

Total Maximum Daily Load for Nutrients in Machado Lake

Monitoring and Reporting Program Plan



CTSW-RT-11-286.01.1 DRAFT



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District 7 – Los Angeles and Ventura Counties
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The Basin Plan Amendment of the Machado Lake TMDL (BPA) requires the California Department of Transportation (Caltrans) and other Municipal Separate Storm Sewer System Permittees (MS4 Permittees) to submit a monitoring plan. The monitoring plan should be designed to monitor the progress of pollutant load reductions and improvements in water quality. The Caltrans Monitoring and Reporting Program (MRP) Plan for Machado Lake Nutrient Total Maximum Daily Loads (TMDLs) consists of near-term total phosphorus and total nitrogen runoff monitoring conducted during program implementation of the Caltrans responsible jurisdictional Waste Load Allocation (WLA) adopted March 11, 2009.

Watershed Description

Machado Lake, previously known as Harbor Park Lake, is located in Ken Malloy Harbor Regional Park. The Machado Lake watershed lies adjacent to the Dominguez Channel watershed and has a drainage area of approximately 13,603 acres. Caltrans' roadways and facilities comprise approximately 163 acres (1.2%) of this area. Figure 1 shows all Caltrans facilities within the Machado Lake Watershed. There are no maintenance stations, park and ride lots, or rest areas/vista points identified in the watershed.

Machado Lake as described in *Resolution No. R4-2008-006* has a surface area of approximately 40 acres and averages about three feet deep. The lake receives stormwater runoff from storm drains throughout a watershed of approximately 20 square miles. The dominant land use in the Machado Lake Watershed is high density single family residential accounting for approximately 45% of the land use. Industrial, vacant, retail/commercial, multi-family residential, transportation, and educational institutions each account for 5-7% of the land use while "all other" land uses account for the remaining 23%. Machado Lake is a receiving water body of urban and stormwater runoff from a network of storm drains throughout the watershed.

Source Characterization

The Los Angeles Regional Water Quality Control Board (Regional Board) has characterized the Machado Lake Watershed (Regional Board 2008), identifying major point and non-point source discharges. Point sources are identified as stormwater discharges from municipal separate storm sewer systems, Caltrans, and general construction and industrial discharges. Nonpoint sources were identified as internal nutrient loading (nutrient flux from sediment), atmospheric deposition, wind re-suspension, bioturbation, birds, and general surface runoff. Urban runoff includes land uses that are within the County of Los Angeles; Los Angeles Flood Control District; Cities of Carson, Lomita, Los Angeles, Palos Verdes Estates, Rancho Palos Verdes, Redondo Beach, Rolling Hills, Rolling Hills Estates, Torrance; and Caltrans. The major nonpoint sources of nutrients in the watershed are identified as internal nutrient loading (nutrient flux from sediment).

The urban discharges identified above are regulated under NPDES permits issued to the County of Los Angeles, and the incorporated cities therein, NPDES No. CAS 004001 (Regional Board Order No. 01-182) and Caltrans, Order No. 99-06-DWQ.

