MALIBU CREEK AND LAGOON BACTERIA TMDL
COMPLIANCE MONITORING PLAN

PREPARED BY THE
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

SUBMITTED ON BEHALF OF

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT
COUNTY OF VENTURA
VENTURA COUNTY WATERSHED PROTECTION DISTRICT
CALIFORNIA DEPARTMENT OF TRANSPORTATION
CITIES OF
AGOURA HILLS
CALABASAS
HIDDEN HILLS
MALIBU
THOUSAND OAKS
WESTLAKE VILLAGE

REVISED SEPTEMBER 5, 2007

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1.0 INTRODUCTION

1.1 Background

The Malibu Creek Watershed is located about 35 miles west of Los Angeles and extends from the Santa Monica Mountains to the Pacific Coast. The watershed is approximately 109 square miles and drains into the Malibu Lagoon and ultimately into Santa Monica Bay when the Lagoon is breached.

Federal Regulations under the Clean Water Act require States to develop a list of impaired waters and the pollutants for which they are impaired, also known as the 303(d) List. Several reaches and tributaries to the Malibu Creek and Lagoon were designated as impaired and included on California's 1998 and 2002 CWA 303(d) list of impaired waters due to excessive amounts of coliform bacteria. The presence of coliform bacteria in surface waters is an indicator that water quality may not be sufficient to maintain the beneficial use of these waters for human body contact recreation (REC-1). To address this issue, States must establish a watershed-based pollutant specific Total Maximum Daily Load to bring impaired waters into compliance with water quality standards necessary for its beneficial uses.

The California Regional Water Quality Control Board, Los Angeles Region (Regional Board) released a first draft of the Malibu Creek and Lagoon Bacteria TMDL on December 13, 2004. The TMDL was subsequently approved by the United States Environmental Protection Agency (USEPA) on January 10, 2006, and came into effect on January 24, 2006. One of the TMDL's first requirements is the submittal of a Compliance Monitoring Plan within 120 days of the effective date.

1.2 Participants

This Monitoring Plan is developed by the County of Los Angeles Department of Public Works in coordination with the other responsible jurisdictions and agencies under the TMDL, including the County of Ventura, Ventura County Watershed Protection District, the cities of Agoura Hills, Calabasas, Hidden Hills, Malibu, Thousand Oaks, and Westlake Village; and California Department of Transportation (Caltrans). Implementation of this monitoring program will be funded jointly by these responsible agencies.

During the development of the monitoring plan, feedback was also solicited from the Regional Board, Heal the Bay, and Santa Monica Bay Keeper.

For reference, the TMDL document can be found in Appendix A of this document or on the Regional Board's website at http://www.swrcb.ca.gov/rwqcb4/ .

1.3 Objectives

Data collected from this Monitoring Plan will be used to achieve the following:

1) Characterize the existing water quality as compared to water quality at the reference watershed,
2) Measure compliance with the allowable number of exceedances days set forth by the TMDL; and
3) Provide data to support the re-evaluations that will be made when the TMDL is reconsidered in 2009.

2.0 COMPLIANCE TARGETS

2.1 Numeric Targets

The TMDL establishes multi-part numeric targets based on the bacteriological water quality objectives for marine and fresh water to protect the water contact recreation use (REC-1). The bacteriological objectives are set forth in Chapter 3 of the Regional Water Quality Control Plan (Basin Plan). The objectives are based on four bacteriological indicators and include both the geometric mean[1] limits and single sample limits. The Basin Plan objectives that serve as the numeric targets for this TMDL for marine waters and fresh waters are listed below in Table 1 and Table 2, respectively:

Table 1. Numeric Targets in Marine Waters Designated for Water Contact Recreation (REC-1).

Geometric Mean Limits (Marine Waters)	
Indicator	**mpn/100ml**
Total Coliform	1,000
Fecal Colifom	200
Enterococcus	35
Single Sample Limits (Marine Waters)	
Indicator	**mpn/100ml**
Total Coliform*	10,000
Fecal Coliform	400
Enterococcus	104

*Total coliform density shall not exceed 1,000/100 ml, if the ratio of fecal-to-total coliform exceeds 0.1.

Table 2. Numeric Targets in Fresh Waters Designated for Water Contact Recreation (REC-1).

Geometric Mean Limits (Fresh Waters)	
Indicator	**mpn/100ml**
E. Coli	126
Fecal Colifom	200
Single Sample Limits (Fresh Waters)	
Indicator	**mpn/100ml**
E. Coli	235
Fecal Coliform	400

[1] The geometric mean is defined in Webster's Dictionary as "the n^{th} root of the product of n numbers." Thus, the 30-day geometric mean calculation for the Malibu Creek and Lagoon TMDL will be calculated as the 30th root of the product of 30 numbers (the most recent 30 day results). For weekly sampling, the 30 numbers are obtained by assigning the weekly test result to the remaining days of the week. If more samples are tested within the same week, each test result will supersede the previous result and be assigned to the remaining days of the week until the next sample is collected. This rolling 30-day geometric mean must be calculated for each day, regardless of whether a weekly or daily schedule is selected.

