

Section 4

Central Valley Salt & Nitrate Management Strategy

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 recommends a salt and nitrate management strategy that includes regulatory requirements for the Central Valley Region. Based on the findings in Section 3 and those described below, this section describes an approach the Central Valley Water Board could 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 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, strategy, and guidance documents that provide the regulatory and technical basis for each of these recommendations. The Central Valley Water Board may propose amendments to the Basin Plans to incorporate these recommendations into the Basin Plans. Combined, the SNMP and the recommended policies 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 scales.¹

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 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.

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>

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 maximum contaminant level (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 implemented as quickly as possible in all areas in the Central Valley Region.

Goal 2: Achieve Balanced Salt and Nitrate Loadings

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

Goal 3: Implement Managed Aquifer Restoration Program

This goal seeks, where reasonable and feasible, to restore salt and nitrate levels within groundwater basins and subbasins or locally managed areas to concentrations that comply with the applicable water quality objectives established for each constituent. As demonstrated in the technical work used to support 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 reasonable and feasible, but also seeks to minimize or prevent further degradation of ground waters that are currently meeting water quality objectives to avoid future impairment.

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

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 are described in Sections 4.3.2 (nitrate) and 4.3.3 (salt) below, and 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 resources to be allocated 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 and data need to be tailored to the local area to be more representative of existing conditions where the discharge(s) occur and have influence.

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 Groundwater 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 still must 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 salt management requirements under this SNMP. Dischargers will be strongly encouraged to participate in this SNMP's phased Salinity Management Strategy (see Attachment A-3), 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 consistent with the State's Recycled Water Policy and addressing 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 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 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 and expertise 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 Basin Plan amendments. The sections below provide a summary of CV-SALTS recommendations. The information below is supported by the cited detailed policy, strategy, or guidance documents provided in Attachment A.

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.

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).⁴ 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). High resolution mapping was developed for the Central Valley Region, which may be used to support the development of appropriate management area.

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 118.⁵ 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.⁶ The SRSJB Basin Plan does not currently identify or enumerate specific groundwater basins or subbasins, as identified by DWR's Bulletin 118.

DWR periodically revises the boundaries of groundwater basins/subbasins. Therefore, even if the Basin Plans are updated to incorporate the existing, published delineation, this information could become outdated requiring additional Basin Plan amendments. Given that changes to groundwater basin/subbasin delineations will occur in the future, it may not be appropriate to directly incorporate DWR's groundwater basin/subbasin designations into the Basin Plans. Instead, as part of the planned update to the Basin Plans to incorporate the SNMP, the Central Valley Water Board will consider the best approach for referencing DWR-delineated groundwater basins/subbasins in the Basin Plans to allow for future changes.

Groundwater Management Zone Policy (Attachment A-1)

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 first safe drinking water, then to manage nitrates to create a balance within the defined management area (where feasible), and ultimately to develop and implement a long-term plan for restoration of groundwater (where feasible) to meet applicable water quality objectives.

⁴ The TLB Basin Plan further divides one of these groundwater basins into three hydrographic units, see TLB Basin Plan Figure III-1.

⁵ TLB Basin Plan, pages II-5 & II-6.

⁶ 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

Although the Basin Plans do not currently prevent the management of nitrates through the creation of management zones, the SNMP recommends the inclusion of a Groundwater Management Zone Policy within the Basin Plans so that what constitutes a proper management zone is clearly defined and to ensure that criteria for approval of a management zone by the Central Valley Water Board are properly established in regulation. 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 (Attachment A-2)

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 (Attachment A-3)

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 2016c). 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, a regulated brine line, or other projects that would allow containment or removal of salt, 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 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 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 (1) a recommendation for removal of existing salinity-related limitations in the TLB Basin Plan Implementation Chapter; and (2) adoption of a proposed Interim Salinity Permitting Approach for salinity discharges during implementation of the first phase 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)

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 related to salinity after June 30, 2019. In addition, the Salinity Exception Program applies only to TDS/EC, chloride, sulfate and sodium and does not identify guidelines for an exception to be authorized for nitrate water quality objectives. This SNMP recommends revising the existing Exceptions Policy by amending the Basin Plans 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 salinity 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) (Attachment A-5)

Significant challenges exist in 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, currently no guidance exists on how to interpret the narrative objective in a manner that accounts for local and regional differences. As a default, a conservative approach ensures protection of the most sensitive crop in all locations at all times (e.g., $EC < 700 \mu\text{S}/\text{cm}$) has been utilized, even though individual crop and livestock sensitivity to salinity varies widely and potential impacts can be mitigated through management activities.⁷

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

- Impacts on the ability of dischargers to manage/maximize reuse of drainage water on progressively more salt tolerant crops.
- Many subbasins and localized areas have elevated background salt concentrations that are higher than $700 \mu\text{S}/\text{cm}$.
- Due to consumptive use, very high quality irrigation water would be needed to ensure $700 \mu\text{mhos}/\text{cm}$ 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 current ambient salt concentrations in the production zone of each basin/subbasin. Specifically,

- *AGR Class 1:* $\text{TDS} < 600 \text{ mg}/\text{L}$ ($EC < 1,000 \mu\text{S}/\text{cm}$). Groundwater quality in the production zone that may be used as an agricultural water supply is generally suitable for irrigating all crops and all stock watering.
- *AGR Class 2:* $600 \text{ mg}/\text{L} < \text{TDS} < 2,000 \text{ mg}/\text{L}$ ($1,000 \mu\text{S}/\text{cm} < EC < 3,000 \mu\text{S}/\text{cm}$). Groundwater quality in the production zone that may be used as an agricultural water supply is generally acceptable for stock watering and for irrigating most salt-tolerant crops; it is not generally suitable for irrigating many salt-sensitive crops, except as a temporary, short-term alternative when higher quality water supplies are not readily available.
- *AGR Class 3:* $2,000 \text{ mg}/\text{L} < \text{TDS} < 5,000 \text{ mg}/\text{L}$ ($3,000 \mu\text{S}/\text{cm} < EC < 7,500 \mu\text{S}/\text{cm}$). Groundwater quality in the production zone that may be used as an agricultural water supply is generally acceptable for stock watering but is not generally suitable for irrigating all but the most salt-tolerant crops, except as a temporary, short-term alternative when higher water quality water supplies are not readily available.

⁷ 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.

- *AGR Class 4*: TDS > 5,000 mg/L (EC > 7,500 µS/cm). Groundwater quality in the production zone that is not suitable for either stock watering or crop irrigation AGR uses unless blended with lower salinity water. Areas within this classification should be considered for AGR de-designation.

The AGR classes as described above are not proposed for incorporation into the Basin Plans at this time. Instead, 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 or other approaches will be re-evaluated for potential inclusion in the Basin Plans through a future amendment process.

Salinity Variance Policy (Attachment A-6)

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)⁸. 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 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.⁹

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

⁸ Central Valley Water Board Resolution No. R5-2014-0074.

⁹ 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.