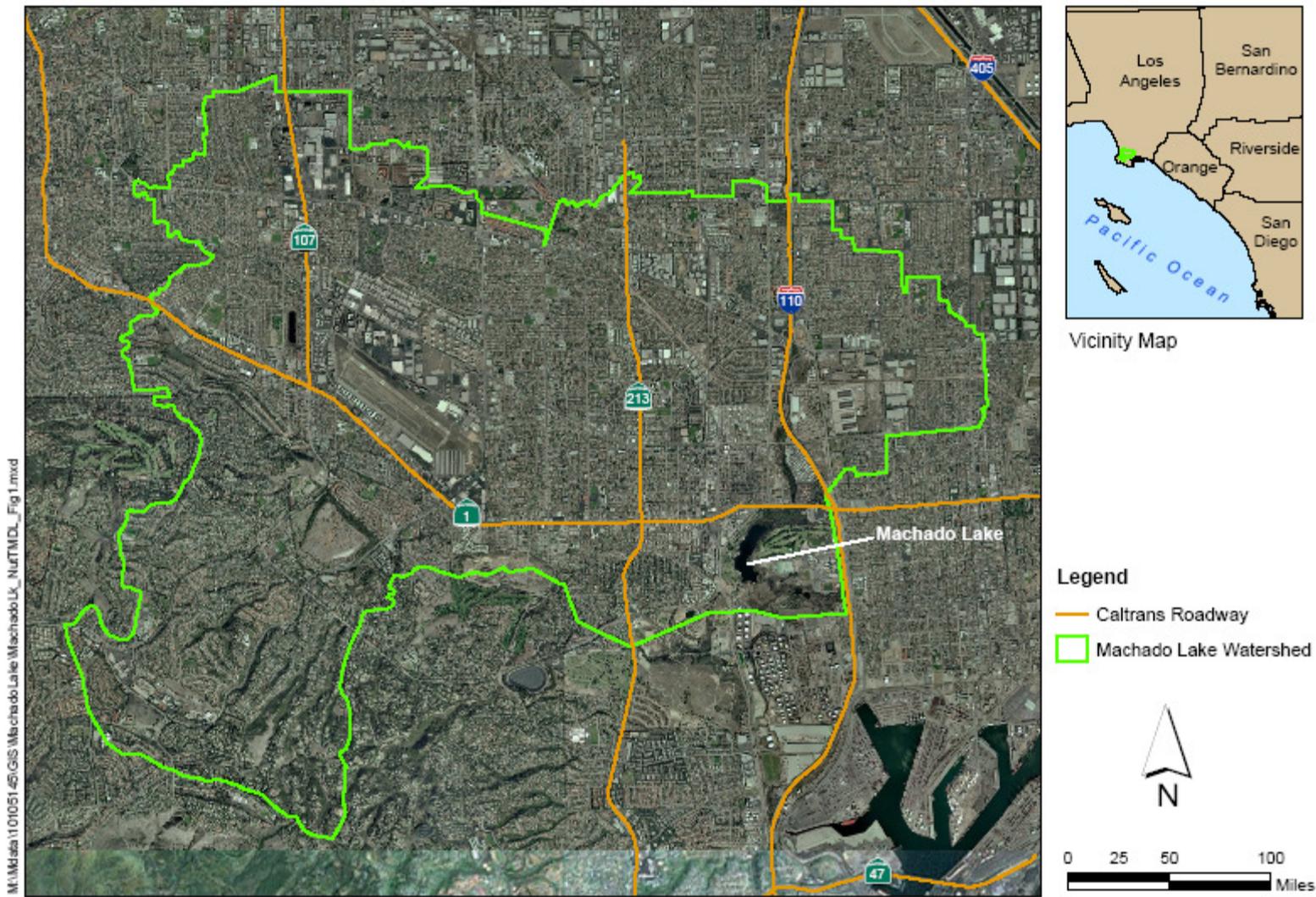


Figure 1: Caltrans Facilities within the Machado Lake Watershed

Waste Load Allocations

Waste Load Allocations (WLAs) for the Machado Lake Nutrients TMDL that Caltrans and the MS4 Permittees must achieve are shown in Table 1. The effective date interim WLAs are based on current in-lake concentrations, set at the 95th percentile of current concentrations. The 5 year Interim WLAs require a 30% reduction from current in lake concentrations.

Table 1: Summary of Waste Load Allocations for the Machado Lake Nutrient TMDL

Waste Load Allocations	Years After Effective Date	Interim Total Phosphorus WLAs (mg/L)	Interim Total Nitrogen (TKN + NO ₃ -N + NO ₂ -N) WLAs (mg/L)
MS4 Permittees ¹ , Caltrans, General Construction and Industrial Stormwater permits	At Effective Date ²	1.25	3.50
	5 ³	1.25	2.45
	9.5 (Final WLAs ⁴)	0.10	1.00

¹ Municipal Separate Storm Sewer System (MS4) Permittees including: Los Angeles County, Los Angeles County Flood Control District, and the Cities of Carson, Lomita, Los Angeles, Palos Verdes Estates, Rancho Palos Verdes, Redondo Beach, Rolling Hills, Rolling Hills Estates, and Torrance.

