L-N. • It is infeasible, impracticable or unreasonable to prohibit the discharge. • Discharger required to develop and implement an ACP for the nitrate components of the SNMP, which shall include the following: <ul style="list-style-type: none"> – Identification of nitrate related drinking water supply issues in the area impacted the discharge(s); – Time schedule with milestones for addressing newly-identified nitrate related drinking water supply issues in the area impacted by the discharge(s); – Preliminary identification of the steps that will be taken to evaluate actions necessary to implement Management Goals 2 and 3 where reasonable and feasible, which may be phased in over time and will likely require further evaluation and assessment to identify proposed long-term actions. • Discharger required to seek and obtain an exception in accordance with the Exceptions Policy.

¹ 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.

² In making this determination, the Central Valley Water Board shall consider information provided by the discharger that demonstrates that the level of nitrogen entering the receiving water is different than the level of nitrates in the discharge due to naturally occurring groundwater recharge, nitrogen transformation and losses, and nitrogen up take by plants.

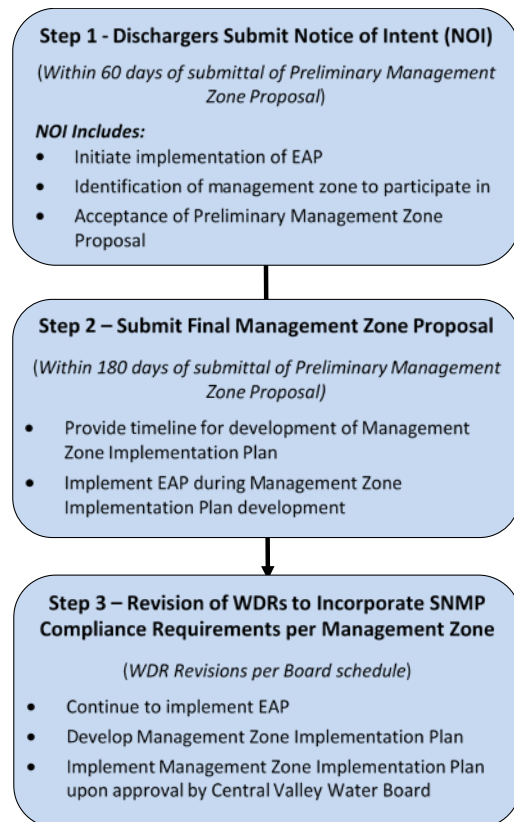
Path B – Participants in a Management Zone

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 described in Figure 4-3. Following submittal of this proposal (see above for time allowed to submit), dischargers that have selected Path B will continue to implement this SNMP per the steps illustrated in **Figure 4-5**, beginning with a filing of an NOI.

- **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** - 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. 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 Revised 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.

Figure 4-5. Path B Steps to Compliance with SNMP



- **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, which must be submitted within 180 days of submittal of the Preliminary Management Zone Proposal. **Figure 4-6** summarizes the requirements for a Final Management Zone Proposal (see Groundwater Management Zone Policy in Attachment A-1).

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.

Figure 4-6. Minimum Requirements for Final Management Zone Proposal

- Timeline for development of the Management Zone Implementation Plan.
- Updated list of participants.
- Governance structure that, at a minimum, establishes the following: (a) roles and responsibilities of all participants; (b) funding or cost-share agreements to implement short term nitrate management projects/activities; and (c) a mechanism to resolve disputes among participating dischargers.
- Additional evaluation of groundwater conditions across management zone area, if necessary.
- Identification of proposed approach for regulatory compliance (i.e., use of assimilative capacity and/or seeking approval of an exception for meeting nitrate water quality objectives).
- Explanation of how the management zone intends to interact and/or coordinate with other similar efforts such as those underway pursuant to the SGMA.