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 (Attachment A-7)

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, but only for groundwater. In addition to an offset project being used to support compliance with a WDR, offsets may be proposed to support a request for either an allocation of available assimilative capacity or an exception (see Nitrate Permitting Strategy [Attachment A-2] and Exceptions Policy [Attachment A-4], respectively). Ultimately, the decision to pursue an offset is voluntary. Offsets must be (1) proposed by discharger (individual or group of dischargers) as an Alternative Compliance Project (ACP, see 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.

As noted above, this SNMP recommends that the Offsets Policy be applicable only to groundwater at this time. However, during implementation of the Phase I – Prioritization and Optimization Study (see SNMP Attachment A-3 and Section 4.3.3, Salt Management, below), an Offset Policy for surface water may be considered for potential inclusion in the Basin Plans through a future Basin Plan amendment process.

Finally, to support implementation of this policy, it may be appropriate to establish a mitigation fund designed to develop and implement water quality improvement projects within the same receiving water basin, subbasin or management zone where the discharge occurs. This may be particularly useful for pooling the resources of many relatively small dischargers into a critical mass of funding to support water quality projects that would normally be beyond the means of individual dischargers to fund. Establishment of a mitigation fund will likely require California legislation. Accordingly, while this SNMP supports the use of a mitigation fund to support implementation of this policy, none are proposed to be established at this time.

Drought and Water Conservation Policy (Attachment A-8)

The effects of drought and the implementation of encouraged or mandated water conservation practices can significantly impact effluent quality in discharges to surface water or groundwater.

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 or for ongoing, expanding and sometimes mandated conservation practices. However, extended periods of below normal precipitation (i.e., “droughts”) as well as extensive conservation practices can create compliance issues for some dischargers because of increased TDS/EC and other salinity-related constituents in influent and effluent. This problem is 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) ground or lower quality surface water 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 and industrial users. 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.
- Once water conservation practices are implemented, they are likely to continue, especially if they necessitated capital investment (i.e. redirection for landscape irrigation, low flush toilets, drip irrigation, etc.).
- 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 impractical 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 subbasin.
- 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 normally 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;¹⁰ (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;¹¹ or (c) declaration of a local emergency consistent with the California Emergency Services Act.¹² At such times, more appropriate interim WDRs or effluent limits, such as the short term MCL of 2,200 µmhos/cm EC, 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) by promoting maximum use/reuse of available water supplies. Potential impacts to downstream/downgradient water quality must also be evaluated as part of this demonstration.
- 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.

¹⁰ California Government Code Section Title 2, Division 1, Chapter 7, California Emergency Services Act; also see <http://www.water.ca.gov/waterconditions/declaration.cfm>

¹¹ 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

¹² California Government Code Section Title 2, Division 1, Chapter 7, California Emergency Services Act.

Guidance to Implement Secondary Maximum Contaminant Levels (Attachment A-9)

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:

- Secondary Maximum Contaminant Levels (SMCL) are secondary drinking water standards. The California Health and Safety Code defines secondary drinking water standards as:

“...standards that specify maximum contaminant levels that, in the judgment of the department, are necessary to protect the public welfare. Secondary drinking water standards may apply to any contaminant in drinking water that may adversely affect the odor or appearance of the water and may cause a substantial number of persons served by the public water system to discontinue its use, or that may otherwise adversely affect the public welfare. Regulations establishing secondary drinking water standards may vary according to geographic and other circumstances and may apply to any contaminant in drinking water that adversely affects the taste, odor, or appearance of the water when the standards are necessary to ensure a supply of pure, wholesome, and potable water.”¹³
- 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 the 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.
- Primary MCLs that are set at levels to protect public health; SMCLs are drinking water standards are “set to protect the odor, taste, and appearance of drinking water”.¹⁴ The secondary drinking water standards are enforceable. In California, compliance with SMCLs in drinking water, as it is served to consumers, is measured in the groundwater source or at distribution system entry points. Water samples collected from either of these two points has often undergone some form of natural or treatment-based filtration.¹⁵ However, samples used to evaluate compliance with SMCLs that are specified as WDRs are usually

¹³ California Health and Safety Code, Division 104 Environmental Health, Part 12 Drinking Water, Chapter 4 California Safe Drinking Water Act, Article 1, Section 116275(d)

¹⁴ 22 CCR §64481(b)(2)

¹⁵ There are some exceptions, such as Hetch-Hetchy reservoir, which are exempt from EPA's Long-term² Enhanced Surface Water Treatment Rule.

collected at locations where natural or artificial filtration has yet to occur. Consequently, the analytical results may overestimate the actual effect on public drinking water supplies. As currently applied, compliance with the SMCL-based water quality objectives is assessed as though the waste discharge might be served directly to the public, as drinking water, with no further treatment including filtration. This is not a realistic possibility for the community water systems governed by 22 CCR §64449. Accordingly, the proposed guidance recommends 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 on 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 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 (Attachment A-10)

When an individual (or third party group subject to a General Order) or group of dischargers is unable to demonstrate that their discharge is not individually or collectively causing or contributing to nitrate degradation above the triggers identified in the Central Valley SNMP (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 capacity¹⁶ or an exception in these circumstances requires submittal of a proposed ACP. This request may be made as an individual discharger (which includes a third party group subject to a General Order) or dischargers working collaboratively as part of a groundwater management zone. While the Central Valley Water Board has the discretion to deny such a request, any proposed Alternative Compliance Project(s) submitted for consideration must contain specific components. Attachment A-10 provides guidance of the minimum components required for submittal of an ACP for approval. Examples of the key minimum components include:

- Consistency 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

¹⁶ 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.

balanced nitrate loadings within the proposed boundaries of the project, where feasible and reasonable, and a plan for establishing a managed aquifer restoration program to restore nitrate levels to concentrations at or below the water quality objectives to extent reasonable and feasible.

- Assure that drinking water that meets drinking water standards is available to drinking water users within the zone of influence of a discharge where there are significant nitrate concerns in groundwater. This component may be met through the development and implementation of an Early Action Plan (EAP) (e.g., see Section 4.3.2.1 below or the Nitrate Permitting Strategy (Attachment A-2).
- Outreach that will occur to insure that stakeholders or affected communities within the zone of influence of a discharge, including communities with drinking water quality concerns, are informed of, and given opportunity to participate in, the development of any ACP proposal as well as ongoing activities designed to resolve their drinking water concerns.
- Identification of short (< 20 years) and long-term (> 20 years) projects and/or planning activities that will be implemented as part of the ACP to make progress towards attaining each of the water quality-related management goals established by the Central Valley SNMP within the zone of influence. For management zones, projects/planning activities may be prioritized to better allocate resources. Over time as water quality improves in prioritized areas, updates to the ACP may shift the priorities.
- Short and long-term schedules for implementation of nitrate management activities with interim milestones and performance measures to assess progress, and identification of triggers for the implementation of alternative procedures or measures to be implemented if the interim milestones are not met.
- Surveillance and monitoring program that is adequate to assure that the ACP when implemented is achieving the expected progress towards attainment of water quality-related management goals.
- Identification of the responsibilities of each regulated discharger, or groups of regulated dischargers if participating in a management zone, to manage nitrate.

