CENTRAL VALLEY REGIONAL
WATER QUALITY CONTROL BOARD

Development of a Drinking Water Policy for Surface Waters of the Central Valley

Public Scoping Meeting
Staff Report

July 2008

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

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REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ACRONYMS

BU	Beneficial Use
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CTR	California Toxics Rule
CVP	Central Valley Project
CWA	Clean Water Act
CWC	California Water Code
DPH	Department of Public Health
EC	Electrical Conductivity
MCL	Maximum Contaminant Level
MUN	Municipal and domestic supply beneficial use
NTR	National Toxics Rule
PRC	Public Resources Code
TDS	Total Dissolved Solids
TMDL	Total Maximum Daily Load
TOC	Total Organic Carbon
US EPA	United States Environmental Protection Agency
WQO	Water Quality Objective

1 INTRODUCTION

The Sacramento-San Joaquin Delta provides drinking water to more than 25 million people in the Southern California, Central Coast, and San Francisco Bay regions (CALFED Water Quality Program Plan, 2000). The tributaries of the Sacramento and San Joaquin rivers that originate in the Sierra Nevada Mountains generally have high quality water; however, as the tributaries flow into lower elevations, they are affected by urban, industrial, and agricultural land uses, natural processes, and a highly managed water supply system.

The Central Valley Regional Water Quality Control Board (Central Valley Water Board) is soliciting input from interested persons on alternatives to improve existing policies for protecting municipal and domestic supply beneficial uses as an amendment to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins (Basin Plan). Currently, the Basin Plan lacks numeric water quality objectives for several known drinking water constituents of concern, such as organic carbon, a disinfection by-product precursor, and pathogens (i.e., *Cryptosporidium* and *Giardia*). As a result, implementing existing numeric objectives may or may not adequately protect source waters designated for municipal and domestic supply.

The Regional Water Board proposes to amend the Basin Plan to improve policies to address drinking water constituents of concern in surface waters of the Central Valley. The purpose of this California Environmental Quality Act (CEQA) scoping document and meeting is to solicit input for scoping the project and alternatives. This document presents the problem statement, describes the project area, lays out the requirements for amending the Basin Plan, summarizes the relevant State and Federal laws, and discusses the initial project alternatives.

2 PROBLEM STATEMENT

The State Water Resources Control Board (State Water Board) Sources of Drinking Water Policy (resolution no. 88-63) designates surface and ground waters sources of drinking water with some exceptions. That policy, (see section 6.2) as incorporated into the Basin Plan, designates virtually all surface waters in the Sacramento River and San Joaquin River Basins as having municipal and domestic supply (MUN) beneficial uses.

The Basin Plan includes both narrative and numeric water quality objectives that can be and are implemented for protecting MUN uses. They are:

1. high quality water must be maintained through the antidegradation policy,
2. waters are not to contain biostimulatory substances that “promote aquatic growth in concentrations that cause nuisance or adversely affect beneficial uses, “
3. waters are to be “maintained free of toxic substances that produce detrimental physiological responses”,
4. water must not “contain taste-or-odor-producing substances in concentrations that impart undesirable tastes or odors to domestic or municipal water supplies…or that cause nuisance, or otherwise adversely affect beneficial uses, “
5. water “shall not contain chemical constituents in concentrations that adversely affect beneficial uses”,

6. "the fecal coliform concentration based on a minimum of not less than five samples for any 30-day period shall not exceed a geometric mean of 200/100 ml, nor shall more than ten percent of the total number of samples taken during any 30-day period exceed 400/100 ml" for water that have the recreation beneficial use, and
7. the California Department of Public Health (DPH) maximum contaminant levels (MCLs) are incorporated by reference.

