

Improving Calleguas Creek Watershed

REPORTING WATERSHED IMPROVEMENT

Based on Statistical Evidence of Watershed-wide Improvement (Option 2a)

Watershed Identification

a	Organization	California Regional Water Quality Control Board, Los Angeles Region
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c	Project Title	Reducing ammonia in the Calleguas Creek Reach 7 Watershed, Los Angeles Basin, California
d	No. Watersheds Improved	One watershed. Available data show statistically significant water quality improvement due to reduction of ammonia levels in Calleguas Creek Reach 7 that runs through one Hydrologic Unit Code 12 (HUC-12) watersheds.

Description of 2002 Baseline Condition

e	Watershed(s)	The 2002 303(d) list describes Calleguas Creek Reach 7 as flowing through two HUC-12 watersheds: Lower Simi Arroyo (HUC# 180701030102) and Upper Simi Arroyo (HUC# 180701030101). In the 1998 303(d) list, Calleguas Creek Reach 7 was known as including Arroyo Simi Reach 1 (Moorpark Fwy 23 to Brea Canyon) and Arroyo Simi Reach 2 (above Brea Canyon). The Calleguas Creek Nutrient TMDL describes the Reach 7 as the Arroyo Simi watershed.
f	2002 Impairments	The 2002 303(d) lists Calleguas Creek Reach 7 as impaired for ammonia from both point and nonpoint sources. A complete listing of the Reach 7 impairments can be found on page 10 of the 2002 303(d) list .
g	Map (optional)	Two maps attached: Figure 1 shows HUC-12 watershed delineations and monitoring locations and Figure 2 and shows land uses. More maps available at these online documents: Calleguas Creek Watershed Nutrient TMDL Reaches 2002 303(d) List Reaches Wastewater Treatment Plants

Evidence of Watershed Approach

<p>h Area of Effort</p>	<p>The entire Calleguas Creek watershed is a 343 square mile watershed consisting of 50% undeveloped, 25% urban, and 25% agriculture land uses. Most of the urban areas are located in the upper watershed and most of the agriculture is located in the middle and lower watershed (Figure 2).</p> <p>The Calleguas Creek Reach 7 watershed, a subunit of the Calleguas Creek watershed also known as Arroyo Simi, runs through two sub-watersheds: the Upper Simi Arroyo and Lower Simi Arroyo. Land use in Lower Simi Arroyo is approximately 25% urban and 75% open space. There is a small amount of agricultural land use in the northeastern portion of this watershed, and in the upper portion of Reach 8 (Tapo Canyon Creek) which drains to Reach 7.</p> <p>The largest sources of ammonia in the Calleguas Creek watershed are six wastewater treatment plants or publicly owned treatment works (POTW). In the Arroyo Simi watershed, the Simi Valley Water Quality Control Plant (WQCP) contributes 78% of the flow and 98% of the dry-weather ammonia load.</p>
<p>i Key Stakeholders Involved and Their Roles</p>	<p>The Los Angeles Regional Water Quality Control Board (LARWQCB) is the State of California regional water quality agency responsible for implementing the federal Clean Water Act as well as state water quality laws and regulations in the coastal watersheds of Los Angeles and Ventura Counties. The LARWQCB adopted the Nitrogen Compounds and Related-Effects Total Maximum Daily Load (Nitrogen TMDL) and Implementation Plan in 2003, and revised the waste load allocations (WLA) in 2009. The TMDL established an implementation plan, relying on regulatory, and non regulatory mechanisms requiring stakeholders to reduce ammonia discharges.</p> <p>The Calleguas Creek Watershed Group (CCWG) formed in 1996 as a coalition of wastewater treatment plants, water agencies, local property owners, environmental groups, agricultural parties, governmental entities, and other private interests. This group developed the Calleguas Creek Watershed Management Plan (CCWMP) and oversees TMDL implementation and monitoring programs.</p> <p>The Ventura County Agricultural Irrigated Lands Group (VCAILG) is comprised of various agricultural organizations, water districts and individuals. They formed to act as one unified agricultural group to comply with the Regional Board Conditional Waiver for Irrigated Lands (defined below).</p>
<p>j Watershed Plan</p>	<p><u>Total Maximum Daily Load (TMDL) Assessment:</u> The Calleguas Creek Nitrogen TMDL became effective on July 16, 2003. It identified wastewater treatment plants, including the Simi Valley WQCP, as the major sources of ammonia in the watershed. The only sources assigned ammonia waste load allocations were wastewater treatment plants. The TMDL also assigned nitrate and nitrite waste load allocations to the wastewater treatment plants. There are few agricultural dischargers in the Arroyo Simi watershed and these nonpoint sources were assigned load allocations for nitrate and nitrite, but not ammonia because they are not a significant source of ammonia.</p>