Factors to Support a Maximum Benefit Finding (Attachment A-11)

The State Antidegradation Policy (No. 68-16) sets forth the specific conditions that must be met and demonstrations that must be made before the Central Valley Water Board can allow a discharge (or discharges) to lower water quality in an existing high quality water:

- (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).¹⁷

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 (State Water Board Resolution No. 88-63) the Basin Plans designate MUN as a beneficial use on all water bodies unless they are specifically listed as water bodies that are not designated with MUN. The Basin Plans state that waters designated for MUN must not exceed Maximum Contaminant Levels (MCLs, primary or secondary) for chemical constituents, pesticides, and radionuclides. While Resolution 88-63 does contain exceptions for the MUN designation such as water bodies constructed or modified to convey agricultural drainage, to utilize the exception the Basin Plans require a formal Basin Plan amendment.

During NPDES permit adoptions there have been challenges to the need to protect the MUN beneficial use designation in agricultural drains due to the exceptions identified in 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, in coordination with Central Valley Water Board staff, 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,

¹⁷ State Water Board. Statement of Policy with Respect to Maintaining High Quality of Waters in California. Resolution No. 68-16 (October 28, 1968).

Central Valley Water Board staff prepared the documentation to support a Basin Plan amendment to remove MUN from 12 water bodies downstream of these four POTWs. All of these water bodies met exception criterion 2b in the Sources of Drinking Water Resolution 88-63. This Basin Plan amendment was approved by the Central Valley Water Board and State Water Board on April 15 and August 18, 2015, respectively)¹⁸ and approved by the Environmental Protection Agency on April 21, 2016. In part, the amendment developed a standardized method for evaluating and categorizing agriculturally dominated water bodies into constructed, modified or natural.

- *Region-wide MUN Evaluation Process and Adoption of a Limited MUN Beneficial Use* – The Central Valley Water Board is currently working on a second Basin Plan amendment to establish a Central Valley region-wide process for evaluating the MUN beneficial use in agriculturally dominated surface water bodies based on the process utilized in Phase 1 and adopt a Limited MUN (LMUN) use. 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 downstream 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 were not constructed to supply drinking water. Consequently, establishment of a region-wide process to evaluate the applicability of the MUN beneficial use on

¹⁸ Central Valley Water Board Resolution No. R5-2015-0022; State Water Board Resolution No. 2015-0055

agricultural drains provides an important tool to support implementation of this SNMP. The Basin Plan amendment is expected to be proposed for adoption in early 2017.¹⁹

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.²⁰ The Project Study Area is located in the southern part of the Central Valley of California in the Tulare Lake Basin. The Tulare Lake Basin essentially functions as a closed basin except during extreme flood years, when some Kings River water moves north through Fresno Slough into the San Joaquin River. Because the Tulare Lake Basin is a closed basin, salts have been naturally deposited and accumulated since its formation and before any influence from humans. The diversion of water into the basin from other watersheds to support 3 million acres of agriculture, (Sholes 2006) including three of the five most agriculturally productive counties in the United States,²¹ has exacerbated the accumulation of salts. The application of MUN and AGR in the center of the historic Lake Bed has impeded efforts to consolidate and manage salt in evaporation basins.

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

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 ($\mu\text{S}/\text{cm}$) as a 30-day running average,

¹⁹ http://www.waterboards.ca.gov/centralvalley/water_issues/salinity/mun_beneficial_use/index.shtml

²⁰ http://www.waterboards.ca.gov/centralvalley/water_issues/salinity/tulare_lakebed_mun_evaluation/index.shtml

²¹ http://agcomm.co.tulare.ca.us/default/assets/File/2012CensusCA_1.pdf

except during Extended Dry Periods,²² 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.

These proposed amendments would set objectives that would be protective of the two beneficial uses in the LSJR that are most sensitive to salinity impacts: AGR and MUN. MUN and the irrigation supply component of AGR were determined to be the most salt sensitive used after completion of separate studies on salinity impacts to aquatic life (Buchwalter 2014) and stock watering (Kennedy/Jenks Consulting 2013). In addition, setting an EC performance goal will promote achievement of the best possible water quality under variable conditions, consistent with the SNMP Drought and Water Conservation Policy (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.²³

To determine salinity levels protective of irrigated agriculture utilizing the LSJR for supply, the proposed amendment used the Hoffman Model with specific inputs as follows:

- Selecting the most salt sensitive crop from crops comprising 95% of the commercial acreage (i.e. almonds);
- Utilizing a 15% leaching fraction;
- Protecting to 95% yield; and
- Protecting in 95% of the driest years.

Inputs were adjusted to protect 70% yield during extended dry periods.

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. In addition, the proposed amendment provides guidance on: interpreting narrative objectives to protect AGR; adjusting regulation to account for extended dry periods; and managing salt at a basin-wide scale.

²² See footnote 2 in:

http://www.waterboards.ca.gov/centralvalley/board_decisions/tentative_orders/1608/mun_wkshp/1608_lsjr_wkshp_mtrl.pdf

²³ Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary, State Water Resources Control Board, December 13, 2006.

The Basin Plan amendment is expected to be proposed for consideration in December 2016 and adoption in early 2017.²⁴

4.2.4 Regulatory Evaluations

CV-SALTS conducted several regulatory and literature reviews to evaluate the technical basis for protection of selected beneficial uses. More specifically, these studies evaluated what constitutes reasonable protection of existing and probable future uses for protection of MUN, AGR and aquatic life, as related to nitrate and/or salt. The specific evaluations completed are summarized in the subsections below and the complete findings are accessible through the Technical Projects Index located at the CV-SALTS website;²⁵ they are also accessible in Attachment B of this SNMP.

4.2.4.1 Salinity Effects on MUN-related Uses of Water

CV-SALTS completed research to define what constitutes reasonable protection of existing and probable future MUN uses. This effort focused on an evaluation of the current state of knowledge regarding the effects of elevated salinity concentrations on drinking water supply, including human health concerns, and other domestic uses of water such as impacts of salinity on residential, commercial and industrial water-using devices. This study also reviewed water quality objectives established in other California regions, federal recommendations for the protection of water used as a drinking water supply developed by the US EPA, MUN-related water quality standards adopted by other states, and guidelines established by selected international entities. The outcome was a summary of key findings along with supporting data and references (CDM Smith 2016d).

4.2.4.2 Salinity Effects on Agricultural Irrigation Uses

Comparable to its evaluation of the MUN use, CV-SALTS evaluated what constitutes reasonable protection of existing and probable future use of water for agricultural irrigation. This research included an evaluation of the current state of knowledge regarding the effects of elevated salinity concentrations on crop yields, wetland plants and vegetation commonly used for landscaping. In addition, the study reviewed water quality objectives established in other California regions, federal recommendations developed by the US EPA, water quality standards adopted by other states to protect water used for irrigation, and guidelines established by selected international entities. The outcome was a summary of the key findings along with supporting data and references (CDM Smith 2016e).