2.2 Allowable Number of Exceedance Days

The TMDL allows some exceedances of the Basin Plan bacteriological objectives to account for bacterial loading from non-anthropogenic sources (e.g. wildlife). The allowable number of exceedance days varies depending on the time of year[2] and sampling frequency. Table 3 summarizes the allowable number of exceedance days for all sampling sites, as well as when these limits must be achieved.

Table 3. Summary of compliance targets.

Time of Year	Compliance Deadline	Allowable Number of Exceedance Days			
		Daily Sampling		Weekly Sampling	
		Single Sample Limit	Geometric Mean Limit	Single Sample Limit	Geometric Mean Limit
Summer dry weather	1/24/09*	0	0	0	0
Winter dry weather	1/24/12	3	0	1	0
Wet weather	1/24/16**	17	0	3	0

*May be extended to 1/24/12.
**May be extended up to 7/15/21.

[2] For compliance purposes, the TMDL divides the year into three separate periods:

- summer dry-weather (April 1 –October 31)
- winter dry-weather (November 1 – March 31), and
- wet weather (days with rain events of $\geq$ 0.1 inches of precipitation and the three days following the end of the rain event.

3.0 SAMPLING PROGRAM DESIGN

3.1 Sampling Sites

Eighteen sampling sites will be sampled under this monitoring program. Sites were selected using the following guidelines:

- Seven sites specified in Table 7-10.2 of the TMDL (Noted in Table 4).
- At least one site in each subwatershed;
- Areas where frequent REC-1 use is known to occur; and
- Availability of previous water quality data;
- Perennial flow; and
- Safe and legal access.

Many of the sites either are or had been previously monitored by other programs. Specifically, one of the proposed sites is also being monitored by Heal the Bay. Four sites are being monitored by the Las Virgenes Municipal Water District. Six sites had been previously monitored under the Malibu Creek Watershed Monitoring Program led by the City of Calabasas and two sites monitored under the Malibu Creek Watershed Water Quality Monitoring Project conducted by the County of Los Angeles Department of Public Works. Table 4 lists all 18 sampling sites and the subwatershed in which each is located. The general locations of the sampling sites are shown in Figure 1. A more detailed description of each sampling sites is included in Appendix B.

3.2 Frequency

The TMDL allows a choice between daily and weekly sampling for this monitoring program. Responsible agencies have elected to conduct weekly sampling at all sites. Because fewer exceedances will be detected with weekly sampling, the TMDL's allowable number of exceedance days is reduced accordingly when samples are collected weekly.

3.3 Duration

The monitoring program will be implemented as approved until the TMDL is re-considered in 2009/2010. At that time, the program will be re-evaluated so monitoring can be reduced or discontinued at those reaches where beneficial uses are not impaired. It is assumed that such modifications to the approved monitoring program will require Regional Board approval.

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Figure 1. General Locations of Sampling Sites