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 as allowed in the Groundwater Management Zone Policy, or through an exception to meeting the water quality objective for nitrate as set forth in the Exceptions Policy (Attachment A-4). **Figure 4-7** summarizes the minimum requirements for the Management Zone Implementation Plan.

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 nitrate WQOs. 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.

Figure 4-7. Minimum Requirements for Management Zone Implementation Plan

- It must be consistent with the management goals of the Central Valley SNMP, including, addressing short-term and long-term drinking water needs affected by nitrates, plan for achieving balanced nitrate loadings within the management zone (to the extent feasible and reasonable), and plan for establishing a managed aquifer restoration program to restore nitrate levels to concentrations at or below the water quality objectives to the extent it is feasible and reasonable to do so.
- The highest water quality priority within any management zone where groundwater is impaired by nitrate contamination is the assurance that a drinking water supply that meets drinking water standards is available to all drinking water users within the management zone boundary.
- Funding or cost-share agreements, or a process for developing such funding or cost-share agreements, to implement intermediate and long-term nitrate management projects/activities.
- Implementation of nitrate management activities within a management zone may be prioritized based on factors identified in the Central Valley SNMP and the results of the characterization of nitrate conditions. Prioritization provides the basis for allocating resources with resources directed to the highest water quality priorities first.
- It shall include a water quality characterization and nitrate management measures consistent with the requirements established in the Central Valley SNMP, including:
 - Characterization of nitrate conditions within the proposed management zone which will be used as the basis for demonstrating how nitrate will be managed within the management zone over short and long-term periods to meet the management goals established in the Central Valley Region SNMP.
 - Short (≤ 20 years) and long-term (> 20 years) projects and/or planning activities that will be implemented within the management zone, and in particular within prioritized areas (if such areas are identified in the Implementation Plan) to make progress towards attaining each of the management goals established by the Central Valley SNMP. Over time as water quality is managed in prioritized areas, updates to the plan may shift the priorities in the management zone.
 - Milestones related to achievement of the overall Central Valley SNMP's long-term goal of achieving balanced nitrate loadings and managed aquifer restoration.
 - A short and long-term schedule for implementation of nitrate management activities with interim milestones.
 - Identification of triggers for the implementation of alternative procedures or measures to be implemented if the interim milestones are not met.
 - A water quality surveillance and monitoring program that is adequate to assure that the plan when implemented is achieving the expected progress towards attainment of management goals.
 - Consideration of areas outside of the management zone that may be impacted by discharges that occur within the management zone boundary areas.
- The plan may be modified periodically to incorporate changes based on new data or information, and should generally be changes that will benefit water quality in the management zone. Any modifications to the plan that impact or change timelines, milestones or deliverables identified in the Implementation Plan must be approved by the Central Valley Water Board's Executive Officer.
- Identify the responsibilities of each regulated discharger, or groups of regulated dischargers participating in the management zone to manage nitrate within the Zone.
- Include a proposed monitoring program, or in the alternative, participate in a valley-wide and/or regional groundwater monitoring, if appropriate.

4.3.2.3 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 establishes 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 (see footnote 22), or be a volume-weighted average for the **upper or production** 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 **production 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.

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 4.3.2.2 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 or production zone** would typically need to be accompanied with a proposed ACP while granting assimilative capacity in shallow groundwater would 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 and/or production 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. Guidelines specific to developing ACPs are set forth in Attachment A-10 of the SNMP.

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.” To determine if BPTC is being implemented, the SNMP recommends that the Central Valley Water Board look at whether BPTC (at the discharge) can show that nitrate concentrations in the relevant groundwater will remain below 10 mg/L or established trigger levels for the defined planning horizon (i.e., 20 years). In cases where assimilative capacity is being granted based on availability of assimilative capacity in the **upper zone or production** 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 or production** zones). For example, to evaluate if BPTC is being implemented granting use of assimilative capacity based on the **upper zone or production 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 (see also SNMP Attachment A-11):

- 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 reasonably 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. The granting of such exceptions for nitrates is discussed immediately below in Section 4.3.2.4.

