

**STATE WATER RESOURCES CONTROL BOARD
BOARD MEETING SESSION – CENTRAL COAST REGIONAL WATER BOARD
FEBRUARY 4, 2014**

ITEM 5

SUBJECT

CONSIDERATION OF A PROPOSED RESOLUTION APPROVING AN AMENDMENT TO THE WATER QUALITY CONTROL PLAN FOR THE CENTRAL COASTAL BASIN TO ADOPT TOTAL MAXIMUM DAILY LOADS FOR NITROGEN COMPOUNDS AND ORTHOPHOSPHATE IN THE LOWER SALINAS RIVER AND RECLAMATION CANAL BASIN, AND THE MORO COJO SLOUGH SUBWATERSHED

DISCUSSION

On March 14, 2013, the Central Coast Regional Water Quality Control Board (Central Coast Water Board) adopted [Resolution No. R3-2013-0008](#) amending the Water Quality Control Plan for the Central Coastal Basin (Basin Plan) to establish total maximum daily loads (TMDLs) for nitrogen compounds and orthophosphate in the Lower Salinas River and Reclamation Canal Basin, and the Moro Cojo Slough Subwatershed.

The geographic scope of this TMDL project encompasses approximately 405 square miles of the lower Salinas Valley in northern Monterey County and includes the lowermost Salinas River, Moro Cojo Slough, Tembladero Slough, the Reclamation Canal, and associated upstream tributaries, hereafter collectively referred to as the “TMDL project area.” The Central Coast Water Board is required by federal law to develop TMDLs for waterbodies identified on the Clean Water Act section 303(d) list. Multiple waterbodies within the TMDL Project Area are listed on the Clean Water Act section 303(d) list for water quality impairments due to nitrate and unionized ammonia, as well as nutrients, low dissolved oxygen, and chlorophyll-a (an algal biomass indicator). A wide range of designated current, potential, or future beneficial uses, including drinking water supply, aquatic habitat, livestock watering and irrigation supply, and water contact recreational uses are not being supported in surface waterbodies of the TMDL project area, and the impairments therefore constitute a serious water quality problem.

The Central Coast Water Board’s goals for establishing these TMDLs are to 1) establish the nitrate, un-ionized ammonia, and orthophosphate loading capacities in streams of the TMDL project area in accordance with Clean Water Act requirements; and 2) recommend a strategy to reduce loading of these pollutants in streams to acceptable levels, thereby ultimately rectifying the identified water quality impairments.

Also noteworthy is that the U.S. Environmental Protection Agency (U.S. EPA) recently reported that nitrogen and phosphorus pollution, and the associated degradation of drinking and environmental water quality, has the potential to become one of the costliest and most

challenging environmental problems the nation faces¹. More than half of the nation's streams, including most streams in the lower Salinas Valley, have medium to high levels of nitrogen and phosphorus. According to U.S. EPA, nitrate drinking water standard violations have doubled nationwide in eight years. Algal blooms, resulting from the biostimulatory effects of nutrients (specifically, nitrogen and phosphorus), are steadily on the rise nationwide; related toxins have potentially serious health and ecological effects. These types of water quality impairments in the lower Salinas valley are also having significant adverse downstream impacts to the receiving waters of the ecologically sensitive Elkhorn Slough estuary as demonstrated by estuarine researchers and the peer-reviewed scientific literature.

Pollutant Sources

Staff conducted source analyses to identify the contributing sources of nitrogen compounds and phosphate to the project area waterbodies. Discharges of unionized ammonia, nitrate, and orthophosphate originating from irrigated agriculture, urban lands, grazing lands, and natural sources are contributing loads to receiving waters. These source categories are assigned allocations for unionized ammonia, nitrate, and orthophosphate to achieve the TMDL. Staff estimates that irrigated agriculture provides the overwhelming majority of controllable water column loads in the TMDL project area and this source category is not currently meeting its proposed load allocation. In an effort to establish additional lines of supporting evidence, staff compared its source analysis to conclusions reached by other scientists in previous nutrient-water quality studies in the lower Salinas Valley. Note that other researchers have similarly concluded that agriculture is the dominant source of nutrient loading to surface waters and groundwaters of the lower Salinas Valley², which provides a qualitative weight-of-evidence approach to the TMDL and adds a measure of confidence to the source analysis staff developed.