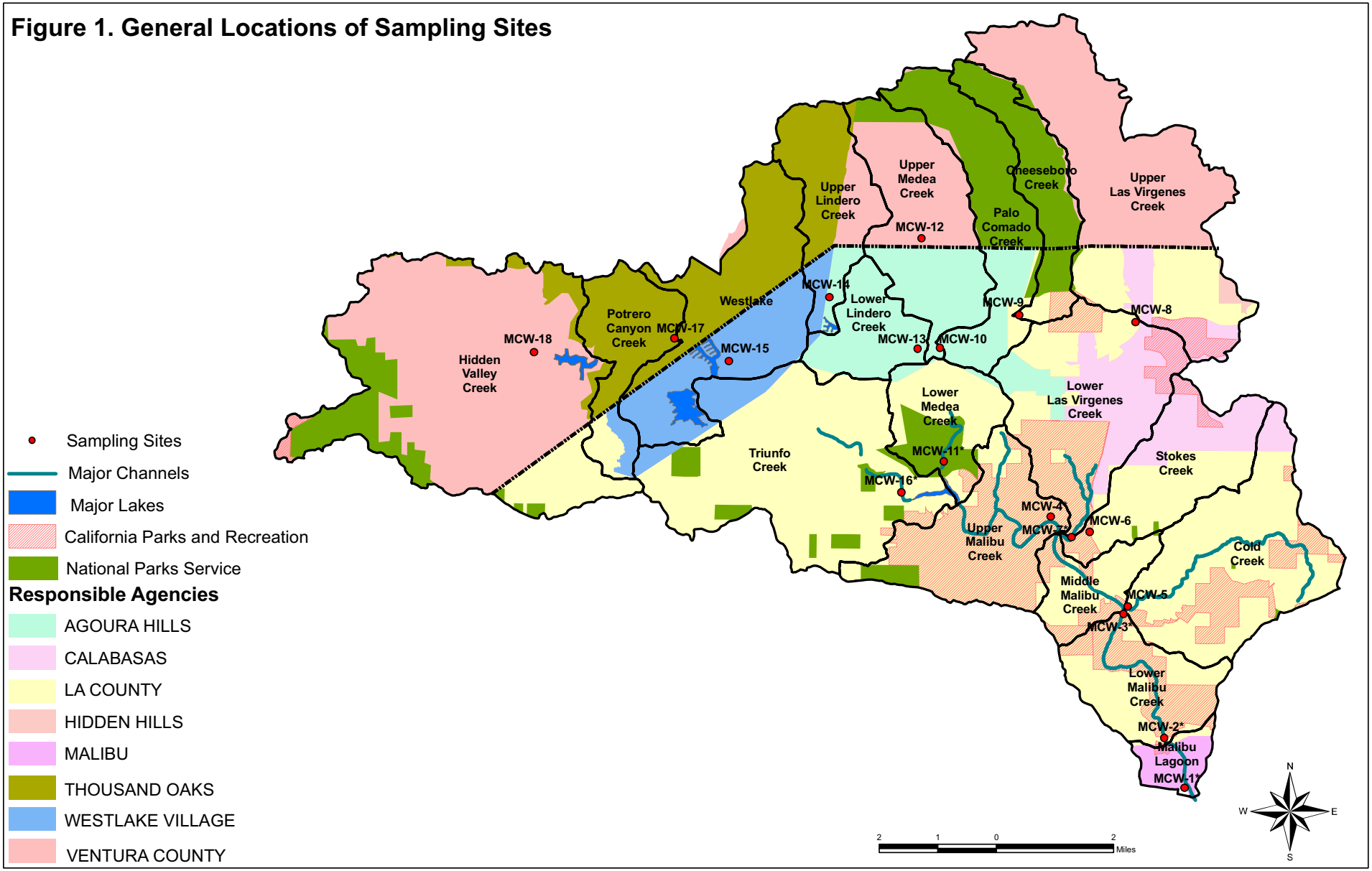

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Table 4. List of Sampling Sites.

Site ID	Subwatershed	Coordinates
MCW-1*	Malibu Lagoon	N 34°02.069’ W 118°40.969’
MCW-2*	Lower Malibu Creek	N 34°02.825’ W 118°41.371’
MCW-3*	Middle Malibu Creek	N 34°04.654’ W 118°42.105’
MCW-4*	Upper Malibu Creek	N 34°06.001’ W 118°43.364’
MCW-5	Cold Creek	N 34°04.739’ W 118°41.996’
MCW-6	Stokes Creek	N 34°05.889’ W 118°42.748’
MCW-7*	Lower Las Virgenes Creek	N 34°05.769’ W 118°43.072’
MCW-8	Upper Las Virgenes Creek	N 34°08.989’ W 118°41.892’
MCW-9	Cheeseboro Creek	N 34°09.082’ W 118°44.058’
MCW-10	Palo Comado Creek	N 34°08.585’ W 118°45.468’
MCW-11*	Lower Medea	N 34°06.921’ W 118°45.339’
MCW-12	Upper Medea	N 34°10.230’ W 118°45.765’
MCW-13	Lower Lindero	N 34°08.592’ W 118°45.842’
MCW-14	Upper Lindero	N 34°09.327’ W 118°47.406’
MCW-15	Westlake	N 34°08.346’ W 118°49.168’
MCW-16*	Triunfo	N 34°06.438’ W 118°46.073’
MCW-17	Potrero Canyon	N 34°08.696’ W 118°50.165’
MCW-18	Hidden Valley	N 34°08.474’ W 118°52.673’

*Required by the Malibu Creek and Lagoon Bacteria TMDL (Table 7-10.2 in the TMDL).

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4.0 METHODOLOGY

Monitoring will begin upon execution of the cost-sharing Memorandum of Agreement between the County of Los Angeles and the other participating responsible agencies, with a goal of no later than six months after the Regional Board's approval of this plan. It is estimated that six months will be needed to hire a consultant team to implement this program.