Implementation Plan: The TMDL contains an Implementation Plan that includes:

- A requirement that the waste load allocations for ammonia, nitrite, and nitrate established in the TMDL be implemented as effluent limits in the National Pollutant Discharge Elimination System (NPDES) permits of the wastewater treatment plants
- A time schedule for wastewater treatment plants to implement advanced treatment (nitrification/denitrification or N/DN) to remove ammonia, nitrate and nitrite from wastewater to meet effluent limits
- A time schedule for agricultural sources to develop and implement agriculture best management practices to reduce nitrate and nitrite
- Watershed monitoring to determine TMDL effectiveness

The TMDL implementation plan uses an iterative approach with ongoing monitoring and integrated regulatory tools (coordinated watershed monitoring, NPDES permits, and the Conditional Waiver for Irrigated Lands, a state nonpoint source regulatory program described below) to address ammonia impairments in the watershed. The TMDL prioritized a reduction in ammonia loads from wastewater treatment plants to address the ammonia impairments in the watershed.

Watershed Group: The TMDL is implemented through the Calleguas Creek Watershed Group and the the Calleguas Creek Watershed Management Plan. The CCWG is responsible for developing, implementing and reporting the watershed monitoring plan. The CCWG links the agricultural groups with the wastewater treatment plants and other key stakeholders to ensure that the waste load allocations assigned to the treatment plants and the load allocations assigned to the agricultural dischargers are effectively implemented.

Waste Load Allocations: The ammonia waste load allocations are implemented through NPDES permit effluent limits and receiving water monitoring requirements for the wastewater treatment plants. The wastewater treatment plants can incorporate nitrification and denitrification (N/DN) operations, as needed, in their treatment processes to reduce ammonia discharge and achieve the permit limits. Nitrification reduces ammonia load by oxidizing it to nitrite and nitrate, and denitrification reduces the nitrite and nitrate loads by reducing these compounds to gaseous nitrogen. In the Arroyo Simi, the Simi Valley WQCP has ammonia limits for its discharge No. 001 and receiving water monitoring requirements upstream and downstream of its discharge.

Load Allocations: The nitrate and nitrite load allocations are implemented through the Conditional Waiver for Irrigated Lands (aka [Agricultural Waiver](#)), a program under the State of California Porter-Cologne Act that provides administrative permitting authority to the Los Angeles Regional Water Quality Control Board to regulate all nonpoint sources of pollution. The LARWQCB adopted the Agricultural Waiver for Ventura and Los Angeles Counties in 2005. In lieu of a permit, the Agricultural Waiver requires potential dischargers of nonpoint source pollutants (e.g., agricultural growers) to implement best management practices, such as irrigation management, improved fertilizer application practices, and erosion control to reduce pollutant runoff and attain nitrate and nitrite load allocations. The growers are also required to develop water quality management plans, monitor and test runoff quality, measure pollutant removal effectiveness, and track compliance with Agricultural Waiver requirements.

By assigning waste load allocations for ammonia as well as waste load and load allocations for nitrate and nitrite, the TMDL ensures that total nitrogen levels in the waterbody do not increase while ammonia levels decrease.

k Restoration Work

The Simi Valley WQCP is the major source of ammonia in the Arroyo Simi watershed; thus, restoration work consisted of installing advanced treatment (N/DN) at the Simi Valley WQCP to remove ammonia. The N/DN was installed in September 2004. Ammonia levels immediately decreased, improving water quality in the Arroyo Simi watershed (Figure 3).