² The compliance point for all effective date interim WLAs is measured in the lake.

³ The compliance point for all year 5 interim WLAs is measured as specified in Implementation Plan Section II of the BPA Table 7-29.1.

⁴ The compliance point for all final WLAs is measured as specified in Implementation Plan Section II of the BPA Table 7-29.1.

Table 2 shows the constituents of interest and associated numeric targets specified in the Machado Lake Nutrient TMDL.

Table 2: Numeric Targets for Machado Lake Nutrient TMDL

Indicator*	Numeric Target	Reference
Total Phosphorus	0.1 mg/L monthly average	EPA Guidance 2000
Total Nitrogen (TKN + NO ₃ -N + NO ₂ -N)	1.0 mg/L monthly average	EPA Guidance 2000
Ammonia	5.95 mg/L hourly average	Basin Plan
Ammonia	2.15 mg/L 30 day average	Basin Plan
Dissolved Oxygen	5 mg/L single sample minimum measured 0.3 meter above the sediments	Basin Plan
Chlorophyll a	20 ug/L monthly average	EPA Guidance 1999 and review of Carlson Trophic State Index Classification System

* Field sampling will include the identified indicators. .

Description of Roadways and Facilities

Caltrans operates and maintains four routes in the watershed, LA-1 (Pacific Coast Highway), LA-107 (Hawthorne Boulevard), LA-110 (Harbor Freeway), and LA-213 (Western Avenue), which comprise 14.7 miles. Table 3 summarizes information about these routes, including the route number, stretch of miles, and post mile (PM) limits.

Table 3: Highway Mile and Post Miles

Route	Miles	PM Start	PM End
LA-1	6.16	11.22	17.38
LA-107	2.35	0	2.25
LA-110	2.71	3.81	6.52
LA-213	3.59	4.15	7.74

Table 4 summarizes Caltrans watershed statistics and shows that no maintenance stations, park and ride lots, or rest areas/vista points are identified in the watershed.

Table 4: Caltrans Watershed Statistics

Total Watershed Area:	13,603 Acres
Caltrans Tributary Area:	163 Acres
Caltrans Percentage of Watershed:	1.2 %
Roadways:	14.7 miles
Maintenance Stations:	0
Park and Ride Lots:	0
Rest Areas/Vista Points:	0

Caltrans is engaged in implementing its Statewide Stormwater Management Plan (SWMP). Implementation of the SWMP includes the installation of Best Management Practices (BMPs), treatment control measures to reduce the quantity and improve the quality of stormwater discharged from Caltrans facilities. Caltrans currently has no identified structural BMPs in the watershed, but it has employed the following non-structural BMPs in this watershed:

Street Sweeping

Caltrans conducts roadway sweeping and roadside cleanup operations to provide safe highway conditions and to maintain a neat and clean appearance appropriate for the type and use of the road. Sweeping is currently conducted on an as-needed basis throughout the watershed. Material collected is disposed of appropriately.

Drain Inlet Cleaning

Caltrans inspects culverts and drain inlets to determine if cleaning is required. Culverts and ditches are cleaned when sediment and other materials impair culvert function; these activities are typically conducted before the rainy season in order to maintain hydraulic capacity.

Monitoring Implementation

The BPA requires Caltrans and MS4 Permittees to submit a MRP Plan. The MRP Plan should be designed to monitor the progress of pollutant load reductions and improvements in water quality. The deadline for submittal of the monitoring program was February 19, 2010, one year from the effective date of the TMDL. Caltrans submitted a letter regarding the MRP on March 11, 2010. The Regional Board reviewed and commented on the submittal by Caltrans and requested an MRP Plan be submitted by May 1, 2011.

The MRP is developed to accomplish the following specific objective:

- Determine compliance with the waste load allocations for total phosphorus, and total nitrogen.