4.1 Sampling Procedure

Sampling will be conducted by qualified professionals with proper training and in accordance with accepted industry protocols. Responsible agencies intend to contract this program's implementation to outside consultant(s). General sampling procedures are described below. Prior to the start of sampling, a detailed sampling protocol and QA/QC procedures will be submitted to the Regional Board.

Weekly sampling will be conducted on Mondays. Grab samples will be collected, placed on ice, and delivered to the lab under chain-of-custody within the six-hour holding time. Each sample will be associated with recorded observations of site conditions, which should minimally include sample ID, collection date and time, weather conditions including rain measurement, estimated flow rate, environmental conditions (presence of wildlife), suspicious discharges, sample characteristics (color and turbidity), and sampler's name.

Sampling should only occur when conditions are safe. The safety of the sample collector is the top priority and should preclude scheduled sampling.

4.2 Analytical Methodology

Marine/brackish samples collected from the Lagoon will be tested for the presence of total coliform, E. coli or fecal coliform, and enterococcus bacteria. Freshwater samples will be tested for the presence of E. coli and fecal coliform. All indicator groups will be quantified from a single sample collected at the designated monitoring site. Necessary dilutions or aliquot volumes will be processed to insure that reportable values can be determined. Bacterial results are reported as organism type per 100 mL of sample. When selecting analytical bacterial methods for TMDL monitoring, the importance of fast turnaround times (24 hours or less) should be emphasized.

For the marine/brackish samples, the IDEXX chromogenic substrate method E. coli result can be converted to fecal coliform using a 1:1 translator. The application of a 1:1 translator was approved by the Regional Board in October 2002 after review of the IDEXX and Membrane Filtration Study conducted by the City of Los Angeles (approval letter dated October 16, 2002, from Dennis Dickerson, Executive Officer).

Prior to the start of sampling, a detailed laboratory protocol and QA/QC procedures will be submitted to the Regional Board for review.

4.3 Data Management

Data collected as result of this monitoring program will be managed entirely by the consultant team conducting the monitoring. Both quantitative and qualitative results will be stored in a database designed in accordance with the State's Surface Water Ambient Monitoring Program data reporting protocols. Data reports will summarize sampling results as well as contain a running tally of the number of exceedances. Monthly data summary reports will be submitted to the Regional Board as well as participating responsible agencies by the last day of each month for data collected during the previous month.

To determine whether a result falls under the dry- or wet-weather category, a rain gage within the Malibu Creek and Lagoon watershed will be used.

4.4 Quality Assurance/Quality Control

If multiple laboratories are used, each will participate in an inter-laboratory calibration program to ensure consistency of results. Laboratories must employ a program that associates quality assurance with the laboratory facility, staff, instrumentation and equipment, materials and methods, media and reagents, and data validation. The quality assurance procedures shall be in accordance with Standard Methods for the Examination of Water and Wastewater, 18-20th Editions (APHA 1992-98). All participating laboratories must maintain ELAP certification.

APPENDIX A

Attachment A to Resolution No. 2004-019R

Proposed Amendment to the Water Quality Control Plan – Los Angeles Region to incorporate the Malibu Creek and Lagoon Bacteria TMDL

Adopted by the California Regional Water Quality Control Board, Los Angeles Region on December 13, 2004

Amendments:

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Chapter 7. Total Maximum Daily Loads (TMDLs)
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Chapter 7. Total Maximum Daily Loads (TMDLs) Summaries, Section 7-10 (Malibu Creek and Lagoon Bacteria TMDL)

This TMDL was adopted by the Regional Water Quality Control Board on December 13, 2004.

This TMDL was approved by:

The State Water Resources Control Board on September 22, 2005.
The Office of Administrative Law on December 1, 2005.
The U.S. Environmental Protection Agency on January 10, 2006.

The following table includes the elements of this TMDL.

