

**CALLEGUAS CREEK WATERSHED  
NITROGEN COMPOUNDS AND RELATED EFFECTS TMDL**

**STAFF REPORT**



**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
LOS ANGELES REGION**

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## Table of Contents

1.	EXECUTIVE SUMMARY .....	3
2.	INTRODUCTION .....	3
3.	REGULATORY HISTORY .....	5
4.	ADOPTED WASTE LOAD ALLOCATION .....	6
5.	IMPLEMENTATION STATUS AND PROPOSED CHANGES TO THE MASS BASED DAILY WASTELOAD ALLOCATION .....	6
6.	STAFF FINDING AND RECOMMENDATION .....	8

## **1. EXECUTIVE SUMMARY**

California Regional Water Quality Control Board, Los Angeles Region (Regional Board) adopted an amendment to the Basin Plan, Resolution 02-017, to include a TMDL for nutrient and related effects in the Calleguas Creek watershed on October 24, 2002. The TMDL for Nitrogen Compounds and Related Effects for Calleguas Creek, Resolution No. 02-017 was approved by the State Board on March 19, 2003, the Office of Administrative Law on June 5, 2003, and the U.S. Environmental Protection Agency on June 20, 2003. The Calleguas Creek Nitrogen Compounds and Related Effects TMDL included concentration based maximum daily effluent limits (MDEL), average monthly effluent limits (AMEL), and mass based daily waste load allocations (WLAs) for ammonia for publicly owned treatment works (POTWs) including Hill Canyon Wastewater Treatment Plant (WTP), Simi Valley Water Quality Control Facility (WQCF), Moorpark Wastewater Treatment Plant (WTP), Camarillo Water Reclamation Plant (WRP), and Camrosa Water Reclamation Facility (WRF).

The National Pollutant Discharge Elimination System (NPDES) permits for the Hill Canyon WTP, Simi Valley WQCF, Moorpark WTP, Camarillo WRP, and Camrosa WRF will be under consideration in the near future for renewal by the Regional Board. The Calleguas Creek Nitrogen Compounds and Related Effects TMDL waste load allocations will be incorporated into the permits in conformance with the Clean Water Act and related federal regulations. In preparing the NPDES permit renewals, Regional Board identified a typographical error in the mass based daily WLAs for ammonia in the Calleguas Creek Nitrogen Compounds and Related Effects TMDL. Translating a concentration-based limit into a mass based daily limit requires multiplying the concentration-based limit by the flow rate. The mass based daily WLAs for ammonia, however, were incorrectly calculated as the product of the daily flow rate and the average monthly effluent limits (AMEL), rather than the daily flow rate and the maximum daily effluent limits (MDEL).

This Basin Plan Amendment corrects the mass based daily WLAs for ammonia to be based upon the MDEL, and updates the WLAs to be consistent with the current practice of recognizing that flow is variable. The mass based WLAs for ammonia are corrected to be based on the maximum daily effluent limit, MDEL and the actual POTW effluent flow rate at the time the monitoring is conducted.

## **2. INTRODUCTION**

The Calleguas Creek Watershed is located in southeast Ventura County, California, and in a small portion of western Los Angeles County, and drains an area of approximately 343 square miles from the Santa Susana Pass in the east, to Mugu Lagoon in the southwest. Current land use is approximately 26 percent agriculture, 24 percent urban, and 50 percent open space.

Segments of Calleguas Creek, its tributaries, and Mugu Lagoon are impaired by nitrogen compounds and eutrophic effects, including low dissolved oxygen, organic enrichment, and algae and are included on the 1998 California 303(d) list of impaired waterbodies in California. The Clean Water Act requires Total Maximum Daily Loads (TMDLs) be developed to restore impaired waterbodies. A consent decree between U.S. EPA, Heal the Bay, Inc. and BayKeeper, Inc. was approved on March 22, 1999, which resolved litigation between those parties relating to the pace of TMDL development. The court order directs the U.S. EPA to ensure that TMDLs for all 1998-listed impaired waters be established within 13 years of the consent decree. The consent decree combined water body pollutant combinations in the Los Angeles Region into 92 TMDL analytical units. Waterbodies impaired by eutrophication, algae, ammonia, and odor in Calleguas Creek watershed were scheduled in the Consent Decree as analytical unit 1. According to the consent decree, the Calleguas Creek Nitrogen Compounds and Related Effects TMDL was scheduled for adoption by the Regional Board by March, 2002.