Numeric Water Quality Targets and Allocations

Numeric targets are water quality targets developed and used to ascertain when and where water quality objectives are achieved, and hence, when beneficial uses are protected.

➤ Target for Nitrate (MUN standard)

For impaired stream reaches that are required to support drinking water (MUN) and groundwater recharge (GWR) beneficial uses, staff is proposing a nitrate numeric target of 10 mg/L (nitrate as N) for this TMDL, which therefore is equal to the Basin Plan's numeric nitrate water quality objective protective of drinking water beneficial uses.

¹ U.S. Environmental Protection Agency: Memorandum from Acting Assistant Administrator Nancy K. Stoner. March 16, 2011. Subject: "Working in Partnership with States to Address Phosphorus and Nitrogen Pollution through Use of a Framework for State Nutrient Reductions".

² Anderson et al. (2003). *Nutrients in Surface Waters of Southern Monterey Bay Watershed* (California State University, Monterey Bay – Watershed Institute, Publication No. WI-2003-11); and Moran et al. (2011). *Nitrate Fate and Transport in the Salinas Valley: Final Report for the SWRCB*. (Lawrence Livermore National Lab LLNL-TR-484186)

➤ Target for Unionized Ammonia (toxicity objective)

For unionized ammonia (a nitrogen compound), staff is proposing a numeric target of 0.025 mg/L (as N) for this TMDL, which therefore is equal to the Basin Plan's unionized ammonia numeric water quality objective protective against toxicity in surface waters.

➤ Targets for Biostimulatory Substances (nitrate and orthophosphate)

The Basin Plan contains the following narrative water quality objectives for biostimulatory substances:

"Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses."

Due to natural variability which influences biostimulatory problems, uniform national or state-wide numeric water quality criteria for nitrogen and phosphorus are not appropriate. Therefore, in order to implement the Basin Plan's narrative objective for biostimulatory substances, the Central Coast Water Board is required to develop technically defensible numeric water quality criteria to assess attainment or non-attainment of the narrative water quality objective. To implement this narrative objective, staff evaluated available data, studies, established methodologies, technical guidance, peer-reviewed numeric criteria, and other information to estimate the levels of nitrogen and phosphorus that can be present without causing violations of the Basin Plan biostimulatory substances objective

For biostimulatory substances (nitrate and orthophosphate), staff is proposing numeric targets that were developed using U.S. EPA-recommended methodologies, and supplemented by the California Nutrient Numeric Endpoint (CA NNE) approach³. It is worth noting that according to the U.S. EPA, using a combination of recognized nutrient target development approaches result in numeric criteria of greater scientific validity⁴.

On the basis of technical guidance and established methodologies, staff is proposing seasonal biostimulatory water quality targets for nitrate which range by waterbody type-category⁵ from 1.4 mg/L to 6.4 mg/L in the dry season and 8.0 mg/L in the wet season.

On the basis of technical guidance and established methodologies, staff is proposing seasonal biostimulatory water quality targets for orthophosphate which range by waterbody type-category from 0.07 mg/L to 0.13 mg/L in the dry season and 0.3 mg/L in the wet season.

In addition to using established and recognized methodologies in developing nutrient numeric water quality criteria, staff also submitted its technical analysis and approaches for independent scientific peer review by researchers with expertise in nutrient pollution and water quality issues.

³ The California nutrient numeric endpoints (NNE) approach was developed as a methodology for the development of nutrient numeric targets for use in the water quality programs of the California's Water Boards. The NNE approach is a risk-based approach in which algae and nutrient targets can be evaluated based on multiple lines of evidence; the intention of the NNE approach is to use nutrient response indicators to develop potential nutrient water quality criteria.

⁴ See U.S. Environmental Protection Agency (2000). *Nutrient Criteria Technical Guidance Manual – Rivers and Streams*. EPA-822-B-00-002.