4.2.4.3 Stock Watering Protection

The Central Valley Region protects stock watering supplies through application of the AGR beneficial use. CV-SALTS conducted research to identify water quality criteria that may be used to establish salinity and nitrate-related water quality objectives to protect stock watering supplies in the Central Valley. This study considered the following information sources: (a) water quality objectives established in other regions of California or in other selected states; (b) review of US EPA recommendations; (c) university extension publications and specialists; (d) published peer-reviewed literature; and (e) selected international agencies. The final report provided CV-SALTS

²⁴ http://www.waterboards.ca.gov/centralvalley/water_issues/salinity/upstream_salt_boron/index.shtml

²⁵ <http://www.cvsalinity.org/index.php/committees/technical-advisory/technical-projects-index.html>

with recommendations for protection of stock watering sources (Kennedy/Jenks Consultants 2013).

4.2.4.4 Aquatic Life Protection

CV-SALTS implemented a study to identify potential water quality criteria that could be used to establish salinity-related water quality objectives to protect aquatic life in Central Valley surface waters. This study researched the following information sources: (a) recent literature reviews conducted by selected states to establish water quality criteria for salinity-related constituents; (b) peer-reviewed published literature; (c) data and methodologies developed by federal agencies, including US EPA and the United States Department of Interior; (d) recommendations developed by selected international agencies; and (e) any information developed by other California agencies. The final report provided technical recommendations for CV-SALTS consideration (Buchwalter 2014).

4.2.5 Development of the Technical Foundation

CV-SALTS commissioned a number of technical studies over many years to develop baseline information to support this SNMP. 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;²⁶ they are also accessible in Attachment B of this SNMP. In the subsections below, summaries are provided for the key studies that have been used to (a) support development of the policies, strategies and regulatory tools described in Section 4.2.2 above 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.

4.2.5.1 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 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

²⁶ <http://www.cvsalinity.org/index.php/committees/technical-advisory/technical-projects-index.html>

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.

Nitrate Implementation Measures Study (NIMS)

CV-SALTS conducted the 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).

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.

Aggressive Restoration Modeling Scenario

The NIMS study summarized above identified a number of potential nitrate management controls (e.g., pump, treat, and serve, or pump, treat, and re-inject) that could be deployed in the Central Valley to improve water quality. The AID Management Zone Archetype Study, discussed below in Section 4.2.5.3, evaluated a number of management scenarios and the potential benefits to water quality within the AID area. To better understand the types of nitrate control measures that would be necessary to meet SNMP management goal #3 (Implement Managed Aquifer Restoration Program), a modeling study, i.e., Aggressive Restoration Modeling Scenario, was completed that linked management Scenario #3 from the AID Management Zone Archetype Study (with specified targets for irrigation efficiency, reduced nitrogen loading, and artificial recharge changes) with selected nitrate management controls identified by the NIMS and on-farm winter recharge. The study evaluated two selected areas within the AID boundary (Dinuba and Cutler/Orosi) with varying nitrate conditions. Well fields were designed for each of the study areas and then modeled to observe the degree to which nitrate decreases in ambient groundwater within 10 to 20 years (and as long as 100 years) using different simulations. Key findings included (Luhdorff & Scalmanini and LWA 2016b):

- A targeted approach for restoration works better in smaller geographic settings where there is more control and knowledge about the local transport of water and nitrate mass.
- Applying pump, treat, and reinject designs to large regional areas is not practicable because there are too many other complications such as non-point sources, local rural/urban/domestic pumping stresses, and lateral influxes that interfere with the movement and restoration of the water that is attempted with the pump, treat, and reinject system design.
- With regards to use of on-farm recharge as a management control: (a) It is advantageous for flushing the root zone with clean water, but the effects of the increased recharge are not always discernible in the precise area of the recharge activity and recharge effects may be seen downgradient and may be affected by nearby pumping stresses; (b) it aids in the vertical movement of clean water, but can also result in displacement of existing poor shallow water quality causing this water to move downward into lower parts of the aquifer system, sometimes including the production zone; and (c) on-farm recharge and any attempts at enhanced natural recharge or artificial recharge are greatly dependent on the ability of the aquifer materials and water table elevation to accept additional water.

- Pump, treat, and serve efforts rather than pump, treat, and reinject are an excellent way to provide clean drinking water to communities, but this approach does not serve as a particularly beneficial tool for restoration. The amount of nitrate mass removed from municipal pumping is minor compared to the amount of mass entering the system through surface mass loading and lateral fluxes on a regional scale. Most of the pump, treat, and serve water is consumed; therefore, little treated water returns to the aquifer system, offering little or no replenishment to the aquifer.
- Restoration is not likely feasible on the scale of the Central Valley. It appears to be unrealistic even on the scale of the archetype study area, AID, as it would likely take on the order of thousands of new wells to pump, treat, and reinject clean water back into the system while intercepting surface mass loadings before they migrate down into the production zone. Localized efforts in areas that are of high priority (based on proximity to communities and existing ambient conditions) may be potentially ideal for restoration activities that may include on-farm recharge, other artificial recharge efforts, and pump/treat/reinject efforts. Even so, restoration activities may take decades to result in satisfactory declines in impaired groundwater quality, and eventually the areas may reach equilibrium where the nitrate mass entering the system equals the mass exiting. Therefore, targeted reductions in nitrate concentrations may still be difficult to achieve.

4.2.5.2 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 by dischargers and other affected entities will be necessary. Where a long-term management program is necessary, SSALTS recommended 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 that identified the need for a “valleywide drain” to transport salts out of the Tulare and San Joaquin River Basins.²⁷

Similar to nitrate, the time and cost to achieve salt balance (so no additional degradation occurs in areas of concern), 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 (in 2014 dollars) to operate and maintain the system (CDM Smith 2014). These costs do not include the pipelines required to collect effluents for treatment. Once treatment and brine disposal systems are operational, treated water 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 provided a conceptual level view of the challenges that will be faced in the Central Valley to achieve salt balance and ultimately restoration, both where it is deemed reasonable and feasible. Not only are there significant 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 10-15 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). The second and third phases would seek funding for and implement the salt management program.

4.2.5.3 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 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 of 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

²⁷ TLB Basin Plan, Pg. IV-5-6; SRSJR Basin Plan, Pg. IV-15.00

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 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 four 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. Three of these management scenarios varied factors such as irrigation efficiency, recharge and nitrogen loading. The findings from these various scenarios showed that salt and nitrate concentrations did not improve significantly over different time periods (5, 10, 20, 30, 40, 50, 75 and 100 years). In fact, water quality declined in some cases as legacy salt and nitrate loads moved through the groundwater. A fourth management scenario was evaluated that was much more aggressive in its implementation. Called the “extreme scenario” this scenario removed all agricultural-related mass loading of nitrogen in the AID. Based on the modeling results from implementation of this scenario, improvement of simulated nitrate concentrations occurred in all groundwater zones over time, but at the same time degradation of simulated TDS concentrations occurred (LWA et al. 2016, see Appendix E).

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).

4.2.5.4 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/subbasin 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. Attachment B of this SNMP provides links to additional information regarding studies completed to fulfill the requirements of the Recycled Water Policy.