Table 7-10.1. Malibu Creek and Lagoon Basins Bacteria TMDL: Elements

Element	Key Findings and Regulatory Provisions
Problem Statement	Elevated bacterial indicator densities are causing impairment of the water contact recreation (REC-1) beneficial use at Malibu Creek, Lagoon, and adjacent beach. Swimming in waters with elevated bacterial indicator densities has long been associated with adverse health effects. Specifically, local and national epidemiological studies compel the conclusion that there is a causal relationship between adverse health effects and recreational water quality, as measured by bacterial indicator densities.
Numeric Target *(Interpretation of the numeric water quality objective, used to calculate the waste load allocations)*	The TMDL has a multi-part numeric target based on the bacteriological water quality objectives for marine and fresh water to protect the water contact recreation use. These targets are the most appropriate indicators of public health risk in recreational waters. These bacteriological objectives are set forth in Chapter 3 of the Basin Plan.[1] The objectives are based on four bacterial indicators and include both geometric mean limits and single sample limits. The Basin Plan objectives that serve as the numeric targets for this TMDL are: In Marine Waters Designated for Water Contact Recreation (REC-1) <u>1. Geometric Mean Limits</u> a. Total coliform density shall not exceed 1,000/100 ml. b. Fecal coliform density shall not exceed 200/100 ml. c. Enterococcus density shall not exceed 35/100 ml. <u>2. Single Sample Limits</u> a. Total coliform density shall not exceed 10,000/100 ml. b. Fecal coliform density shall not exceed 400/100 ml. c. Enterococcus density shall not exceed 104/100 ml. d. Total coliform density shall not exceed 1,000/100 ml, if the ratio of fecal-to-total coliform exceeds 0.1. In Fresh Waters Designated for Water Contact Recreation (REC-1) 1. Geometric Mean Limits a. E. coli density shall not exceed 126/100 ml. b. Fecal coliform density shall not exceed 200/100 ml. 2. Single Sample Limits a. E. coli density shall not exceed 235/100 ml. b. Fecal coliform density shall not exceed 400/100 ml.

[1] The bacteriological objectives were revised by a Basin Plan amendment adopted by the Regional Board on October 25, 2001, and subsequently approved by the State Water Resources Control Board, the Office of Administrative Law and finally by U.S. EPA on September 25, 2002.

Element	Key Findings and Regulatory Provisions
	These objectives are generally based on an acceptable health risk for marine recreational waters of 19 illnesses per 1,000 exposed individuals as set by the US EPA (US EPA, 1986). The targets apply throughout the year. The final compliance point for the targets is the point at which the effluent from a discharge initially mixes with the receiving water. Implementation of the above bacteria objectives and the associated TMDL numeric targets is achieved using a 'reference system/anti-degradation approach' rather than the alternative 'natural sources exclusion approach' or strict application of the single sample objectives. As required by the CWA and Porter-Cologne Water Quality Control Act, Basin Plans include beneficial uses of waters, water quality objectives to protect those uses, an anti-degradation policy, collectively referred to as water quality standards, and other plans and policies necessary to implement water quality standards. The 'reference system/anti-degradation approach' means that on the basis of historical exceedance levels at existing monitoring locations, including a local reference beach within Santa Monica Bay, a certain number of daily exceedances of the single sample bacteria objectives are permitted. The allowable number of exceedance days is set such that (1) bacteriological water quality at any site is at least as good as at a designated reference site within the watershed and (2) there is no degradation of existing bacteriological water quality. This approach recognizes that there are natural sources of bacteria that may cause or contribute to exceedances of the single sample objectives and that it is not the intent of the Regional Board to require treatment or diversion of natural coastal creeks or to require treatment of natural sources of bacteria from undeveloped areas. The geometric mean targets may not be exceeded at any time. The rolling 30-day geometric means will be calculated on each day. If weekly sampling is conducted, the weekly sample result will be assigned to the remaining days of the week in order to calculate the daily rolling 30-day geometric mean. For the single sample targets, each existing monitoring site is assigned an allowable number of exceedance days for three time periods (1) summer dry-weather (April 1 to October 31), (2) winter dry-weather (November 1 to March 31), and (3) wet-weather (defined as days with 0.1 inch of rain or greater and the three days following the rain event.)
Source Analysis	Fecal coliform bacteria may be introduced from a variety of sources including storm water runoff, dry-weather runoff, onsite wastewater treatment systems, and animal wastes. An inventory of possible point and nonpoint sources of fecal coliform bacteria to the waterbody was compiled, and both simple methods and computer modeling were used to estimate bacteria loads for those sources. Source inventories were