The Machado Lake is a receiving body of urban and stormwater runoff from a network of storm drains throughout the watershed. There are three discharge points into Machado Lake from the following storm drain channels: Drain 553, Wilmington Drain, Project No. 77/510 and Waleria Lake. Approximately 88% of the discharge in to Machado Lake flows through the Wilmington Drain. The discharge sources and average annual external nutrient loading are identified in Table 5.

Table 5: Average annual external nutrient load to Machado Lake by sub drainage area*

	Total N Load (kg)	Total P Load (kg)	Ortho-P Load (kg)	Inorg-N Load(kg)
Drain 553	4,039	1,706	402	2,010
Wilmington Drain	2,043	886	195	999
Project 77/510	898	390	84	436
Waleria Lake	607	278	56	292
Total	7,587	3,260	737	3,736

* Technical Memo for Machado Lake Nutrient TMDL, Lai 2008

Caltrans monitoring sites have been selected based on proximity to Machado Lake point sources, land use characteristics, and areas that would best represent Caltrans' discharge. Monitoring sites have been identified in Figure 2. Alternate sites are identified should additional data be necessary. Table 6 provides approximate locations identified in Figure 2, which will require field studies to determine end of pipe monitoring locations.

Table 6: Proposed Monitoring Locations

State Route	Nearest Cross Street*	
	Proposed Location	Alternate Location
LA-110	W. Lomita Blvd.	-
LA-110	W. Q Street	-
LA-110	-	W. Sepulveda Blvd.
LA-1	-	Crenshaw Blvd.
LA-1	-	SR-213
LA-1	Normandie Ave.	-
LA-1	S. Waterman Way	-
LA-213	-	W. 238 th
LA-107	-	-

* Locations are approximate and a field study will be necessary to determine end of pipe monitoring selection.