Table 4-1. CV-SALTS Technical Studies Completed to Satisfy Recycled Water Policy SNMP Requirements for the Evaluation of Salt and Nitrate

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. 2016c. <i>SSALTS Final Phase 3 Report: Evaluate Potential Salt Disposal Alternatives to Identify Acceptable Alternatives for Implementation</i>. October 2016. • CDM Smith. 2016a. <i>Nitrate Implementation Measures Study</i>. March 2016. • CDM Smith. 2014. <i>SSALTS Final Phase 2 Report: Development of Potential Salt Management Strategies</i>. October 2014. • CDM Smith 2013. <i>SSALTS Final Phase 1 Report: Identification and Characterization of Existing Salt Accumulation Areas</i>. December 2013. • Luhdorff & Scalmanini Consulting Engineers and LWA. 2016b. <i>Alta Irrigation District Management Zone: Aggressive Restoration Alternative Modeling Scenario Results</i>. Technical memorandum prepared for CV-SALTS. September 2016. • LWA et al. 2016. <i>Management Zone Archetype Analysis Report: Alta Irrigation District</i>. July 2016.

¹ See Section 6 for complete references; referenced CV-SALTS studies may be accessed at through Attachment B or at: <http://www.cvsalinity.org/index.php/committees/technical-advisory/technical-projects-index.html>

4.3 Salt and Nitrate Management Strategy

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

For planning purposes to support development of this SNMP the groundwater basins/subbasins, as currently established by DWR for the Central Valley (DWR 2003), serve as the basic or default units for the evaluation of salt and nitrate in the Central Valley Region. 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 N) - 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.

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) provide additional supporting information.

Efforts to manage nitrate to meet the goals of this SNMP will be implemented in WDRs or other appropriate Board orders that must implement relevant provisions of the Basin Plans, or Conditional Waivers, which must be consistent with the Basin Plans.²⁸ 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

²⁸ Water Code §13263 & 13269

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 in order to comply with the nitrate components of the SNMP. The SNMP encourages dischargers to participate in management zones as the preferred method for complying with the nitrate components of the SNMP. However, participation in a management zone may not be appropriate for every discharger, or groups of dischargers, depending on local 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 groundwater²⁹ (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 by the Central Valley Water Board (again subject to required findings). In this case it is recommended that the Central Valley Water Board evaluate the availability of assimilative capacity using a volume-weighted average in the upper zone.

Early Action Plans (EAP)

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

²⁹ For the purposes of this discussion, shallow groundwater is defined as follows: The shallowest portion 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.

Prioritization of Implementation (To be discussed again at November 10 Policy Meeting)

Implementation of the nitrate management requirements of this SNMP will be prioritized based on a combination of current groundwater quality, predicted trends in nitrate water quality over 50 years, and 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 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 for nitrate 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 or, in some cases, through coordination with local agencies to enforce source water protection requirements.

Figure 4-1. Characteristics of a Management Zone

- A defined area which incorporates a portion of a larger groundwater basin(s)/subbasin(s) that serves as a discrete regulatory compliance unit for compliance with the nitrate components of the Central Valley SNMP;
- Intended to include all of the groundwater and all of the regulated dischargers that discharge nitrate and that choose to participate in the management zone within the land area encompassed by the management zone boundary.
- Intended, where nitrates in groundwater are impacting groundwater being used as a drinking water supply, to facilitate the assurance of safe drinking water for all residents in an area adversely affected by dischargers participating in the management zone, encourage stakeholder coordination and cooperation, promote better water resource management through appropriate allocation of resources, and provide greater regulatory flexibility where needed to prioritize nitrate management activities and allow time to achieve compliance with the Central Valley SNMP's nitrate 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 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 4-2), 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).³⁰ During this formulation period, dischargers interested in forming a management zone (or a lead entity on behalf of dischargers) should work collectively to develop a Preliminary Management Zone Proposal that includes the elements summarized in **Figure 4-3**. The timeline for preparation of this proposal is as follows:

³⁰ 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.

- For dischargers 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. Similarly, the Central Valley Water Board may adjust the priority of an area based on updated information.

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

The SNMP recognizes that some discharges of nitrates to groundwater 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,

Figure 4-2. Initial SNMP Nitrate Management Actions

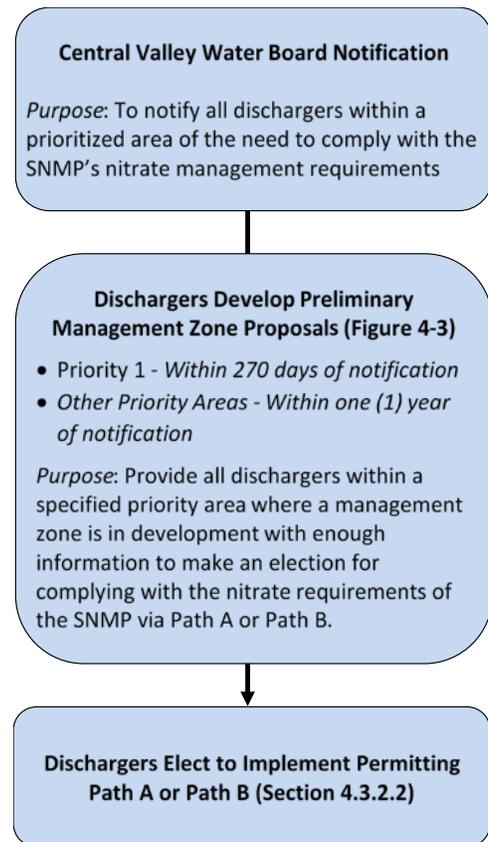


Figure 4-3. Elements of Preliminary Management Zone Proposal

- 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 other non-dischargers to address nitrate-related drinking water issues, which must include consideration of coordinating with affected communities, domestic well users 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 immediate drinking water needs of those initially identified within the management zone boundary whose drinking groundwater exceeds nitrate standards;
- Initial assessment of groundwater conditions based on existing data and information for each basin or subbasin covered by the management zone;
- 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 regulatory compliance pathway for participating dischargers (i.e., intend to request approval of use of assimilative capacity that may be available on a volume-weighted basis in the upper zone, 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.

- 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

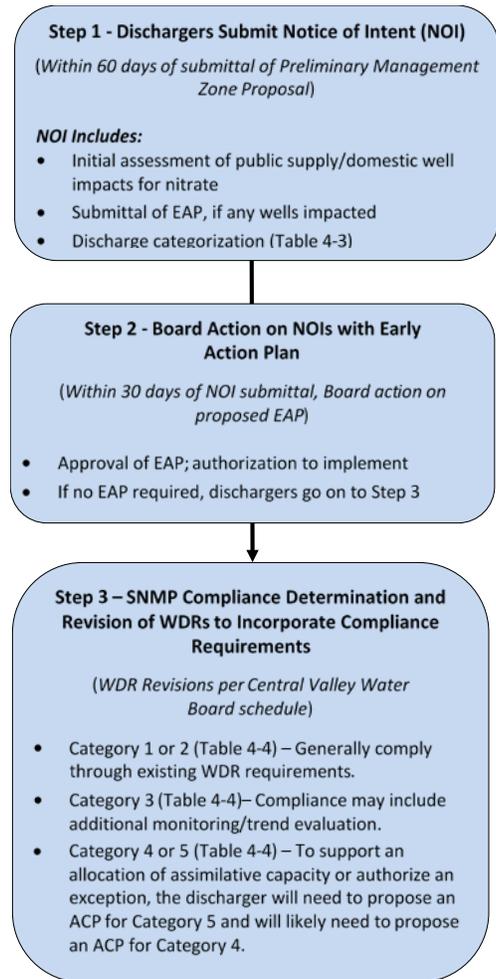
Valley where groundwater is better than the nitrate water quality objective, and cropping and cultural practices have remained constant, data and information may be used to demonstrate the low threat nature of the discharge.