Element	Key Findings and Regulatory Provisions
	used in the analysis to identify all potential sources within the Malibu Creek watershed, modeling was used to identify the potential delivery of pathogens into the creeks and the lagoon
Loading Capacity	The loading capacity is defined in terms of bacterial indicator densities, which is the most appropriate for addressing public health risk, and is equivalent to the numeric targets, listed above. As the numeric targets must be met at the point where the effluent from storm drains or other discharge initially mixes with the receiving water throughout the day, no degradation or dilution allowance is provided.
Waste Load Allocations *(for point sources)*	Waste Load Allocations (WLAs) are expressed as the number of daily or weekly sample days that may exceed the single sample limits or 30-day geometric mean limits as identified under "Numeric Target." WLAs are expressed as allowable exceedance days because the bacterial density and frequency of single sample exceedances are the most relevant to public health protection. Zero days of exceedance are allowed for the 30-day geometric mean limits. The allowable days of exceedance for the single sample limits differ depending on season, dry weather or wet-weather, and by sampling locations as described in Table 7-10.2. The allowable number of exceedance days for a monitoring site for each time period is based on the lesser of two criteria (1) exceedance days in the designated reference system and (2) exceedance days based on historical bacteriological data at the monitoring site. This ensures that bacteriological water quality is at least as good as that of a largely undeveloped system and that there is no degradation of existing water quality. However, existing data indicates that the number of exceedance days for all locations assessed in this TMDL were greater than the allowable exceedance days (i.e., number of exceedance days greater than the number at the reference sites). For each monitoring site, allowable exceedance days are set on an annual basis as well as for three time periods. These three periods are: 1. summer dry-weather (April 1 to October 31) 2. winter dry-weather (November 1 to March 31) 3. wet-weather (defined as days of 0.1 inch of rain or more plus three days following the rain event). The responsible jurisdictions and responsible agencies are the County of Los Angeles, County of Ventura, the cities of Malibu, Calabasas, Agoura Hills, Hidden Hills, Simi Valley, Westlake Village, and Thousand Oaks; Caltrans, and the California Department of Parks and Recreation.The responsible jurisdictions and responsible agencies include the permittees and co-permittees of the municipal storm water (MS4) permits for Los Angeles County and Ventura County, and Caltrans. The storm water permittees are individually responsible for the discharges from their municipal separate storm sewer systems to Malibu Creek, Malibu Lagoon or tributaries thereto. The California

Element	Key Findings and Regulatory Provisions
	Department of Parks and Recreation (State Parks), as the owner of the Malibu Lagoon and Malibu Creek State Park, is the responsible agency for these properties. However, since the reference watershed approach used in developing this TMDL is intended to make allowances for natural sources, State Parks is only responsible for: conducting a study of bacteria loadings from birds in the Malibu Lagoon, water quality monitoring, and compliance with load allocations applicable to anthropogenic sources on State Park property (e.g., onsite wastewater treatment systems). The Santa Monica Mountains Conservancy and the National Park Service as the owner of natural parkland also are responsible for water quality monitoring and compliance with load allocations resulting from anthropogenic sources (e.g.,onsite wastewater treatment systems) from lands under their jurisdiction. As discussed in "Source Analysis", discharges from Tapia WWRF and effluent irrigation, and general construction storm water permits are not expected to be a significant source of bacteria. Therefore, the WLAs for these discharges are zero (0) days of allowable exceedances for all three time periods and for the single sample limits and the rolling 30-day geometric mean.
Load Allocations *(for nonpoint sources)*	Load Allocations (LA) are expressed as the number of daily or weekly sample days that may exceed the single sample limits or 30-day geometric mean limits as identified under "Numeric Target." LAs are expressed as allowable exceedance days because the bacterial density and frequency of single sample exceedances are the most relevant to public health protection. Zero days of exceedance are allowed for the 30-day geometric mean limits. The allowable days of exceedance for the single sample limits differ depending on season, dry weather or wet-weather, and by sampling locations as described in Table 7-10.2. The allowable number of exceedance days for a monitoring site for each time period is based on the lesser of two criteria (1) exceedance days in the designated reference system and (2) exceedance days based on historical bacteriological data at the monitoring site. This ensures that bacteriological water quality is at least as good as that of a largely undeveloped system and that there is no degradation of existing water quality. However, existing data indicates that the number of exceedance days for all locations assessed in this TMDL were greater than the allowable exceedance days. For each monitoring site, allowable exceedance days are set on an annual basis as well as for three time periods. These three periods are: 1. summer dry-weather (April 1 to October 31) 2. winter dry-weather (November 1 to March 31) 3. wet-weather (defined as days of 0.1 inch of rain or more plus three days following the rain event).