⁵ Waterbody categories include: Alluvial basin floor stream and canal reaches, alluvial fan & alluvial plain creek reaches, alluvial flood plain river reaches, and tidal flat reaches

The following is a summary peer review comment received by staff regarding the proposed nutrient numeric water quality targets:

“On the whole, in my opinion the numeric targets strike a reasonable balance between being over-protective and under-protective*. Nutrient targets in surface waters (1.4-6.4 mg-N/L for nitrate; 0.07- 0.13 mg-P/L for orthophosphate) are around an order of magnitude above ambient background levels (e.g., ~0.15 mg-N/L for nitrate; ~0.07 mg-P/L for orthophosphate), but are around an order of magnitude below current typical levels in surface waters in Project Areas (~3-25 mg-N/L for nitrate; ~0.1-1 mg-P/L for orthophosphate). This is a reasonable starting point”*

Scientific Peer Review: summary comment by Dr. Marc Beutel, Associate Professor, Washington State University Department of Civil and Environmental Engineering (May 2012)
*emphasis added by Central Coast Water Board staff

Further, as these proposed nutrient numeric targets are intended to support aquatic habitat beneficial uses, federal fisheries biologists from the U.S. National Marine Fisheries Service (NMFS) reviewed staff’s proposed nutrient numeric targets and reported their support for the nutrient targets⁶.

Consistent with Clean Water Act requirements, implementing parties are assigned waste load allocations or load allocations equal to the identified numeric water quality targets. Waste load allocations are assigned to NPDES⁷ regulated municipal separate storm sewer system (MS4) entities in the TMDL project area. Load allocations are assigned to irrigated agricultural operation and to livestock and grazing operations in the TMDL project area.

Implementation Strategy

➤ Irrigated Agriculture

Staff estimates that nutrient loads from irrigated lands overwhelmingly are the largest source category of nutrient loading to waterbodies in the TMDL project area. Therefore, management measures will need to be implemented to achieve the proposed load allocations for irrigated lands. TMDL implementation and load allocations for owners and operators of irrigated lands will be implemented and achieved by complying with the conditions and requirements of the Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands (Agricultural Order) and any renewals or revisions thereof. Owners and operators are required to comply with the requirements of the Agricultural Order and subsequent revisions of the Agricultural Order. Central Coast Water Board staff will prioritize implementation efforts in the TMDL Project Area aimed at addressing discharges of nutrients as described in the TMDL Final Project Report ([Attachment 2](#)). The goals of implementing these load allocations can be summarized as follows:

⁶ Letter to Water Board staff dated Nov. 10, 2011, from Steven A. Edmondson, Southwest Regional Habitat Manager, National Oceanic and Atmospheric Administration – National Marine Fisheries Service.

⁷ NPDES = national pollutant discharge elimination system program

- 1) Control discharges of nitrate to impaired waterbodies and groundwater⁸.
- 2) Implement management practices capable of achieving load allocations identified in this TMDL and demonstrate progress towards this goal during the TMDL implementation phase.

➤ Stormwater

Waste load allocations (WLAs) will be incorporated into NPDES MS4 stormwater permits. Municipal separate storm sewer systems (MS4s) are considered relatively minor loads of nitrogen compounds and orthophosphate in the TMDL Project Area as a whole, based on staff's source analysis and on available storm drain effluent data. However, because these sources can potentially have significant localized effects on water quality, the MS4s are allocated waste load allocations. The Central Coast Water Board will address nitrogen compounds and orthophosphate discharged from the City of Salinas's and the County of Monterey's municipal separate storm sewer systems by regulating the MS4 entities under the provisions of an individual municipal stormwater permit or by the State Water Resource Control Board's General Permit for the Discharges of Storm Water from Small Municipal Separate Storm Sewer Systems (General Permit).