Evidence of Watershed-wide Improvement

l Impairments Removed (if applicable)

Ammonia levels reduced in wastewater treatment plant discharge to Calleguas Creek Reach 7 currently meet NPDES permit effluent limits and comply with the TMDL Implementation Plan. It is expected that data from continuing ambient water quality monitoring will support delisting (i.e., impairment removal) of ammonia in Reach 7 for the 2012 303(d) listing cycle.

m Statistical Results

Data collected from the Simi Valley WQCP receiving water monitoring stations demonstrate water quality improvement in the Calleguas Creek Reach 7 (Arroyo Simi) watershed. The monitoring stations are located specifically in the Lower Simi Arroyo watershed, HUC# 180701030102. Monitoring Station W-12 is upstream of the Simi Valley WQCP discharge point No. 001 (Figure 1). Station W-11 is downstream of their discharge point No. 001.

Ammonia Reduction: Monthly ammonia data were analyzed from January 2001 to December 2007 (Figure 3). The Simi Valley WQCP installed the N/DN treatment system in September 2004. Data collected from January 2001 through September 2004 were compared to data collected from October 2004 through December 2007 to determine if there was a statistically significant change over time in the difference between upstream and downstream ammonia concentrations. Using a before-after-control-impact design and a t-test, it was demonstrated that there was a statistically significant difference in ammonia concentrations before implementation of N/DN and after implementation of N/DN ($p < 0.05$).

Total Nitrogen: Monthly total nitrogen data were also analyzed to demonstrate that other forms of nitrogen did not increase with decreasing ammonia (Figure 4). Using a before-after-control-impact design and a t-test, it was demonstrated that there was a statistically significant difference in total nitrogen concentrations before implementation of N/DN and after implementation of N/DN ($p < 0.05$).

n Environmental Significance

Monitoring results demonstrate that focusing on the largest source of ammonia loading in the watershed resulted in statistically significant reductions in ammonia concentrations in Calleguas Creek Reach 7 (Arroyo Simi) watershed.

o Photos/Graphics (optional)

Figure 1 – Map of Calleguas Creek Watershed showing HUC-12 watershed delineations and monitoring locations
 Figure 2 – Map of Calleguas Creek Watershed showing Southern California Association of Governments (SCAG) land uses
 Figure 3 – Ammonia concentrations in Arroyo Simi upstream and

downstream of the Simi Valley WQCP
Figure 4 – Total Nitrogen concentrations in Arroyo Simi upstream and
downstream of the Simi Valley WQCP

More maps available at these online documents:

[Calleguas Creek Watershed](#)

[Nutrient TMDL Reaches](#)

[2002 303\(d\) List Reaches](#)

[Wastewater Treatment Plants](#)