Numbers 1-5 are narrative water quality objectives that must be interpreted using a numeric limit in order to implement them in permits or waste discharge requirements. As indicated in the introduction, no numeric objectives exist for several drinking water constituents of concern. The DPH MCLs and the water quality objectives for bacteria are implemented in permits; however, the bacteria water quality objective was established for protecting the water-contact recreation beneficial uses, not specifically for drinking water. As such, there is concern that the existing bacteria objective does not protect drinking water supplies from contamination by actual pathogens such as *Cryptosporidium* and *Giardia*.

Considering these regulatory gaps, the risk to human health, and the available information, the highest priority constituents of concern selected for policy development are salinity, including bromide; organic carbon; nutrients; and pathogens (see Table 1). Salinity is difficult and extremely expensive to treat and renders drinking water unpalatable in high concentrations. It also causes economic impacts by shortening the life of plumbing fixtures and appliances and causing scaling on distribution pipes. Another important impact is that salty source water restricts the ability to recycle wastewater or recharge groundwater. Bromide reacts with chlorine, used in water treatment plants to disinfect drinking water, to form carcinogenic disinfection byproducts such as trihalomethanes and haloacetic acids. Bromide also forms bromate, a carcinogen, upon disinfection with ozone, which is an alternative to chlorine disinfection. There are existing water quality objectives for chloride, electrical conductivity, and total dissolved solids; however, they may not fully protect MUN uses.

Organic carbon forms trihalomethanes, haloacetic acids, and other disinfection byproducts, upon disinfection with chlorine or chloramine. The concentrations of total organic carbon (TOC) in source waters determine the types of treatment that is required at water treatment plants. As TOC concentrations increase, additional treatment is required to remove the TOC prior to disinfection. As indicated previously, no numerical water quality objectives or targets are available to interpret narrative water quality objectives for disinfection byproduct precursors such as organic carbon and bromide.

Nutrients are required for proper functioning of aquatic ecosystems but when they are present in drinking water supplies at concentrations that exceed natural background levels, a number of adverse impacts occur. When nutrients are readily available and other environmental conditions favorable, algal growth can reach levels that cause taste and odor impairments in drinking water, add organic carbon, obstruct water conveyance facilities, clog filters, and increase the quantity and expense of handling solid waste from the water treatment process. In addition, some algae produce toxic compounds. Numeric targets for nutrients have only been established on a site specific basis, none of which were established to protect MUN beneficial uses.

Finally, pathogens, such as *Cryptosporidium* and *Giardia*, are of concern in drinking water supplies because they cause disease when ingested at very low concentrations. The Basin Plan includes water quality objectives for bacteria for the protection of recreational uses of surface waters, which are the basis for NPDES permit requirements for wastewater disinfection. However, there are no numeric objectives for actual pathogens (bacteria are used as an indicator of the presence of actual pathogens such as *Cryptosporidium* and *Giardia*) and there is a lack of data on which to base a numeric water quality objective or numeric interpretation of the narrative toxicity objective.

While the priority constituents described above are of concern for protecting MUN beneficial uses, policies to reduce them could conflict with protecting aquatic life and wildlife beneficial uses. Organic carbon and nutrients are essential components of a functioning ecosystem because they are energy sources for the base of the food web (i.e., bacteria and algae). However, little is known about what levels and types of organic carbon and nutrients are needed to support the ecosystem. In addition, it is widely recognized that the Delta ecosystem is in collapse and that there is need to increase habitat, specifically wetland habitat. Wetlands are a source of organic carbon and nutrients, which, as described above, cause problems for treating water for drinking. Wetlands also are habitat for wildlife, which are sources of pathogens.

3 WATERSHED DESCRIPTION

The scope of the Central Valley Drinking Water Policy is the area downstream of the major dams in the Sacramento and San Joaquin River Watersheds and the Delta.

3.1 Sacramento River

The Sacramento River drains the northern part of the Central Valley and covers 27,210 square miles with an annual average runoff of 18.6 million acre-feet (DWR, 2008). For planning purposes, this includes all watersheds tributary to the Sacramento River that are north of the Cosumnes River watershed, the drainage sub-basins of Cache and Putah Creeks and the Yolo and Sutter bypasses.