4.3.2.4 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 exceptions²⁷ under certain circumstances. This section describes how such exceptions authority should be applied with respect to permitting nitrate discharges to groundwater. A more detailed description of the specific basin plan revisions required to enact a broader exceptions policy and the rationale for such changes is provided in Attachment A-4 (Exceptions Policy).

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.²⁸ 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

²⁷ 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).

²⁸ 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. Also see SNMP Attachment A-6.

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 SNMP Section 4.1.1. In addition, this SNMP recommends two overarching conditions when authorizing an exception for nitrate:

- 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 (see Attachment A-10 for required elements for an ACP). 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.²⁹ Exceptions are intended to complement, not replace, the water quality standards review process.

In the Basin Plans, the current exceptions policy is restricted to a limited number of salinity constituents (electrical conductivity, TDS, chloride, sulfate and sodium).³⁰ As discussed in Section 4.2.2.3 and Attachment A-4, this policy should be revised in order to provide the Central Valley Water Board additional authority to allow exceptions for nitrate in WDRs. Specifically, per the recommendations of this SNMP, to grant an exception for discharges of nitrate, **Figure 4-8** summarizes the factors that the SNMP the Central Valley Water Board should consider.

²⁹ 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).

³⁰ Central Valley Water Board Resolution No. R5-2014-0074.

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.

4.3.3 Salt Management

Salt management under this SNMP will be guided by the Salinity Management Strategy (see Attachment A-3). Below is a summary of the key elements of this strategy.

4.3.3.1 Overview

As noted in Section 4.2.4.2, current salinity management activities may only address about 15% of the annual salt load; accordingly, long-term solutions, including development of regional desalters and a Central Valley regulated brine line are needed to address the other 85%. These long-term management strategies will require significant state and federal funding to implement.

Figure 4-8. Factors to Consider When Authorizing an Exception for Nitrate in a WDR

- Nitrate concentrations in the groundwater basin and whether they exceed or threaten to exceed the MCL.
- If there is no feasible, practicable or reasonable means for the discharger to assure compliance with the relevant WDRs governing nitrate under traditional permitting approaches, or if a proposed ACP can further the goals of the SNMP more effectively than the traditional permitting approach.
- With respect to determining if it is infeasible, impracticable or unreasonable to prohibit the discharge, the Central Valley Water Board shall consider guidelines for making such an assessment if such guidelines are developed in the future. The Central Valley Water Board's obligation to follow any future developed guidelines will depend on the process used for acceptance of the guidelines by the Central Valley Water Board.
- If authorizing the discharge is in the best interests of the people of the state.
- The discharger, or group of dischargers, proposes to implement an ACP in lieu of meeting the relevant WDRs for nitrate.
- The ACP provides appropriate wellhead treatment or an alternative drinking water supply to down-gradient groundwater users impacted by the discharge(s) and where nitrate levels exceed or threaten to exceed the MCL.¹
- The discharger continues to make reasonable best efforts, where feasible and practicable, to further reduce nitrate concentrations in the discharge.
- The discharger is participating in efforts towards implementation of a long-term nitrate compliance plan, as may be required under either permitting Path A or B (see Section 4.3.2.2)

¹ The discharger may propose to participate in a regional project or make one or more payments to a regional nitrate mitigation fund approved as an ACP subject to Regional Water Board review and approval.

In the meantime, the Central Valley Water Board must implement the Basin Plans through the adoption of WDRs/Conditional Waivers that consider the beneficial uses to be protected and the water quality objectives associated with those beneficial uses.