At a public meeting on October 24, 2002, the Regional Board adopted an amendment to the Basin Plan to include a TMDL for nutrient and related effects in the Calleguas Creek watershed. The Calleguas Creek Nutrient and Related Effects TMDL included concentration based maximum daily effluent limits (MDEL), average monthly effluent limits (AMEL), and mass based daily waste load allocations (WLAs) for ammonia for POTWs including Hill Canyon WTP, Simi Valley WQCF, Moorpark WTP, Camarillo WRP, and Camrosa WRF.

The TMDL for Nutrient and Related Effects for Calleguas Creek, Resolution No. 02-017 was approved by the State Board on March 19, 2003, the Office of Administrative Law on June 5, 2003, and the U.S. Environmental Protection Agency on June 20, 2003. The TMDL for Nutrient and Related Effects for Calleguas Creek, Resolution No. 02-017 is effective on July 16, 2003. The Calleguas Creek Nitrogen Compounds and Related Effects TMDL waste load allocations will be incorporated into the permits in conformance with the Clean Water Act and related federal regulations.

Regional Board identified a typographical error in the mass based daily WLAs for ammonia in the Calleguas Creek Nitrogen Compounds and Related Effects TMDL. Translating a concentration-based limit into a mass based daily limit requires multiplying the concentration-based limit by the flow rate. The mass based daily WLAs for ammonia, however, were incorrectly calculated as the product of the daily flow rate and the average monthly effluent limits (AMEL), rather than the daily flow rate and the maximum daily effluent limits (MDEL).

This Basin Plan Amendment corrects the mass based daily WLAs for ammonia to be based upon the MDEL, and updates the WLAs to be consistent with the current practice of recognizing that flow is variable. The mass based WLAs for ammonia are corrected to be based on the maximum daily effluent limit, MDEL and the actual POTW effluent flow rate at the time the monitoring is conducted. Based on the information provided within this report, the Regional Board can take formal action to revise the TMDL Waste Load Allocations.

### 3. REGULATORY HISTORY

Calleguas Creek was included on California's Clean Water Act (CWA) Section 303(d) list in 1998 as water-quality-limited due to ammonia, nitrite-N and nitrate-N, dissolved oxygen and algae. Ammonia is included on the 1998 303(d) list as impairing various reaches of Calleguas Creek, including Arroyo Simi, Arroyo Las Posas, Arroyo Conejo, Conejo Creek, and Calleguas Creek. The 303(d) listing for ammonia was based primarily on the data collected by the POTWs under their NPDES permits and Regional Board monitoring. Monitoring conducted subsequent to the 1998 303(d) listing, including POTW effluent monitoring, the Calleguas Creek Characterization Study (CCCS) and the Thousand Oaks Study, has confirmed the basis for most of the ammonia listings.

Nitrate-N + nitrite-N and nitrogen are listed on the 1998 303(d) list as impairing various reaches of the Calleguas Creek watershed. Background information developed for the 1996 303(d) list indicates that nitrate-N + nitrite-N is listed as impairing ground water recharge beneficial uses in Revolon Slough, Calleguas Creek, and Arroyo Las Posas. Nitrogen compounds are listed as impairing aquatic life beneficial uses in Beardsley Channel, Revolon Slough, Calleguas Creek, Mugu Drain, Oxnard Drain #3, and Mugu Lagoon (RWQCB, 1997a). The 303(d) listing was based primarily on the data collected by the POTWs under their NPDES permits, the Thousand Oaks Study, and Regional Board monitoring. Monitoring conducted subsequent to the 1998 303(d) listing, including POTW monitoring, the CCCS and the Thousand Oaks Study, confirmed the basis for most of the listings.