The principal streams are the Sacramento River and its larger tributaries: Feather, Yuba, Bear, and American rivers to the east; and Cottonwood, Stony, Cache, and Putah creeks to the west. The remaining inputs come from streams entering from smaller watersheds along the river and from agricultural and storm drain systems. The Sacramento River basin supplies more than 80% of the fresh water flows to the Sacramento-San Joaquin Delta. There are over 50 sub-basins or tributaries within the Sacramento River.

Inflow to the Sacramento and Feather rivers comes from a variety of sources. In addition to the natural hydrologic processes of rain fall runoff, snowmelt, and base flow from groundwater discharge, flows are greatly affected by reservoir releases, water diversions, irrigation return flows, and diversions through bypasses. Both the Sutter and Yolo bypasses have the capacity to carry larger volumes of water than the Sacramento River channel when they are utilized to prevent flooding during high flows.

3.2 San Joaquin River

The San Joaquin River flows northward and drains the portion of the Central Valley south of the Sacramento-San Joaquin Delta and north of the Tulare Lake Basin. The San Joaquin River Basin covers 15,880 square miles and yields an average annual runoff of about 5.9 million acre feet (DWR, 2008). The Basin includes the entire area drained by the San Joaquin River and all watersheds tributary to the river. The principal streams in the basin are the San Joaquin River and its larger tributaries: the Cosumnes, Mokelumne, Calaveras, Stanislaus, Tuolumne and Merced rivers.

The lower Basin (below Millerton Reservoir) has had a highly managed hydrology since implementation of the Central Valley Project (CVP) in 1951. Most of the San Joaquin River flow is diverted into the Friant-Kern Canal, leaving the river channel upstream of the Mendota Pool dry except during periods of wet weather flow and major snow melt. Poorer quality (higher salinity) water is imported from the Delta for irrigation along the west side of the river to replace water lost through diversion of the upper San Joaquin River flows. During the irrigation season, the flows in the river between the Mendota Pool and Salt Slough consist largely of groundwater accretions. Salt Slough and Mud Slough are the principal drainage arteries for the Grassland Sub-Watershed and add significantly to the flows and waste loads in the San Joaquin River upstream of its confluence with the Merced River. Discharges from three major river systems, the Merced, Tuolumne, and Stanislaus rivers, which drain the Sierra Nevada, dominate flow and quality of discharges from the east side of the Lower San Joaquin River Basin. Flows from the west side of the river basin are dominated by agricultural return flows since west-side streams receive no snowmelt to maintain their flows and most go dry during the summer months.

The major land use in the valley floor along the Lower San Joaquin River is agriculture, with over 2.1 million irrigated acres, representing 22% of the irrigated acreage in California. Urban growth on the valley floor is converting historical agricultural lands to urban areas and is leading to increased potential for stormwater and urban impacts to local waterways.

3.3 Sacramento-San Joaquin Delta

The legal boundary of the Sacramento-San Joaquin Delta comprises over 700 miles of interconnected waterways and encompasses 1,153 square miles. Four rivers, the Sacramento, the San Joaquin, the Mokelumne, and the Cosumnes feed it. The Delta is home to over two hundred and eighty species of birds and more than fifty species of fish making it one of the most ecologically important aquatic habitats in the State. Drinking water for over 25 million Californians is taken from the Delta at the State Water Project, Central Valley Water Project, and local water intakes.

4 Beneficial Uses

The beneficial uses of the Central Valley water bodies included in this project are as follows: municipal and domestic supply (MUN), agricultural supply (AGR), industrial service supply (IND), industrial process supply (PRO), navigation (NAV), hydropower generation (POW), water contact recreation (REC-1), non-contact water recreation (REC-2), commercial and sport fishing (COMM), aquaculture (AQUA), warm freshwater habitat (WARM), cold freshwater habitat (COLD), estuarine habitat (EST), wildlife habitat (WILD), preservation of biological habitats of special significance (BIOL), migration of aquatic organisms (MIGR), spawning,

reproduction, and/or early development (SPWN), and shellfish harvesting (SHELL). The Basin Plan also states that Water Bodies within the basins that do not have beneficial uses designated in Table II-1 are assigned MUN designations in accordance with the provisions of State Water Board Resolution No. 88-63.