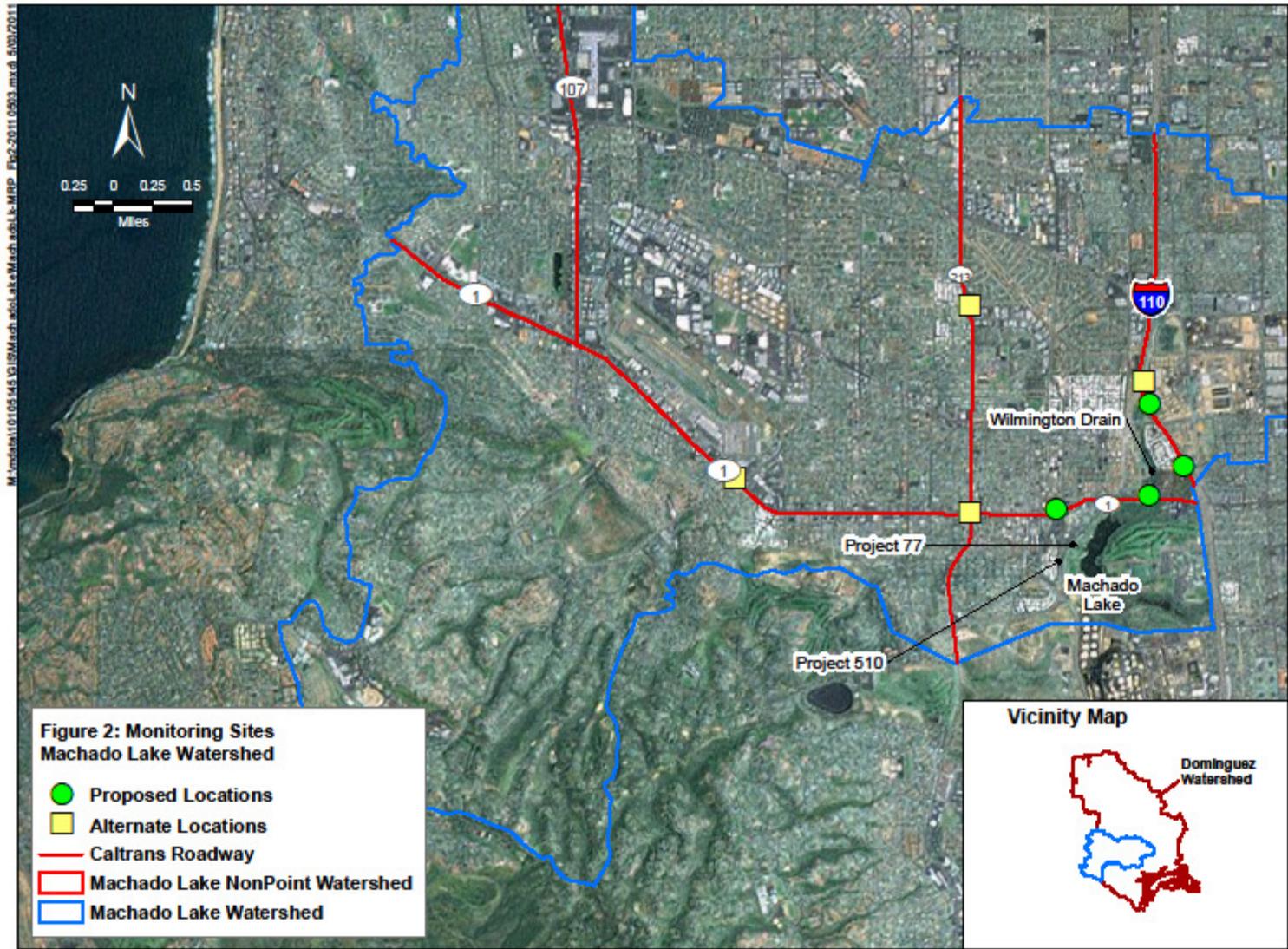


Figure 2: Monitoring Sites in Machado Lake Watershed

Monitoring will begin sixty days after the Executive Officer approval of the MRP. The monitoring constituents, method and frequency are provided in Table 7. Caltrans Discharge Characterization Study Update (CTSW-RT-09-183.44.2) indicates that Caltrans right-of-way is not a significant source of phosphorus and nitrogen. Caltrans is also not a source of dry weather nuisance runoff, however nuisance runoff from adjacent properties may cause run on to the Caltrans right-of-way. This nuisance runoff from adjacent properties however would not be a representative Caltrans' sample. Six to eight storm event runoff field samples will be collected at end of pipe per location per year, and quarterly dry weather samples will be provided if dry weather nuisance runoff is present at the proposed locations. Monitoring will continue the following year to provide additional data should Caltrans exceed the WLAs. All monitoring and reporting shall be performed in accordance with the latest Caltrans Comprehensive Protocols Guidance Manual (CTSW-RT-03-105.51.42).

Table 7: Monitoring Constituents and Sampling Frequencies

Constituents	Method	Type and Frequency of Sampling*	
		Storm Event Runoff	Dry Weather**
Total nitrogen	Grab	6 – 8 per Year	Quarterly
Total phosphorus	Grab	6 – 8 per Year	Quarterly
Nitrate (NO ₃ -N)	Grab	6 – 8 per Year	Quarterly
Total ammonia (NH ₃ -N)	Grab	6 – 8 per Year	Quarterly
Ortho-phosphorus (PO ₄)	Grab	6 – 8 per Year	Quarterly
pH	Grab	6 – 8 per Year	Quarterly
Dissolved oxygen	Grab	6 – 8 per Year	Quarterly
Electrical conductivity	Grab	6 – 8 per Year	Quarterly
Total Dissolved Solids	Grab	6 – 8 per Year	Quarterly
Total Suspended Solids	Grab	6-8 per Year	Quarterly
Turbidity	Grab	6 – 8 per Year	Quarterly

* Sample collections (end of pipe discharge) will be processed, sampled and handled in accordance with Surface Water Ambient Monitoring Program (SWAMP) and EPA requirements.

** If runoff is present.

Reporting Requirements

To report the status of TMDL compliance, Caltrans and the MS4 Permittees must submit an annual report to the Regional Board each year from the date when the Monitoring and Reporting Program is approved. This report will describe the results on the monitoring program and assess their progress in complying with the TMDL.

Caltrans will work with the Regional Board staff to coordinate the monitoring program and to develop compliance strategies necessary for Caltrans TMDL implementation.