Because the solutions for addressing salinity are long-term in nature, the Central Valley Water Board needs to be able to consider innovative salt management strategies for both the short-term and the long-term that move the region toward salt balance (i.e., no more degradation) and restoration of impacted areas where reasonable and feasible. This includes needing additional regulatory flexibility with respect to the issuance of WDRs/Conditional Waivers with salinity related requirements. Some policies being proposed with this SNMP that relate to the management of salinity include:

- Guidance to Implement Secondary Maximum Contaminant Levels (Secondary MCL Policy);
- Revisions of the Exceptions Policy for Waste Discharges to Groundwater (Exceptions Policy);
- Revisions of the Salinity Variance Program (Salinity Variance Policy);
- Offset Policy;
- Drought and Water Conservation Policy; and
- Salinity Management to Provide Reasonable Protection of AGR Beneficial Uses in Groundwater (AGR Policy);

The applicability of these various policies will vary depending on implementation of the Salinity Management Strategy described below.

4.3.3.2 Salinity Management Strategy

Overall, the Salinity Management Strategy provides the Central Valley Water Board with a 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
- Restore water quality in groundwater basins where feasible, practicable and reasonable.

Because of the long-term nature of salinity management, this Salinity Management Strategy is phased over time (**Table 4-5**). The first phase consists of developing a Prioritization and Optimization Study for salinity management. The overall goal of this study is to further define the conceptual design of SSALTS (CDM Smith 2014, 2016b) into 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).

Figure 4-9 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, it is recommended 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. Implementation of Phase II, in whole or part, will occur as directed by the findings of the Prioritization and Optimization Study, and after approval of any necessary Basin Plan amendments. It is anticipated that the duration of Phase II will be approximately 10 years. As with Phase I, it is recommended 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 funding to move forward with implementation of Phase II. Actual construction of physical projects would occur in Phase III, subject to available funding.

Table 4-5. Salinity Management Strategy Phases

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

Figure 4-9. Milestones for Implementation of Phase I of the Salinity Management Strategy

Phase I 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				
Salt Management Studies			Prioritization and Salinity Management Analyses							
						Central Valley Brine Line Project Planning				
Special Studies				Groundwater Quality - Trace Constituent Characterization Study						
			Emerging Tech Update No. 1			Emerging Tech Update No. 2			Emerging Tech Update No. 3	
						Recycled Water Imports Study				
								Stormwater Recharge Master Plan Study		

4.3.3.3 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 allows 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, it is recommended 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, it may be necessary to extend the Interim Salinity Permitting Approach 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 (i.e., State Water Board Resolution No. 68-16 and federal 40 CFR 131.12, respectively), 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.³¹ Water conservation and increased recycled water use also increase salinity levels in groundwater. Therefore, the Interim Salinity Permitting 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 a nearby agriculture water 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 collective effort that is region-wide. 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

³¹ TLB Basin Plan, Pg. III-8.

anticipated costs of these efforts, it is appropriate that most 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 Salinity Management Strategy will be phased in appropriately to allow for the need to address drinking water issues for nitrates first. This SNMP identifies nitrate drinking water issues as its first near-term priority (see Section 4.1.1). Salinity is also a priority, but due to the complexities associated with salinity, it will need to be addressed over the long-term.

Permitting Approach

Given the discussion above, CV-SALTS recommends an interim permitting approach for salinity-related discharges to surface and groundwater. To implement this approach in WDRs/Conditional Waivers, it will be necessary for the Central Valley Water Board 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. 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 (see Section 4.2.3). 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.

To balance these two needs, this SNMP recommends that the Central Valley Water Board, in cooperation with stakeholders, develop a series of resolutions/orders that amend applicable WDRs/Conditional Waivers. In general, the resolutions/orders would require dischargers to continue current reasonable, feasible and practicable efforts to implement salinity management practices and/or source control efforts, including implementation of any pollution prevention plans, watershed plans, and/or salt reduction plans. Monitoring for salinity in surface and groundwater would also continue as part of applicable monitoring programs, or through regional monitoring programs as appropriate.³² Monitoring should be coordinated with the Surveillance and Monitoring Program established as part the adoption of Basin Plan amendments to implement this SNMP (see Section 4.4 for summary of this proposed program). Discharge levels of salinity would need to remain fairly consistent with current levels, accounting for conservation and some appropriate increment of growth.