5 WATER QUALITY OBJECTIVES

The Basin Plan establishes water quality objectives to protect water bodies designated with the MUN use. The Basin Plan sets narrative water quality objectives for chemical constituents, bacteria, toxicity, biostimulatory substances, and taste and order and sets numeric water quality objectives for certain constituents. In addition, the Basin Plan incorporates, by reference, the Department of Public Health's primary and secondary maximum contaminant levels (Title 22 of the California Code of Regulations), which are established to protect drinking water.

In 1992 and 2000, the U.S. Environmental Protection Agency (USEPA) promulgated numeric water quality criteria for priority pollutants to protect aquatic life and human health beneficial uses for the State of California in the National Toxics Rule (NTR) and the California Toxics Rule (CTR), respectively. The CTR states "*the standards to be applied are based on the presence in all waters of some aquatic life designation and presence or absence of the MUN designation (municipal and domestic supply).*" Where both the Basin Plan and the NTR or CTR include a water quality objective for any given constituent, the more stringent of the two applies.

6 WATER QUALITY CONTROL PLAN FOR THE SACRAMENTO-SAN JOAQUIN RIVER BASINS

The Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) first adopted the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins in 1975. The current edition (Fourth Edition, 2007) incorporates all amendments since 1975.

6.1 Regulatory Authority and Mandates for Basin Plan Amendments

The State Water Board and the nine Regional Water Quality Control Boards (Regional Water Boards) are the state agencies with primary responsibility for coordination and control of water quality. (California Water Code (CWC) §13000). Each Regional Water Board is required to adopt a water quality control plan, or basin plan, which provides the basis for regulatory actions to protect water quality. (CWC §13240 et seq.). Basin plans designate beneficial uses of water, establish water quality objectives to protect the uses, and outline a program of implementation to achieve the objectives. (CWC §13050(j)). Basin plans, once adopted, must be periodically reviewed and may be revised. (CWC §13240).

Under the federal Clean Water Act (CWA), 33 US Code §1251 et seq., the states are required to adopt water quality standards for surface waters. (CWA §303(c)). Water quality standards consist of 1) designated uses; 2) water quality criteria necessary to protect designated uses; and 3) antidegradation policy. (CWA 303(c)(2)(A) and (d)(4)(B); 40 CFR 131.6). In California, water quality standards are found in the basin plans, statewide water quality control plans

adopted by the State Water Board, and the federal National Toxics Rule (NTR) and California Toxics Rule (CTR). Under the CWA, the states must review water quality standards at least every three years.

Regional Water Boards adopt and amend basin plans through a structured process involving peer review, public participation, and environmental review. Regional Water Boards must comply with the California Environmental Quality Act (CEQA)(Public Resources Code (PRC) §21000 et seq.) when amending their basin plans. The Secretary of Resources has certified the basin planning process as exempt from the CEQA requirement to prepare an environmental impact report or other appropriate environmental document. (PRC 21080.5; CCR, tit. 14, §15251(g)). Instead, State Water Board regulations on its exempt regulatory programs require the Regional Water Boards to prepare a written report and an accompanying CEQA Environmental Checklist and Determination with respect to Significant Environmental Impacts (CEQA Checklist). (CCR, tit. 23, §3775 et seq.).

6.2 Designated Beneficial Uses

Federal regulations require the protection of designated uses. “Existing” beneficial uses of water and uses specified in the Clean Water Act Section 101(a)(2) that are attainable must be designated for protection. “Existing” uses are defined as uses that were attained on or after 28 November 1975. (40 CFR. §131.3(e)). An existing use is established if the use has been actually attained or the water quality necessary to support the use has been achieved at any time since 28 November 1975, even if the use itself is not currently established, unless physical factors prevent attainment of the use (USEPA, 1994).