Element	Key Findings and Regulatory Provisions
	Onsite wastewater treatment systems were identified as the major nonpoint anthropogenic source within the watershed. The responsible agencies are the county and city health departments and/or other local agencies that oversee installation and operation of on-site wastewater treatment systems. However, owners of on-site wastewater treatment systems are responsible for actual discharges.
Implementation	The regulatory mechanisms to implement the TMDL may include, but are not limited to the Los Angeles County Municipal Storm Water NPDES Permit (MS4), Ventura County Municipal Storm Water NPDES Permit, the Caltrans Storm Water Permit, waste discharge requirements (WDRs), MOUs, revised MOUs, general NPDES permits, general industrial storm water permits, general construction storm water permits, and the authority contained in Sections 13225, 13263 and 13267 of the Water Code. Each NPDES permit assigned a WLA shall be reopened or amended at reissuance, in accordance with applicable laws, to incorporate the applicable WLAs as a permit requirement. This TMDL will be implemented in three phases over a ten-year period as outlined in Table 7-10.3. Within three years of the effective date of the TMDL, compliance with the allowable number of summer dry-weather exceedance days and the rolling 30-day geometric mean targets must be achieved. In response to a written request from the responsible jurisdiction or responsible agency subject to conditions described in Table 7-10.3, the Executive Officer of the Regional Board may extend the compliance date for the summer dry-weather allocations from 3 to up to six years from the effective date of this TMDL Within six years of the effective date of the TMDL, compliance with the allowable number of winter dry-weather exceedance days and the rolling 30-day geometric mean targets must be achieved.Within ten years of the effective date of the TMDL, compliance with the allowable number of wet-weather exceedance days and rolling 30-day geometric mean targets must be achieved. To be consistent with the Santa Monica Bay (SMB) Beaches TMDLs, the Regional Board intends to reconsider this TMDL in coordination with the reconsideration of the SMB Beaches TMDLs. The SMB Beaches TMDLs are scheduled to be reviewed in July 2007 (four years from the effective date of the SMB Beaches TMDLs). The review will include a possible revision to the allowable winter dry-weather and wet-weather exceedance days based on additional data on bacterial indicator densities in the wave wash; to re-evaluate the reference system selected to set allowable exceedance levels; and to re-evaluate the reference year used in the calculation of allowable exceedance days. In addition, the method for applying the 30-day geometric mean limit also will be reviewed. The Malibu Creek Bacteria TMDL is scheduled to be reconsidered in three years from the effective date, which is expected to approximately coincide with the reassessment required under the SMB Beaches TMDLs.

Element	Key Findings and Regulatory Provisions
Margin of Safety	A margin of safety has been implicitly included through the following conservative assumptions. • The watershed loadings were based on the 90th percentile year for rain (1993) based on the number of wet weather days. This should provide conservatively high runoff from different land uses for sources of storm water loads • The watershed loadings were also based on a very dry rain year (1994). This ensures compliance with the numeric target during low flows when septic systems and dry urban runoff loads are the major bacterial sources. • The TMDL was based on meeting the fecal 30-day geometric mean target of 200 MPN/ 100 ml, which for these watersheds was estimated to be more stringent level than the allowable exceedance of the single sample standard. This approach also provides assurance that the E. coli single sample standard will not be exceed. • The load reductions established in this TMDL were based on reduction required during the two different critical year conditions. A wet year when storm loads are high, and a more typical dry year when base flows and assimilative capacity is low. This adds a margin of safety for more typical years. In addition, an explicit margin of safety has been incorporated, as the load allocations will allow exceedances of the single sample targets no more than 5% of the time on an annual basis, based on the cumulative allocations proposed for dry and wet weather. Currently, the Regional Board concludes that there is water quality impairment if more than 10% of samples at a site exceed the single sample bacteria objectives annually.
Seasonal Variations and Critical Conditions	Seasonal variations are addressed by developing separate waste load allocations for three time periods (summer dry-weather, winter-dry weather, and wet-weather) based on public health concerns and observed natural background levels of exceedance of bacterial indicators. To establish the critical condition for the wet days, we used rain data from 1993. Based on data from the Regional Board's Santa Monica Bay TMDL this represents the 90th percentile rain year based on rain data from 1947 to 2000. To further evaluate the critical conditions, we modeled a representative dry year. The dry-year critical condition was based on 1994, which was the 50th percentile year in terms of dry weather days for the period of 1947-2000.
Compliance Monitoring	Responsible jurisdictions and agencies shall submit a compliance monitoring plan to the Executive Officer of the Regional Board for approval. The compliance monitoring plan shall specify sampling frequency (daily or weekly) and sampling locations and that will serve

Element	Key Findings and Regulatory Provisions
	as compliance points. This compliance monitoring program is to determine the effectiveness of the TMDL and not to determine compliance with individual load or wasteload allocations for purposes of enforcement. If the number of exceedance days is greater than the allowable number of exceedance days the water body segment shall be considered out-of-compliance with the TMDL. Responsible jurisdictions or agencies shall not be required to initiate an investigation detailed in the next paragraph if a demonstration is made that bacterial sources originating within the jurisdiction of the responsible agency have not caused or contributed to the exceedance. If a single sample shows the discharge or contributing area to be out of compliance, the Regional Board may require, through permit requirements or the authority contained in Water Code section 13267, daily sampling at the downstream location (if it is not already) until all single sample events meet bacteria water quality objectives. Furthermore, if a creek location is out of compliance as determined in the previous paragraph, the Regional Board shall require responsible agencies to initiate an investigation, which at a minimum shall include daily sampling in the target receiving waterbody reach or at the existing monitoring location until all single sample events meet bacteria water quality objectives. The County of Los Angeles, County of Ventura, and municipalities within the Malibu Creek watershed, Caltrans, and the California Department of Parks and Recreation are strongly encouraged to pool efforts and coordinate with other appropriate monitoring agencies in order to meet the challenges posed by this TMDL by developing cooperative compliance monitoring programs.