Discharges being permitted under this interim approach would be required to participate in efforts related to the Phase I Prioritization and Optimization Study, and subsequent Phases II and III as applicable. The level of participation would vary based on salinity in the discharge as well as local conditions, and the needed level of participation would be established by the lead entity that

³² The Central Valley Water Board would retain its authority to identify high priority saline discharges where more stringent control programs must be implemented.

is overseeing the Prioritization and Optimization Study. The resolutions/orders would establish the time-frame for application of the Interim Salinity Permitting Approach, which could not exceed 15 years in length. For NPDES dischargers, which are subject to federal regulatory requirements, it is recommended that as NPDES permits are renewed on their normal five-year cycle, that the Central Valley Water Board consider approval of a salinity variance per the Salinity Variance Policy (see Attachment A-6), which would include a requirement to participate in the Prioritization and Optimization Study in order to receive the variance for meeting applicable surface water quality objectives for salinity. Or, in the alternative, the Central Valley Water Board could consider a NPDES watershed-based permit for salinity as it deems appropriate.

Adopted resolutions/orders would need to include provisions that allow dischargers the discretion to opt out of participation in efforts to prepare the Phase I Prioritization and Optimization Study. However, it is recommended that dischargers wishing to opt out be permitted under current traditional and conservative permitting approaches. For groundwater dischargers wishing to opt out, this would mean that they would need to show that they do not cause or contribute to exceedances of groundwater limitations for salinity constituents in first encountered groundwater, and that selection of applicable salinity water quality objectives would be conservative (e.g., most restrictive criteria for protection of AGR and MUN beneficial uses). Further, no new allocation (or expansion of an allocation) of assimilative capacity could be granted to a groundwater discharger that wishes to opt out of the Prioritization and Optimization Study. However, if a discharger has previously received allocation of assimilative capacity, and such allocation was granted with the support of an antidegradation study/analysis, then a discharger may opt out using previously approved allocations. Further, it is recommended that the Central Valley Water Board use its discretion to issue time schedules for meeting salinity limitations for those opting out sparingly and in a limited manner. In other words, a discharger opting out should not be allowed a long-term time schedule for meeting a restrictive salinity limitation. However, the Central Valley Water Board maintains the discretion to determine if a short time schedule is appropriate in certain circumstances.

For non-NPDES surface water dischargers wishing to opt out, the same principles as described above would apply in that they would need to show that the discharge(s) do not cause or contribute to exceedances of salinity limitations, and that the selection of applicable salinity water quality objectives would be conservative and be based on the most restrictive criteria for the protection of AGR and MUN beneficial uses, as applicable. As with groundwater dischargers, no new allocation (or expansion) of assimilative capacity (i.e., dilution credit) could be granted but that previously approved allocations that were supported by an antidegradation study/analysis could be maintained. Use of time schedules should also be limited as discussed above.

For NPDES surface water dischargers, the same principles would apply as those for non-NPDES surface water dischargers. In addition, salinity variances and long-term compliance schedules would not be an available option for those seeking to opt out of the Phase I Prioritization and Optimization Study.

To prepare the appropriate resolutions/orders that amend the salinity provisions in existing permits, and that establish such provisions for future permits, this SNMP 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 implement this SNMP becoming effective. In the meantime, while such resolutions are being developed, it is recommended that the Central Valley Water Board permit salinity discharges in a reasonable manner that looks to implementing the Salinity Management Strategy.

4.3.3.4 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 (Attachment A-5), as well as application of the secondary MCLs for salinity (Attachment A-9). The documents are part of this SNMP, and may result in Basin Plan amendments in the near-term as determined appropriate. However, for the AGR Policy in particular (Attachment A-5), it may be more appropriate to not amend the Basin Plans to incorporate those policy recommendations in the near-term but rather wait until after completion of Phase I of the Salinity Management Strategy.