Designated uses include both existing uses and potential uses. (40 CFR §131.3(f)). Table II-1 of the Basin Plan, lists Existing or Potential beneficial uses for water bodies within the Sacramento and San Joaquin River basins.

For tributary streams that are not listed in Table II-1, the Basin Plan states that “[t]he beneficial uses of any specifically identified water body generally apply to its tributary streams.” (Basin Plan at II-2.00). The Basin Plan states, however, that in some cases, the beneficial use may not be applicable to the entire water body and that the uses for unidentified waters will be evaluated on a case-by-case basis. (Id.) The Basin Plan also provides that water bodies that are not listed in Table II-1 are assigned municipal and domestic supply (MUN) beneficial use in accordance with State Water Board Resolution No. 88-63, commonly referred to as the “Sources of Drinking Water Policy” unless certain exceptions are met.

6.2.1 State Regulations and Guidance - State Water Board Sources of Drinking Water Policy (Resolution 88-63)

The Sources of Drinking Water Policy, establishes state policy that all waters are considered suitable or potentially suitable to support the MUN beneficial use, with certain exceptions. Exceptions to the MUN designation are allowed for surface and ground waters: 1) with total dissolved solids exceeding 3,000 mg/L (5,000 µS/cm EC), 2) with contamination that cannot reasonably be treated for domestic use, 3) where there is insufficient water supply, 4) in systems designed for wastewater collection or conveying or holding agricultural drainage, or 5) regulated as a geothermal energy producing source.

The Basin Plan implements the Sources of Drinking Water Policy by assigning MUN to all water bodies not listed in Table II-1. Resolution 88-63 addresses only designation of water as drinking water sources; it does not establish objectives for constituents that threaten source waters designated MUN.

6.3 Water Quality Objectives

CWC §13050 defines water quality objectives as "*…the limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area.*"

6.3.1 Federal Regulations and Guidance

Federal regulations require States to adopt narrative or numeric water quality criteria (synonymous with water quality objectives) to protect designated beneficial uses. 40 CFR 131.11(a)(1). States are required to adopt numeric criteria for constituents considered priority toxic pollutants (e.g., mercury). CWA §303(c)(2)(B). Federal regulations permit States to establish water quality standards based on natural background conditions. 40 CFR 131.10.

6.3.2 State Regulations and Guidance

When adopting new water quality objectives, the Central Valley Water Board is required to consider:

(a) Past, present, and probable future beneficial uses of water.
(b) Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto.
(c) Water Quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area.
(d) Economic considerations.
(e) The need for developing housing within the region.
(f) The need to develop and use recycled water. (CWC §13241)

6.4 Program of Implementation

The program of implementation for achieving water quality objectives must include, but not be limited to:

(a) A description of the nature of actions which are necessary to achieve the objectives, including recommendations for appropriate action by any entity, public or private.
(b) A time schedule for the actions to be taken.
(c) A description of surveillance to be undertaken to determine compliance with objectives (CWC §13242).

7 PROJECT ALTERNATIVES

The initial project alternatives are summarized in Table 2 and described in narrative format below. These alternatives will be evaluated for each priority constituent of concern listed in the problem statement. The policy may address each constituent under any alternative. Rather

than list each constituent under each alternative, a generic description, which could be applied to any constituent, is provided below.

Alternative 1a: No Action
Under this alternative, the Basin Plan would not be amended to include additional requirements for protecting MUN designated water bodies. The Regional Water Board would regulate the constituents of concern by applying the narrative objectives. As the Central Valley's population continues to increase, there is the potential for water quality degradation and increased risk to public health. Drinking water suppliers may need to provide additional treatment or otherwise incur increased costs to meet current and potential future drinking water regulations.