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). Alternatively, 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,³¹ 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 will not need an EAP because such discharges are arguably not causing or contributing to an exceedance of the nitrate drinking water standard. Discharges in categories 4 and 5 may need to prepare an EAP, which may be part of a proposed Alternate Compliance Plan (ACP). An EAP is just that, an identification of early actions. The EAP may not be comprehensive, and may need to be revised and supplemented with additional information as part of the ACP that is incorporated directly into the WDRs.

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



³¹ 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.

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 - <i>De minimus</i> Category	Baseline receiving water has available assimilative capacity (i.e., is better than the water quality objective). For this category, the discharge(s) may be above the water quality objective as it enters the receiving water, but the discharge(s) will use less than 10% of the available assimilative capacity over a 20-year period and will not cause the receiving water to exceed a trigger of 7.5 mg/L in that time period. This would be considered a <i>de minimus</i> discharge.
Category 3 - Degradation Below 75% of the Water Quality Objective Category and the discharge occurs in a basin where the upper zone is not exceeding an acceptable annual concentration increase ³	Discharges will be considered as part of this category if they are in a basin where the upper zone is not exceeding an acceptable annual increase in concentration ³ and 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. 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 water quality objective and the Discharge(s) is within a subbasin where the upper zone is exceeding an acceptable annual increase in concentration³	Discharges will be considered as part of this category if they are in a basin where the upper zone is exceeding an acceptable annual increase in concentration ³ and 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. 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) or the discharge may be prohibited

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.

³ Acceptable annual increase: upper zone concentrations do not increase more than 0.1 mg/L NO₃-N per year using cumulative average annual increase over a five-year period.

- Identification of Category of the Discharge (see Table 4-3).
- 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 applicable 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 for Category 5 and will likely need to propose an ACP for Category 4 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 occurs in a basin where the upper zone is not exceeding an acceptable annual increase in concentration. • 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 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 occurs in a basin where the upper zone is not exceeding an acceptable annual increase in concentration. • 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.

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>Category 4</p>	<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 water quality objective 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 objective for nitrate over a 20-year planning horizon; or, the receiving water is at or above 50% of the water quality objective and the discharge occurs in a basin where the upper zone is exceeding an acceptable annual increase in concentration.³ • 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. • Discharger may be 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:

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 5 (continued)	<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.

³ **Acceptable annual increase: upper zone concentrations do not increase more than 0.1 mg/L NO₃-N per year using cumulative average annual increase over a five-year period**

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 and Final Management Zone Proposal** - As part of participating in a management zone, dischargers will need to collectively be responsible for implementing the EAP that was submitted as part of the Preliminary Management Zone Proposal. The time for beginning to implement the EAP shall be based on Central Valley Water Board acceptance of the EAP, which shall be indicated through a notice to proceed from the Central Valley Water Board to the lead entity responsible for the management zone Within 60 days after submittal of the Preliminary Management Zone Proposal to the

Central Valley Water Board and if no objections to the EAP are provided in writing by the Central Valley Water Board, the management zone must begin implementing the EAP. Further, although WDRs for dischargers participating in a management zone will not yet be revised at this step in the process, the SNMP recommends that the Central Valley Water Board find participating dischargers in compliance with nitrate components of the SNMP as long as the participant is timely, and in good faith, participating in the management zone. Participating in the management zone includes assisting in the implementation of the EAP, and assisting in developing the Final Management Zone Proposal. For dischargers that are subject to a General Order as a member of a Third Party Group, Third Party Group participation on behalf of its members shall constitute discharger participation. Third Party Groups shall make all reasonable efforts to inform its members of participation in any Groundwater Management Zone.

Within a 180 days after submittal of a Preliminary Proposal, the management zone must submit a Final Management Zone Proposal. **Figure 4-6** summarizes the requirements for a Final Management Zone Proposal (see also Groundwater Management Zone Policy in Attachment A-1).

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

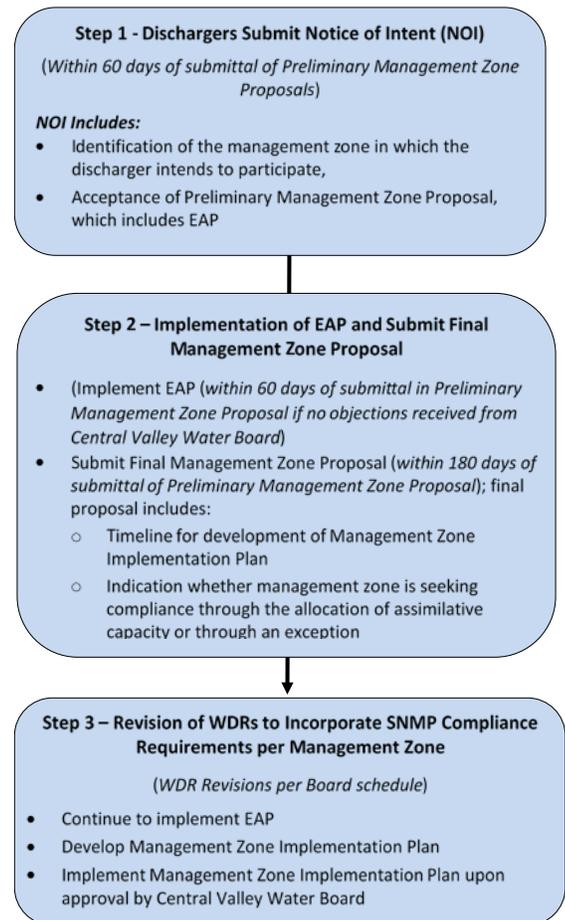


Figure 4-6. Minimum Requirements for Final Management Zone Proposal

- Timeline for development of a 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;¹ and (c) a mechanism to resolve disputes among participating dischargers.
- Additional evaluation of groundwater conditions across management zone area for each basin/subbasin covered, 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.

¹ If future legislative efforts result in the development of funds available for addressing short term and/or long term nitrate drinking water issues, the Final Management Zone proposal may include and/or indicate how use of such funds are coordinated to address nitrate drinking water related issues that would otherwise be the responsibility of the management zone participants

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.

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

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

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 recommends triggers to maintain an appropriate safety factor to ensure that high quality receiving waters do not exceed the water quality objective for nitrate.

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.
- It must document collaboration with residents that are the intended beneficiaries of short and long-term efforts to provide safe drinking water.
- 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.¹
- 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 for each basin or subbasin covered by the management zone 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.

¹Should future legislative efforts result in the development of funds specific to addressing drinking water issues, such funding should be considered as an appropriate funding source for providing short and/or long-term drinking water, subject to the terms, conditions and restrictions for the funding.

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 29), or be a volume-weighted average for the upper zones.