Regional Board adopted an amendment to the Basin Plan on October 24, 2002 to include a TMDL for Nitrogen Compounds and Related Effects in the Calleguas Creek watershed under Resolution No. 02-017. The Calleguas Creek Nutrient and Related Effects TMDL included concentration based maximum daily effluent limits (MDEL), average monthly effluent limits (AMEL), and mass based daily waste load allocations (WLAs) for ammonia for POTWs including Hill Canyon WTP, Simi Valley WQCF, Moorpark Wastewater WTP, Camarillo WRP, and Camrosa WRF.

The TMDL for Nutrient and Related Effects for Calleguas Creek, Resolution No. 02-017 was approved by the State Board on March 19, 2003, the Office of Administrative Law on June 5, 2003, and the U.S. Environmental Protection Agency on June 20, 2003. The TMDL for Nutrient and Related Effects for Calleguas Creek, Resolution No. 02-017 is effective on July 16, 2003.

#### 4. ADOPTED WASTE LOAD ALLOCATIONS

This section describes adopted waste load allocations (WLAs) for ammonia and oxidized nitrogen discharges from POTWs in the Calleguas Creek Nitrogen Compounds and Related Effects TMDL, Resolution No. 02-17. The reduction in loading required to attain water quality targets was based on waste load allocations for ammonia and oxidized nitrogen from POTWs. Waste loads were allocated to Simi Valley WQCF, Hill Canyon WTP, Camarillo WRP, Moorpark WTP, and Camrosa WRF. Discharges from these sources comprise approximately 85% of the ammonia and approximately 50% oxidized nitrogen loads to Calleguas Creek during critical conditions.

The mass based daily WLAs for Simi Valley WQCF, Hill Canyon WTP, Camarillo WRP, Moorpark WTP and Camrosa WRF were based on the design capacity and effluent concentrations needed to meet instream water quality standards for ammonia. The concentration based limits for POTWS are calculated based on maximum daily effluent limit (MDEL) and average monthly effluent limit (AMEL) as required in the Basin Plan Amendment for Ammonia Objectives in Inland Surface Waters, Resolution 02-011. Table 1 shows the Ammonia Effluent Limit and WLAs for the POTWs in the Calleguas Creek watershed.

**Table 1. Adopted Concentration Based Effluent Limits and Mass Based Daily WLAs for the POTWs**

POTWs	NH <sub>3</sub> -N			NO <sub>3</sub> -N (mg/L)	NO <sub>2</sub> -N (mg/L)	NO <sub>3</sub> -N + NO <sub>2</sub> -N (mg/L)
	MDEL <sup>1</sup> (mg/L)	AMEL <sup>2</sup> (mg/L)	Daily WLA (lbs/day)			
Hill Canyon WTP <sup>3</sup>	5.6	3.1	254	9.0	0.9	9.0
Simi Valley WQCF <sup>4</sup>	3.3	2.4	220	9.0	0.9	9.0
Moorpark WTP	6.4	2.6	59	9.0	0.9	9.0
Camarillo WRP <sup>5</sup>	7.8	3.5	177	9.0	0.9	9.0
Camrosa WRF <sup>6</sup>	7.2	3.0	33	9.0	0.9	9.0

#### 5. IMPLEMENTATION STATUS AND PROPOSED CHANGES TO THE MASS BASED DAILY WASTELOAD ALLOCATION

As required in the Implementation Plan, the WLAs for ammonia, nitrite, and nitrate established in this TMDL will be implemented as effluent limits in the NPDES permits for the POTWs discharging in the Calleguas Creek watershed. The effluent limits and WLAs for POTWs will be achieved by incorporating nitrification and denitrification (NDN) operations, as needed, in the POTW wastewater treatment processes. Nitrification