Alternative 1b: Source Monitoring
Under this alternative, dischargers would be required to monitor for drinking water constituents of concern, if they are not already doing so. This alternative would not modify water quality objectives and, therefore, would not require additional limits in permits or waste discharge requirements. Source water quality monitoring may be required through monitoring and reporting requirements or a phased approach in the Basin Plan Implementation chapter.

Similar to alternative 1a, as the development in the Central Valley increases, the lack of increased control of sources of drinking water constituents of concern in alternative 1b may result in water quality degradation and increased risk to public health. Drinking water suppliers may need to provide additional treatment or otherwise incur increased costs to meet current and potential future regulations.

California Water Code §13267 authorizes the Regional Water Board to require dischargers to monitor water quality provided that the need for the information is justified. Because monitoring does not have environmental impacts and is therefore exempt from CEQA, it is not considered a "project" under CEQA. As such, this alternative is a modified version of the "no project" alternative for the purposes of CEQA scoping.

Alternative 2: Maintain Current Water Quality Conditions
Under this alternative, current conditions would be maintained by establishing new narrative or numeric water quality objectives, which would be defined by existing water quality conditions. State and federal antidegradation policies generally define "existing" as the best water quality that was attained since 1968 or 1975 (respectively), after considering previous degradation authorized in accordance with the policies. In addition, surface water quality objectives must protect "existing uses," as defined by the Clean Water Act. This alternative would require additional analysis to define these levels. Dischargers would be required to monitor for drinking water constituents of concern. Effluent limits and other requirements would ensure that municipal and industrial point sources and non-NPDES dischargers did not cause or contribute to exceedances of water quality objectives. Implementation of additional non-point source control measures may be accomplished through a cooperative watershed management approach involving all affected stakeholders.

Additional requirements to control sources of drinking water constituents of concern under alternative 2 would decrease the potential for water quality degradation, therefore, no change

in public health risk would be expected. This assumes that the control measures implemented are sufficient to maintain existing water quality conditions. Drinking water suppliers would continue to provide the necessary treatment to meet current and potential future regulations.

Alternative 3: Improve Source Water Quality

Under this alternative, narrative or numeric water quality objectives would be established to improve water quality for MUN beneficial uses. This alternative is similar to alternative 2 except that the water quality objectives would be more stringent with the intent that water quality would be improved over existing conditions in order to protect MUN uses. Dischargers would be regulated as is described in alternative 2 above, including the potential for a cooperative watershed management approach involving all affected stakeholders.

Should the control measures implemented be sufficient, water quality for drinking water beneficial uses would be expected to improve. However, some constituents of concern for drinking water supplies, specifically organic carbon and nutrients, are necessary for maintaining a healthy ecosystem. Reducing these constituents may impair aquatic life beneficial uses as discussed in the problem statement above. If so, this alternative would be infeasible for these constituents.

As water quality improves under alternative 3, public health risk would potentially decrease. Drinking water suppliers would continue to provide necessary treatment to meet current and potential future regulations.

8 REFERENCES

CALFED. 2000. CALFED Water Quality Program Plan. CALFED Bay-Delta Program, Sacramento, CA.

Central Valley Water Board. 2006. Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board-Central Valley Region for the Sacramento River Basin and the San Joaquin River Basin. Fourth Edition. Sacramento, CA, Central Valley Regional Water Quality Control Board.

Central Valley Water Board. 2003. Watershed Management Initiative-Central Valley Region Chapter. Sacramento, CA. Central Valley Regional Water Quality Control Board.

Department of Water Resources. 2008. California Data Exchange Center. http://cdec.water.ca.gov/cgi-progs/iodir/WSIHIST Sacramento, CA.

USEPA. 1994. Water Quality Standards Handbook: Second Edition, Appendix G. Office of Water, Washington D.C. EPA-823-B-94-005b.

Table 1. Summary of priority drinking water constituents of concern for the development of a drinking water policy for the Central Valley.