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

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

Where an ACP is required, the proposed ACP should be designed to mitigate the significant adverse effect(s) of the permitted discharge(s) as it relates to nitrate for which an exception is granted. Moreover, as part of an ACP for nitrate, discharger(s) will need to show that groundwater users down-gradient of the discharge(s) have drinking water that meets applicable state and federal standards. ACPs may include both interim actions (e.g., bottled water) in the short-term, permanent solutions (such as well-head treatment or alternative drinking water

supplies) in the intermediate term, and efforts to re-attain the water quality objective (where feasible and practicable) over the long-term. Any short and/or long-term drinking water solutions must be developed with participation and concurrence of those benefiting from the project(s). 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.” In cases where assimilative capacity is being granted based on availability of assimilative capacity in the upper zone, the SNMP recommends that the Central Valley Water Board next consider whether mitigation strategies applied at any other point between the discharge and all affected down-gradient water users (e.g., wellhead treatment or alternative water supply, etc.) can better assure safe drinking water to those users.

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

In conjunction with evaluating BPTC, the Central Valley Water Board must determine whether allocating assimilative capacity to authorize a discharge that is expected to lower water quality is “consistent with maximum benefit to the people of the state.” To make this finding for nitrate discharges, the SNMP recommends that the Central Valley Water Board consider the following factors (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 reasonable, feasible, and practicable means for achieving compliance with traditional waste discharge requirements. The Central Valley Water Board is also unlikely to prohibit discharges where no such means exist and considers this option only as a last resort.

Notably, if the Central Valley Water Board concludes that, even after implementing BPTC, a discharge will unreasonably affect present or anticipated beneficial uses of water, or result in water quality less than that prescribed in the Basin Plan, or cause an unmitigated pollution or nuisance to occur, or is inconsistent with maximum benefit to the people of the state, then lower water quality cannot be authorized by allocating a portion of the available assimilative capacity. However, the discharge(s) may still be permitted if the Central Valley Water Board determines that it is appropriate to grant an exception to meeting the water quality standard for nitrate. 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 exceptions³² 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.³³ Exceptions are most commonly employed when there is no feasible, practicable or reasonable means for a discharge to meet with water quality objectives and it is not feasible, practicable or reasonable to prohibit the discharge.

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

In granting an exception, the Central Valley Water Board must consider the three management goals, as discussed in SNMP Section 4.1.1. In addition, this SNMP recommends two overarching conditions when authorizing an exception for nitrate:

³² 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).

³³ 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.

- 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.³⁴ Exceptions are intended to complement, not replace, the water quality standards review process.

In the Basin Plans, guidance under the current exceptions policy is restricted to a limited number of salinity constituents (electrical conductivity, TDS, chloride, sulfate and sodium).³⁵ 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 guidance for allowing 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.

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.

³⁴ 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).

³⁵ Central Valley Water Board Resolution No. R5-2014-0074.

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 the long-term nitrate compliance plan, as described in the permitting pathways options.

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.

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.

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 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 salinity-related policies being proposed with this SNMP include:

- Revisions of the Exceptions Policy for Waste Discharges to Groundwater (Exceptions Policy – see SNMP Attachment A-4);
- Salinity Management to Provide Reasonable Protection of AGR Beneficial Uses in Groundwater (AGR Policy – see SNMP Attachment A-6));
- Revisions of the Salinity Variance Program (Salinity Variance Policy – see SNMP Attachment A-5);
- Offset Policy (see SNMP Attachment A-7);
- Drought and Water Conservation Policy (see SNMP Attachment A-8); and
- Guidance to Implement Secondary Maximum Contaminant Levels (Secondary MCL 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
- Protects beneficial uses by meeting applicable water quality objectives and applying appropriate antidegradation concerns.

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 for the entirety of the Central Valley Region. 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 (see Table 4-5). 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, CV-SALTS recommends that the Executive Officer of the Central Valley Water Board be given the direct authority to extend this time frame if compelling reasons or adequate justification is provided for an extension.

Once the Prioritization and Optimization Study is completed and the Basin Plans are amended based on recommendations from the Study, Phase II of the Salinity Management Plan will be

implemented. 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. The duration of Phase II is anticipated to be approximately 10 years. As with Phase I, the Executive Officer of the Central Valley Water Board should be given the authority to extend the anticipated time frame for compelling reasons, which may include availability of adequate funding to move forward with implementation of Phase II. Actual construction of physical projects would occur in Phase III, subject to available funding, completion and approval of environmental impact studies, and other necessary approvals.

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 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) needed to implement the preferred physical projects; ● Identify and propose any necessary Basin Plan changes that may be necessary to implement the next Phase or Phases of the Salinity Management Strategy (e.g., Offset Policy in surface waters); ● 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

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

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

Basis for Interim Salinity Permitting Approach

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

- This approach applies to permitting salinity discharges to surface and groundwater in the defined interim period.
- The proposed approach for permitting salinity discharges to surface and groundwater must be implemented in a manner consistent with state and federal Antidegradation Policies (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.³⁶ 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 an irrigation supply well can be significant.
- Because of the long-term nature and anticipated high costs for implementation of the Salinity Management Strategy, it is reasonable to expect that dischargers will not be able to implement such strategies individually, but will need to participate in a larger region-wide collective effort. The larger collective effort would begin with implementation of the Prioritization and Optimization Study (Phase I), followed by Phases II and III. Due to the

³⁶ TLB Basin Plan, Pg. III-8.

anticipated costs of these efforts, it is appropriate that discharges not be subject to extensive and/or expensive salinity permit requirements during this interim period. In particular, individual discharge efforts would have little impact on Central Valley salinity management as a whole, and as such they are not reasonable, feasible or practicable.

- It is reasonable to expect that permit requirements (e.g., WDRs/Conditional Waivers, NPDES Permits) with respect to implementing the long-term Salinity Management Strategy to allow time to address drinking water issues for nitrates first. The SNMP identifies nitrate drinking water issues as its first near-term priority (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.
- To allow for the phased approach, and the interim permitting approach described herein, the managed degradation objectives and specified salinity limitations in the TLB Basin Plan need to be deleted from the Basin Plan.
- The Central Valley Water Board retains authority to identify high priority saline discharges and/or areas where more stringent control programs must be implemented.

Permitting Approach

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, the Central Valley Water Board will need to renew/revise existing WDRs/Conditional Waivers and NPDES Permits. Further, during this interim period, there will be new dischargers, or existing dischargers seeking facility modifications, that will have salinity discharges. 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, implement a process whereby a series of resolutions/orders that amend applicable WDRs/Conditional Waivers are considered for adoption by the Central Valley Water Board to implement the Interim Permitting Approach (see Section 4.3.3.5 below). This approach would provide for discharger compliance with salinity water quality objectives during Phase I of the implementation of the Salinity Management Strategy as long as the discharger is in compliance with Interim Permit Provisions applicable to their discharge (as described below), rather than through stringent water receiving limits and/or effluent limits.