4.3.4 Development of Alternative Data

Section 3.3 of this SNMP provides a summary of the ambient water quality conditions and available assimilative capacity for each of the groundwater basins and subbasins in the Central Valley. Dischargers may use these data as the basis for determining if their salt or nitrate discharge will cause degradation of the receiving water. Because these values represent volume-weighted averages of the available water quality data for the area (horizontally and vertically), potential variability from one part of a groundwater basin/subbasin is captured by the values assigned to the groundwater basins/subbasins. However, as illustrated in Section 3, this variability can be significant.

When characterizing water quality for the purposes of complying with the NOI requirements for compliance with the nitrate permitting requirements of this SNMP (see Section 4.3.2.2), a discharger may rely on the data contained or referenced herein or provide alternative data that is deemed more representative of the area under the influence of the discharge. For discharges that occur over a large area (e.g., agricultural discharges), the default values in this SNMP more likely characterize typical water quality conditions. In contrast, dischargers that impact a relatively small area may find it is appropriate to evaluate the existing water quality conditions and trends within their area of influence.

If a discharger opts to provide an alternative data set for the purposes of assessing existing water quality conditions and water quality trends and provide the basis for an alternative evaluation of assimilative capacity, the discharger shall provide the complete set of data used to develop alternative compliance values for the area under the influence of the discharge. At a minimum, the data set should include:

- Well locations and well construction data, to the extent available,
- Water quality data for each well for the shallow zone, upper zone, lower zone, and the production zone.
- Evaluation of the quality and representativeness of the data used in the data analysis.
- Methods to calculate existing ambient water quality and assimilative capacity and determine trends.

If the data analysis is based on water quality modeling, the discharger shall provide sufficient information to allow Board staff to evaluate the model.

4.4 Surveillance and Monitoring Program

A recommended surveillance and monitoring program has been established to assess progress towards achieving the management goals of this SNMP (CDM Smith 2016c). Section 3.3 summarizes existing ambient water quality conditions for the **upper and lower zones** for each of the groundwater basins/subbasins in the Central Valley. This information provides the baseline water quality for this SNMP. To support implementation, this SNMP recommends the establishment of water quality monitoring networks for **shallow and deep zones** of the groundwater basins and subbasins in the Central Valley floor (see Attachment C-1). To the extent possible, these networks should rely on data collected by existing monitoring programs. Over time the water quality results from the SNMP's monitoring networks will be used to evaluate changes in salt and nitrate conditions in the Central Valley and progress towards achieving the management goals under this SNMP.

4.5 CEQA and Economics Analysis

4.5.1 CEQA Scoping

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.³³ These scoping sessions identified likely alternatives under consideration by CV-SALTS for the long-term management of salt and nitrate in the Central Valley. CV-SALTS identified a number of potential alternatives for each of the key elements below, each of which has been built upon and further developed through the CV-SALTS process:

- Evaluating and establishing appropriate beneficial uses and/or WQOs in water bodies and/or classes of water bodies;
- Developing the technical and regulatory basis for the SNMP;
- Evaluating the range of viable salt disposal and nitrate management alternatives;

³³ http://www.waterboards.ca.gov/centralvalley/water_issues/salinity/index.shtml

- Adding implementation plans or changing existing implementation plans
 - Allowing point of compliance to be expanded past first encountered groundwater to include available assimilative capacity and/or direct user protection;
 - New provisions related to variances/exceptions; compliance schedules and alternative compliance strategies;
- Ensuring safe drinking water supplies in areas impacted by salt/nitrate; and/or
- Adopting new policies that would facilitate the management of salt and nitrate.

4.5.2 SNMP Analysis

Note this is a placeholder. This section and subsequent section are intended to be a summary of the key findings from the SED, economics and antidegradation analyses with the full reports provided as references or attachments to this SNMP.