Constituent	Problem	Current Regulatory Framework		Regulatory Gap
		Source Water	Tap	
Organic Carbon	- Forms potentially carcinogenic compounds upon disinfection with chlorine - Contributes to filter fouling	- Narrative WQO[1] for chemical constituents	- Water treatment requirements based on amount of organic carbon in source water	- No target to interpret narrative objective. - No numeric WQOs
Pathogens	- May cause disease when present in drinking water source water at elevated levels	- Numeric WQO for fecal coliform to protect contact recreation BUs[2]	- Water treatment requirements based on amount of pathogens in source water	- No target to interpret narrative objectives for protecting MUN[3] - No WQO for specific pathogens of concern: *Giardia* & *Cryptosporidium*
Salinity (including bromide)	- Causes taste concerns in finished drinking water - Causes scaling on distribution pipes	- Numeric WQO for chloride at Rock Slough intake to protect industrial supply BUs - Numeric WQOs for EC[4] & TDS[5] to protect agriculture Bus in certain areas; narrative WQO in other areas - DPH[6] secondary MCLs in Basin Plan by reference	- Secondary MCLs[7] for TDS, EC, Chloride & Sulfate	- Current numeric WQOs may not fully protect MUN
Nutrients	- May contribute to algal blooms in source water & conveyance systems, & storage facilities - Algae produce taste, odor, & toxins, cause filter fouling, & contributes to organic carbon load	- Narrative WQO for biostimulatory substances, nuisance, & taste & odor; secondary MCLs for taste and odor	- Secondary MCL for odor	- No numeric target to interpret narrative except for those established in TMDLs[8] through site-specific evaluations

[1] WQO = Water Quality Objective
[2] BU = Beneficial Use
[3] MUN = Municipal & Domestic Supply Beneficial Use
[4] EC = Electrical Conductivity
[5] TDS = Total Dissolved Solids
[6] DPH = Department of Public Health
[7] MCL = Maximum Contaminant Level
[8] TMDL = Total Maximum Daily Load

Table 2. Summary of alternatives for policy to address priority drinking water constituents of concern.

	1a. No Action	1b. Source Monitoring	2. Maintain Current Conditions	3. Improve Source Water Quality for MUN BUs[9]
Regulatory Requirements	- No additional requirements on sources of DW[10] COCs[11] beyond current requirements - Regional Water Board would regulate COCs by applying narrative WQOs[12]	- Dischargers required to monitor for DW COCs (many Water Board programs already require monitoring for DW COCs) - Maintains existing regulatory framework (see Table 1)	- Defined by narrative or numeric WQO - Dischargers required to monitor for DW COCs - Requires new limits on some discharges	- Defined by narrative or numeric WQO - Dischargers required to monitor for DW COCs - Requires new limits on some discharges
Water Quality	- Potential for WQ[13] degradation as Central Valley population increases	- Potential for WQ degradation as Central Valley population increases	- No change in WQ assuming implementation is sufficient to maintain current conditions	- WQ improves for DW assuming implementation sufficient - May impair aquatic life BUs
Public Health Risk	- Potential for increased risk to public health associated with WQ degradation	- Potential for increased risk to public health associated with WQ degradation	- No change in risk to public health assuming current conditions are maintained	- Risk to public health decreases for regulated constituents
Implementation	- Drinking water suppliers may need to provide additional treatment or incur increased costs to meet regulations	- Drinking water suppliers may need to provide additional treatment or incur increased costs to meet regulations - Source WQ monitoring required through monitoring and reporting requirements or phased approach in Basin Plan Implementation chapter	- Drinking water suppliers provide necessary treatment to meet regulations - Source WQ maintained through Water Board regulatory programs (NPDES, TMDL, ILRP) - May include a cooperative watershed management approach	- Drinking water suppliers provide necessary treatment to meet regulations - Source WQ improved through Water Board regulatory programs (NPDES, TMDL, ILRP) - May include a cooperative watershed management approach

[9] BU = Beneficial Use
[10] DW = Drinking Water
[11] COC = Constituent of Concern
[12] WQO = Water Quality Objective
[13] WQ = Water Quality