Interim Permit Provisions

Interim Permit Provisions would require dischargers to continue current reasonable, feasible and practicable efforts to control levels of salinity in their discharges while participating in efforts to conduct the Phase I Prioritization and Optimization Study. Interim Permit Provisions may include the following requirements as applicable and appropriate:

- Implement salinity management practices and/or source control efforts;
- Implement pollution prevention plans, watershed plans, and/or salt reduction plans;
- Monitor for salinity in surface and groundwater as part of existing monitoring programs, or through regional monitoring programs as appropriate, which should be coordinated with the CV-SALTS Surveillance and Monitoring Program (SAMP) (see SNMP Section 5);³⁷
- Maintain current discharge levels of salinity to the extent feasible, reasonable, and practicable, while accounting for conservation, salinity levels in the water supply source, and some appropriate increment of growth; and/or
- Comply with interim permit limits, to the extent that the Central Valley Water Board finds it appropriate and necessary to adopt such limits.

All dischargers would be required, and *all interim permits* would need to include, the following requirement:

- Participate in efforts related to conducting 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 established by the lead entity (i.e., CVSC) that is overseeing the Prioritization and Optimization Study.

It is recommended that the resolutions/orders establish the time-frame for application of the Interim Permitting Approach and associated provisions, which could not exceed 15 years in length. For NPDES dischargers, which are subject to federal regulatory requirements, CV-SALTS recommends 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 from meeting applicable surface water quality objectives for salinity. Or, in the alternative, the Central Valley Water Board could consider an NPDES watershed-based permit for salinity as it deems appropriate, which too would require those covered by the watershed-based permit for salinity to participate in the Prioritization and Optimization Study efforts.

4.3.3.4 Opting Out of Participation in the Phase I Prioritization and Optimization Study

It is anticipated that the Central Valley Water Board will encourage and that most dischargers will choose to participate in efforts related to conducting the Phase I Prioritization and Optimization Study. However, the Central Valley Water Board does not have the authority to force dischargers into the Interim Permitting Approach, and to participate in the Prioritization and Optimization Study. Further, some dischargers have already made significant changes to their operation in order to meet restrictive salinity limitations and may decide that the Interim Permitting

³⁷ The Central Valley Water Board would retain its authority to identify high priority saline discharges where more stringent control programs must be implemented.

Approach does not provide them with an appropriate incentive to participate. Accordingly, the Salinity Management Strategy includes an option for dischargers to opt out of participating in efforts related to the Prioritization and Optimization Study. For those dischargers that choose to opt out, CV-SALTS recommends that the Central Valley Water Board permit such dischargers by implementing the following principles:

1. *Interpreting Narrative Water Quality Objectives* – When it interprets narrative water quality objectives for dischargers opting out, the Central Valley Water Board should select applicable salinity water quality objectives in a conservative manner. For the AGR beneficial use, the Central Valley Water Board should apply a conservatively protective agricultural goal (e.g., 700 $\mu\text{mhos/cm}$ for electrical conductivity). However, in determining the agricultural goal that should be used to interpret the narrative objective, the Central Valley Water Board should consider whether a site specific agricultural goal has been developed and/or previously adopted for the discharger in question. If a site specific goal has been developed and/or previously adopted, CV-SALTS recommends that the Central Valley Water Board continue to apply that value if still appropriate. For the MUN beneficial use, the Central Valley Water Board should interpret water quality objectives in a manner consistent with the SNMP guidance for Implementation of Secondary Maximum Contaminant Levels (see Attachment A-9).³⁸
2. *Allocation of Assimilative Capacity* – For dischargers opting out, no new allocation of assimilative capacity, or expansion of an allocation of assimilative capacity should be granted by the Central Valley Water Board. However, if a discharger has previously received an allocation of assimilative capacity, and such allocation was granted with the support of an antidegradation study/analysis, then the Central Valley Water Board should continue to allocate the previously approved assimilative capacity, if still appropriate. For groundwater dischargers wishing to opt out, this would essentially mean that they would need to show that they do not cause or contribute to exceedances of groundwater limitations for salinity constituents in shallow groundwater unless they had previously been permitted the use of assimilative capacity in the groundwater, and such previously authorized use of assimilative capacity was reauthorized by the Central Valley Water Board.
3. *Issuance of Time Schedules* - CV-SALTS recommends that the Central Valley Water Board use its discretion to issue time schedules for meeting salinity limitations for those opting out sparingly, and for minimal time periods. In other words, a discharger opting out should generally be allowed no more than five years for meeting a restrictive salinity limitation. However, the Central Valley Water Board maintains the discretion to determine if a time schedule is appropriate, and the length, for dischargers seeking to opt out.
4. *NPDES Permittees* – For surface water dischargers subject to an NPDES permit that wish to opt out, the Central Valley Water Board needs to determine reasonable potential in a manner that is consistent with 40 CFR § 122.44(d), and should determine if a compliance

³⁸ If there are site specific water quality objectives for salinity constituents in the applicable Basin Plan, such objectives would apply.

schedule is appropriate based on current applicable laws and policies, including consideration of meeting the SNMP goals. When interpreting a narrative water quality objective to conduct a reasonable potential analysis, the Central Valley Water Board must employ Principle 1 above. Further, NPDES permittees should not be allowed to opt out if they are seeking a new allocation of assimilative capacity (i.e., mixing zone/dilution credit) in a surface water for meeting the salinity limitation. However, the Central Valley Water Board should consider maintaining any previously approved mixing zone/dilution credits. Salinity variances would not be an available option for those seeking to opt out of the Prioritization and Optimization Study. In summary, NPDES dischargers wishing to opt out would essentially need to show that:

- The discharge does not have reasonable potential to exceed the applicable criteria;
- The discharge is able to comply with a water quality-based effluent limit, if there is reasonable potential; or
- The discharge will be able to comply with a water quality-based effluent limitation subject to the terms of a compliance schedule approved by the Central Valley Water Board.

4.3.3.5 Process for Development and Adoption of Resolutions/Orders to Implement Interim Permitting Approach

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

4.3.3.6 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 2017 as determined appropriate. However, for the AGR Policy in particular (Attachment A-5), it may be more appropriate to not amend the Basin Plans in 2017 to incorporate those policy recommendations, 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, although a discharge may provide additional information and refine the models used to characterize existing 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, to the extent data are available.
- 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 CEQA, Economics Analysis, and Antidegradation Analysis

4.4.1 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.³⁹ These scoping sessions

³⁹ http://www.waterboards.ca.gov/centralvalley/water_issues/salinity/index.shtml

identified likely alternatives under consideration by CV-SALTS for the long-term management of salt and nitrate in the Central Valley. Through a rigorous stakeholder process, 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 water quality objectives 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;
- 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, e.g., use of offsets;
- Ensuring safe drinking water supplies in areas already impacted by salt and nitrates; and/or
- Adopting new policies that would facilitate the management of salt and nitrate.

4.4.2 Analysis Findings

CV-SALTS completed a Substitute Environmental Document (SED), Economic Analysis and Antidegradation Analysis to support this SNMP. Analyses were based on recommended clarifications, policies and new regulatory tools described in the policies, strategies, and guidance documents included in Attachment A and summarized in Section 4.2.2 above. The results are provided in the following SNMP Attachments:

- Attachment C-1 – Substitute Environmental Document
- Attachment C-2 – Antidegradation Analysis Report
- Attachment C-3 – Economic Analysis Report