<sup>1</sup> Maximum daily effluent limitation

<sup>2</sup> Average monthly effluent limitation

<sup>3</sup> Wastewater Treatment Plant

<sup>4</sup> Water Quality Control Facility

<sup>5</sup> Water Reclamation Plant

<sup>6</sup> Water Reclamation Facility

reduces the ammonia load by oxidizing it to nitrite and nitrate, and denitrification reduces the nitrite and nitrate loads by reducing these compounds to gaseous nitrogen.

As POTWs implement nitrification processes to comply with the ammonia objective, additional oxidized nitrogen is generated in the POTW effluent. Several of the POTWs in the Calleguas Creek watershed required additional time to meet the final WLAs. The  $\text{NO}_3\text{-N}+\text{NO}_2\text{-N}$  concentration in POTWs' effluents were ranging from 32.0 to 38.3 mg/L based on the 95<sup>th</sup> percentiles of effluent performance data reported in the Calleguas Creek Characterization Study. To allow time for completion of denitrification facilities, interim limits were provided for a period of four years from the effective date of the TMDL. The interim limits for the POTWs were expired on July 16, 2007 and final WLAs are now in effect. The final WLAs will be incorporated to the Pollutant Discharge Elimination System (NPDES) permits as renewal cycle are approached. The NPDES permits for the Hill Canyon WTP, Simi Valley WQCF, Moorpark Wastewater WTP, Camarillo WRP, and Camrosa WRF will be under consideration in the near future for renewal by the Regional Board. The Calleguas Creek Nitrogen Compounds and Related Effects TMDL waste load allocations will be incorporated into the permits in conformance with the Clean Water Act and related federal regulations.

Regional Board staff has reviewed most current performances of the POTWs and found that effluent limits are now mostly achieved by incorporating nitrification and denitrification operations in the wastewater treatment processes for the POTWs that currently discharge to the Calleguas Creek. Both Hill Canyon WTP and Camarillo WRP are discharging ammonia at levels well below the AMEL and MDEL limits. The average ammonia-N concentration for 2007 for Camarillo WRP and Hill Canyon WTP were 1.5 mg/L and 1.8 mg/L respectively. The average nitrate-N plus nitrite-N concentration for both Camarillo WRP and Hill Canyon WTP was 7.5 mg/L in 2007 which is also below the WLAs for  $\text{NO}_3\text{-N}+\text{NO}_2\text{-N}$ . Simi Valley WQCF is meeting the effluent limit for ammonia. The average ammonia-N concentration for 2007 for Simi Valley WQCF was below 1.0 mg/L. However, Simi Valley WQCF is still working on meeting the WLA for  $\text{NO}_3\text{-N}+\text{NO}_2\text{-N}$  through modifying their NDN operation. The average nitrate-N plus nitrite-N concentration for Simi Valley WQCF in 2007 was 10.1 mg/L which exceeded the WLA of 9.0 mg/L for  $\text{NO}_3\text{-N}+\text{NO}_2\text{-N}$ . Simi Valley WQCF has filed a request for extension of their interim limits. A Time Schedule Order to extend the interim limits for Simi Valley WQCF may be scheduled for adoption at the September 11, 2008 Board meeting.

In preparing the NPDES permit renewals, Regional Board staff identified a typographical error in the mass based daily WLAs for ammonia in the Calleguas Creek Nitrogen Compounds and Related Effects TMDL. Translating a concentration based limit into a mass based daily limit requires multiplying the concentration-based limit by the flow rate. The mass based daily WLAs for ammonia, however, were incorrectly calculated as the product of the daily flow rate and the AMEL, rather than the daily flow rate and the MDEL.