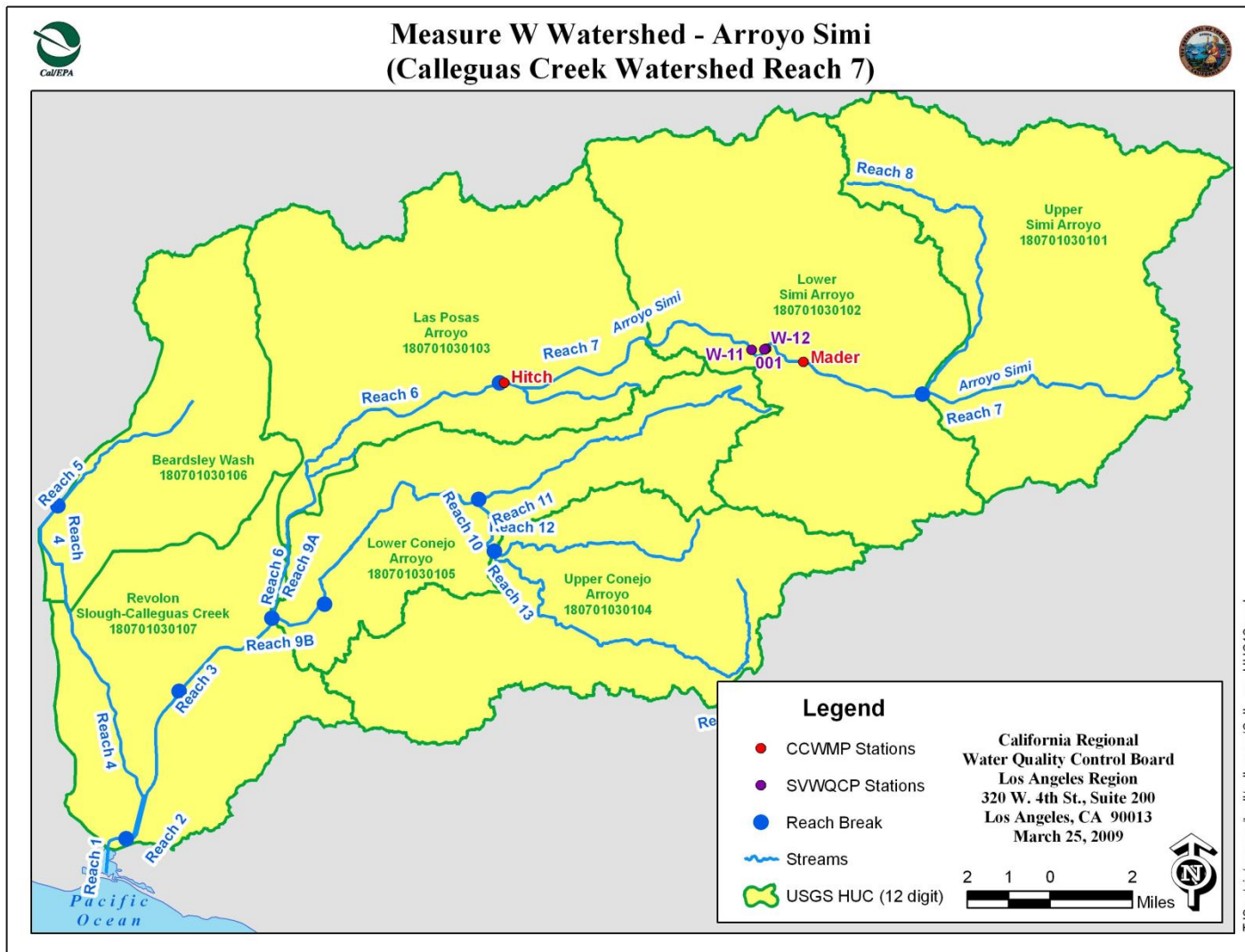
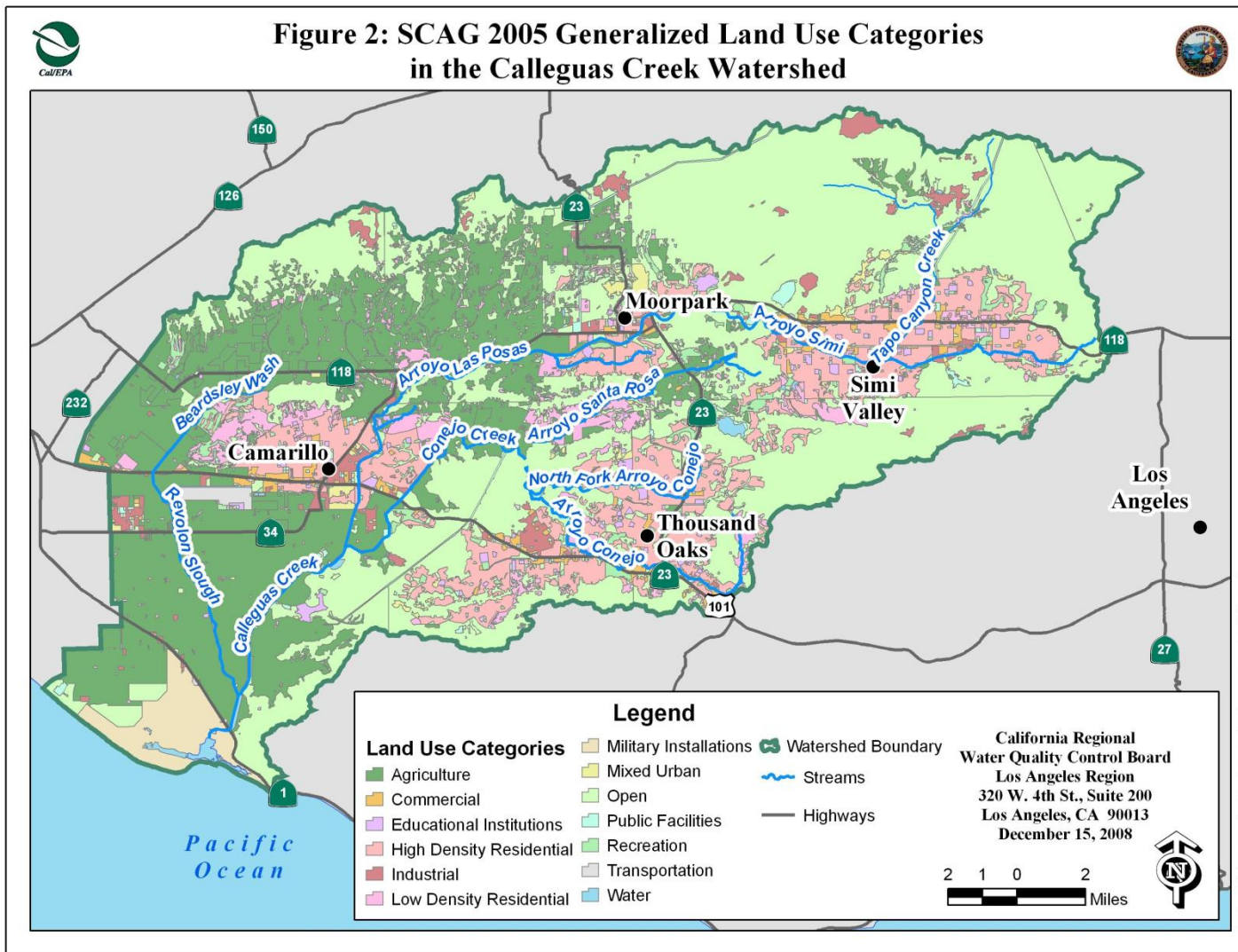
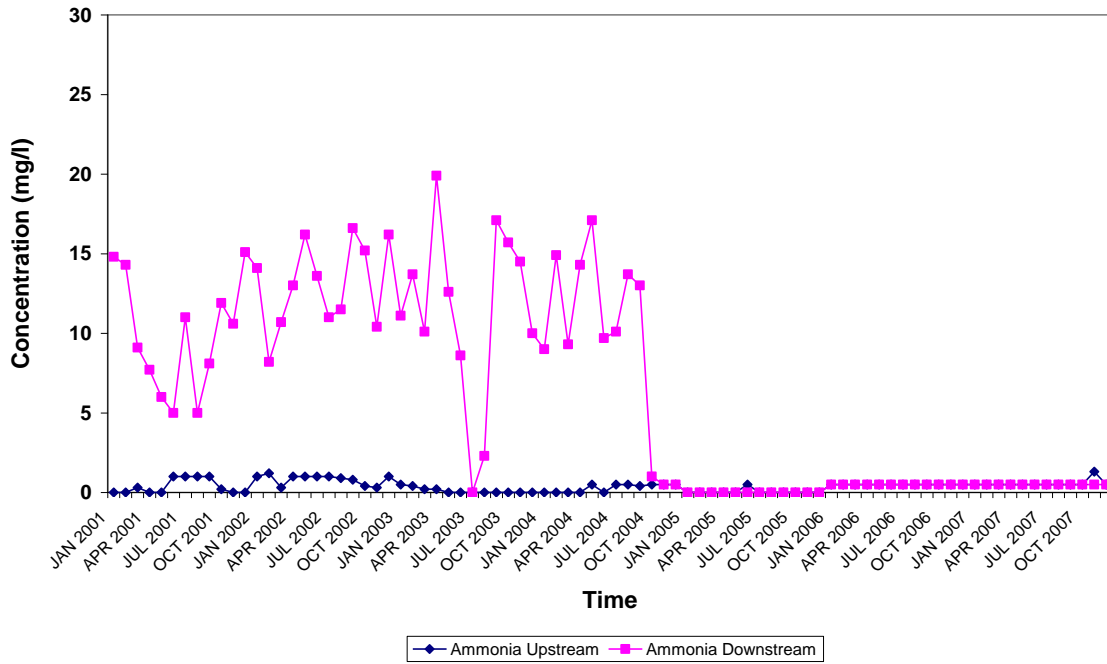


Figure 1



**Figure 3. Arroyo Simi (Calleguas Creek Reach 7)
Ammonia Upstream and Downstream of Simi Valley WQCP**



**Figure 4. Arroyo Simi (Calleguas Creek Reach 7)
Total Nitrogen Upstream and Downstream of Simi Valley WQCP**