➤ Grazing Lands-Domestic Animal Manure

Based on available information, owners and operators of grazing operations and domestic animals on grazing lands are in compliance with their load allocation. As such, new regulatory mechanisms, reporting requirements, and formal regulatory oversight are deemed unnecessary for this source category, and are not being proposed. To maintain and protect existing water quality, owners and operators of grazing operations should begin or continue to self-monitor, self-assess, and make management decisions consistent with technical guidance from existing rangeland water quality management plans, for example, the *California Rangeland Water Quality Management Plan*, the *Central Coast Cattlemen's Grazing Lands Nonpoint Source Approach*, or in conjunction with other resources appropriate to private grazing lands. It is important to note that TMDL project areas are in fact currently subject to an approved Domestic Animal Waste Discharge Prohibition and livestock owners are subject to compliance with an approved indicator bacteria TMDL load allocation⁹. Implementation efforts by responsible parties to comply with this prohibition and with indicator bacteria load allocations will, as a practical matter, also reduce the risk of nitrogen and phosphorus loading to surface waters from domestic animal waste.

Monitoring and Milestones for Tracking Progress and Achieving the TMDLs

The Agricultural Order, and any renewals or revisions thereof, shall include monitoring and reporting requirements that assess progress toward achieving load allocations. It should be noted that the Cooperative Monitoring Program (CMP) - the entity that collects data on behalf of growers - currently is collecting samples on a monthly basis at TMDL project area monitoring sites and proposed TMDL compliance sites. This is more than sufficient to satisfy the sampling frequencies recommended in the TMDL. At this time, staff anticipates that the current CMP monitoring efforts are adequate to assess receiving water quality and TMDL progress on behalf of irrigated agriculture.

⁸ Shallow, recently recharged groundwater is identified in this TMDL as a substantial source contributor of nitrate loads locally to stream waters of the TMDL project area.

⁹ Central Coast Water Board Resolution No. R3-2010-0017 (Sept. 2010).

Applicable NPDES permits that have waste load allocations (WLAs) associated with this TMDL shall contain effluent limits, conditions, and monitoring/reporting elements consistent with the requirement and assumptions of the WLAs in the TMDL.

There is already an abundance of current monitoring efforts in the TMDL project area, including the Cooperative Monitoring Program, the City of Salinas, the Water Board's Central Coast Ambient Monitoring Program, and the Elkhorn Slough National Estuarine Research Reserve monitoring program, that may be used synergistically to help demonstrate compliance and progress by implementing parties. It is also important to reiterate that the Cooperative Monitoring Program is already currently collecting monthly nitrate data from many of the impaired waterbodies, and this is sufficient to meet proposed receiving water quality monitoring frequency requirement, and additional monitoring frequencies or requirements are unwarranted

With regard to implementation progress milestones, staff recognizes that immediate compliance with water quality standards is not feasible, and are proposing temporal milestones as follows.

- First Interim Waste Load and Load Allocations: Achieve the nitrate MUN nitrate standard (10 mg/L nitrate-N in receiving waters that are designated MUN) and the unionized ammonia water quality objective-based allocations within 12 years of the effective date of the TMDL (which is upon approval by the Office of Administrative Law);
- Second Interim Waste Load and Load Allocations: Achieve the less stringent wet-season (Nov. 1 to Apr. 30) biostimulatory target-based allocations within 20 years of the effective date of the TMDL;
- Final Interim Waste Load and Load Allocations: Achieve the more stringent dry-season (May 1 to Oct. 31) biostimulatory target-based allocations within 30 years of the effective date of the TMDL;

The 12 year timeframe to achieve the MUN nitrate standard and the Basin Plan objective for unionized ammonia is based primarily on the expectation that nearly all landowners and operators of irrigated agricultural activities will have completed Farm Water Quality Plans and be implementing management practices by the end of the first waiver cycle (5 years). Water quality benefits resulting from implementing nutrient-control management measures (e.g., grass swales and riparian buffers, etc.) may take a few years to be realized. Central Coast Water Board staff believe 12 years for the first interim waste load and load allocations is a reasonable timeframe to implement management measures and reduce nitrate levels consistent with the allocations and the numeric target. The 12 year benchmark is also consistent with the Central Coast Water Board's vision for the central coast region of healthy, functioning watersheds by the year 2025.

The 20 year timeframe to achieve the second interim waste load and load allocations (which are based on the less stringent wet-season biostimulatory targets) was identified as a reasonable time frame and intermediate benchmark prior to achieving the final, more-stringent final allocations. The basis for this timeline is that source controls (nutrient and irrigation efficiency improvements) and surface water treatment (e.g., constructed wetlands, buffer strips) are anticipated to result in improvements to surface water quality more rapidly than mitigation measures to reduce nitrate pollution in shallow groundwater. Shallow groundwater is a contributing source of nutrients to surface waters; shallow groundwater moves slowly; and shallow groundwater will require longer time frames to respond to the full effects of source control measures.