This Basin Plan Amendment corrects the mass based daily WLAs for ammonia to be based upon the MDEL, and updates the WLAs to be consistent with the current practice of recognizing that flow is variable. The mass based WLAs for ammonia are corrected to be based on the maximum daily effluent limit, MDEL, and the actual POTW effluent flow rate at the time the monitoring is conducted. Current practice recognizes that POTW flow rates are dynamic and mass-based limits that are incorporated into the basin plan will often be expressed as an equation that includes Q, or the flow rate, as one of its factors. The Use of the POTW effluent flow rate to calculate mass based WLAs is consistent with other TMDLs recently approved by U.S. EPA.

The mass based WLAs for ammonia in the Calleguas Creek Nitrogen and Related Effects TMDL include a 10% explicit margin of safety to account for uncertainty concerning the relationships between WLAs and attainment of the water quality standards addressing algae and other listed stressors associated with nutrient loads. Table 2 shows the revised mass based daily WLAs for the POTWs in the Calleguas Creek watershed. Proposed changes are underlined.

Table 2. Revised Mass Based Daily WLAs

POTWs	NH <sub>3</sub> -N			NO <sub>3</sub> -N (mg/L)	NO <sub>2</sub> -N (mg/L)	NO <sub>3</sub> -N + NO <sub>2</sub> -N (mg/L)
	MDEL <sup>7</sup> (mg/L)	AMEL <sup>8</sup> (mg/L)	Daily WLA <sup>9</sup> (lbs/day)			
Hill Canyon WTP <sup>10</sup>	5.6	3.1	<u>5.1xQ</u>	9.0	0.9	9.0
Simi Valley WQCF <sup>11</sup>	3.3	2.4	<u>2.9xQ</u>	9.0	0.9	9.0
Moorpark WTP	6.4	2.6	<u>5.7xQ</u>	9.0	0.9	9.0
Camarillo WRP <sup>12</sup>	7.8	3.5	<u>7.0xQ</u>	9.0	0.9	9.0
Camrosa WRF <sup>13</sup>	7.2	3.0	<u>6.5xQ</u>	9.0	0.9	9.0

## 6. STAFF FINDING AND RECOMMENDATION

Regional Board staff find that the amendment is consistent with the State Antidegradation Policy (State Board Resolution No. 68-16), in that the revisions of the WLAs for the Calleguas creek Nutrients and Related Effects TMDL do not include revisions to WQO5, and provide mass reduction to meet water quality objectives. Likewise, the amendment is consistent with the federal Antidegradation Policy (40 CFR 131.12).

<sup>7</sup> Maximum daily effluent limitation

<sup>8</sup> Average monthly effluent limitation

<sup>9</sup> Q represents the POTW effluent flow at the time the water quality measurement is collected and a conversion factor to lb/day based on the units of measurement for the effluent flow.

<sup>10</sup> Wastewater Treatment Plant

<sup>11</sup> Water Quality Control Facility

<sup>12</sup> Water Reclamation Plant

<sup>13</sup> Water Reclamation Facility

Regional Board staff find that the proposed amendment results does not alter the environmental analysis that was previously completed for the Calleguas Creek Nitrogen Compounds and Related Effects TMDL because correction of the mass based WLAs for ammonia will not result in different implementation actions than those previously analyzed for the Calleguas Creek Nitrogen Compounds and Related Effects TMDL, or different effects upon the environment. The environmentally significant WLA remains the MDEL, which is the technically derived ceiling to the amount of ammonia that can and should be authorized. Correcting the mass-based daily limit to be consistent with the MDEL, as originally intended, has no potential to result in a change in the physical environment. As such, this amendment is both consistent with the prior CEQA documentation, and is itself not a "project" within the meaning of CEQA.

Regional Board staff recommends the Basin Plan amendment amending the revision of the Waste Load Allocations for the Calleguas Creek Watershed Nitrogen Compounds and Related Effects Total Maximum Daily Load be adopted as set forth in Attachment A to the Tentative Resolution with changes in the mass based daily waste load allocations.