The 30-year timeline to meet more-stringent dry-season biostimulatory substances allocations is based on the estimate that legacy nutrient loads, which are unrelated to current practices and are originating from groundwater and baseflow, may locally continue to contribute elevated nutrients to project area surface waters for several decades.¹⁰ Therefore, Central Coast Water Board staff anticipates that it will take a significant amount of time for legacy pollutant loads in shallow groundwater, and the subsequent baseflow pollutant loads to stream reaches, to attenuate. Further, supplementary information from a local water agency indicates that shallow and perched groundwater zones are widely present in the Salinas Valley, and typically have low to moderate permeabilities. Low permeabilities suggest that a substantial amount of time is required to realize attenuation of nutrient pollution in these shallow hydrogeologic zones.

Scientific Peer Review

Independent scientific peer review was conducted for this TMDL project. Two individuals were selected to review this document for scientific adequacy: Dr. Glenn E. Moglen, Professor, Virginia Tech University–Department of Civil and Environmental Engineering; and Dr. Marc W. Beutel, Associate Professor, Washington State University–Department of Civil and Environmental Engineering. These researchers collectively have substantial research experience in water quality, nutrient pollution, hydrology, and aquatic habitat.

Peer reviewer selection was facilitated through the University of California. The detailed step-by-step guidance for setting up and obtaining reviews appears as Exhibit F¹¹ in an Interagency Agreement between the California Environmental Protection Agency and the University of California. A January 7, 2009 Supplement to the Guidelines¹², in part, provides guidance to ensure confidentiality of the process.

POLICY ISSUE

Should the State Water Board approve the amendment to the Basin Plan to establish total maximum daily loads (TMDLs) for nitrogen compounds and orthophosphate in the Lower Salinas River and Reclamation Canal Basin, and the Moro Cojo Slough Subwatershed?

FISCAL IMPACT

Central Coast Water Board and State Water Board staff work associated with or resulting from this action will be addressed with existing and future budgeted resources.

¹⁰ For example, the U.S. Geological Survey (USGS) reports that in spite of many years of efforts to reduce nitrate levels in the Mississippi River Basin, concentrations have not consistently declined during the past two decades. USGS concludes that elevated nitrate in groundwater are a substantial source contributing to nitrate concentrations in river water. Because nitrate moves slowly through groundwater systems to rivers, the full effect of management strategies designed to reduce loading to surface waters and groundwaters may not be seen in these rivers for decades. (see “*No Consistent Declines in Nitrate Levels in Large Rivers of the Mississippi River Basin*” USGS News Release dated 08/09/2011).

¹¹ Online linkage: http://www.waterboards.ca.gov/water_issues/programs/peer_review/docs/exhibit_f.pdf

¹² http://www.waterboards.ca.gov/water_issues/programs/peer_review/docs/rb1_klamath_river/peer_review_guide_010709.pdf

REGIONAL BOARD IMPACT

Yes, approval of this resolution will amend the Water Quality Control Plan for the Central Coastal Basin (Basin Plan).

STAFF RECOMMENDATION

That the State Water Board:

1. Approve the amendment to the Basin Plan adopted under Central Coast Water Board Resolution No. R3-2013-0008.
2. Authorize the Executive Director or designee to submit the amendment adopted under Central Coast Water Board Resolution No. R3-2013-0008 as approved and the administrative record for this action to the Office of Administrative Law and the TMDL to the U.S. Environmental Protection Agency for approval.

State Water Board action on this item will assist the Water Boards in reaching Goal 1 of the Strategic Plan Update: 2008-2012 to implement strategies to fully support the beneficial uses for all 2006-listed water bodies by 2030. In particular, approval of this item will assist in fulfilling Objective 1.1 to prepare, adopt, and implement TMDLs, designed to meet water quality standards, for all impaired water bodies on the 2006 list by 2019.