Note: The complete staff report for the TMDL is available for review upon request.

Table 7-10.2. Malibu Creek and Lagoon Bacteria TMDL: Final Annual Allowable Exceedance Days for Single Sample Limits by Sampling Location

Compliance Deadline		3* years after effective date		6 years after effective date		10 years after effective date	
		Summer Dry Weather ^		Winter Dry Weather ^**		Wet Weather ^**	
		April 1 – October 31		November 1 - March 31		November 1 - October 31	
Station ID	Location Name	Daily sampling (No. days)	Weekly sampling (No. days)	Daily sampling (No. days)	Weekly sampling (No. days)	Daily sampling (No. days)	Weekly sampling (No. days)
LA RWQCB	Triunfo Creek	0	0	3	1	17	3
LA RWQCB	Lower Las Virgenes Creek	0	0	3	1	17	3
LA RWQCB	Lower Medea Creek	0	0	3	1	17	3
LVMWD (R-9)	Upper Malibu Creek, above Las Virgenes Creek	0	0	3	1	17	3
LVMWD (R-2)	Middle Malibu Creek, below Tapia discharge 001	0	0	3	1	17	3
LVMWD (R-3)	Lower Malibu Creek, 3 mi below Tapia	0	0	3	1	17	3
LVMWD (R-4)	Malibu Lagoon, above PCH	0	0	3	1	17	3
LVMWD (R-11)	Malibu Lagoon, below PCH	0	0	3	1	17	3
------	Other sampling stations as identified in the Compliance Monitoring Plan as approved by the Executive Officer including at least one sampling station in each subwatershed, and areas where frequent REC-1 use is known to occur.	0	0	3	1	17	3

Notes: The number of allowable exceedances is based on the lesser of (1) the reference system or (2) existing levels of exceedance based on historical monitoring data.
The allowable number of exceedance days during winter dry-weather is calculated based on the 10th percentile storm year in terms of dry days at the LAX meteorological station
The allowable number of exceedance days during wet-weather is calculated based on the 90th percentile storm year in terms of wet days at the LAX meteorological station.
^ A dry day is defined as a non-wet day. A wet day is defined as a day with a 0.1-inch or more of rain and the three days following the rain event.
* The compliance date may be extended by the Executive Officer to up to 6 years from the effective date.
* *A revision of the TMDL is scheduled for four years after the effective date of the Santa Monica Bay Beaches TMDLs in order to re-evaluate the allowable exceedance days during winter dry-weather and wet-weather based on additional monitoring data and the results of the study of relative loading from storm drains versus birds.

Table 7-10.3. Malibu Creek and Lagoon Bacteria TMDL: Significant Dates

Date	Action
120 days after the effective date of this TMDL	Responsible jurisdictions and responsible agencies must submit a comprehensive bacteria water quality monitoring plan for the Malibu Creek Watershed to the Executive Officer of the Regional Board. The plan must be approved by the Executive Officer before the monitoring data can be considered during the implementation of the TMDL. In developing the 13267 order, the EO will consider costs in relation to the need for data. With respect to benefits to be gained, the TMDL staff report demonstrates the significant impairment and bacteria loading. Further documenting success or failure in achieving waste load allocations will benefit the responsible agencies and all recreational water users. The purpose of the plan is to better characterize existing water quality as compared to water quality at the reference watershed,- and ultimately, to serve as a compliance monitoring plan. The plan must provide for analyses of all applicable bacteria indicators for which the Basin Plan has established objectives including E. coli. For fresh water and enterococcus for marine water. The plan must also include sampling locations that are specified in Table 7-10.2, at least one location in each subwatershed, and areas where frequent REC-1 use is known to occur. However, this is not to imply that a mixing zone has been applied; water quality objectives apply throughout the watershed—not just at the sampling locations.
1 year after effective date of this TMDL	1. Responsible jurisdictions and responsible agencies shall provide a written report to the Regional Board outlining how each intends to cooperatively achieve compliance with the TMDL. The report shall include implementation methods, an implementation schedule, and proposed milestones. Specifically, the plan must include a comprehensive description of all steps to be taken to meet the 3-year summer dry weather compliance schedule, including but not limited to a detailed timeline for all category of bacteria sources under their jurisdictions including but not limited to nuisance flows, urban stormwater, on-site wastewater treatment systems, runoff from homeless encampments, horse facilities, and agricultural runoff. 2. If the responsible jurisdiction or agency is requesting an extension of the summer dry-weather compliance schedule, the plan must include a description of all local ordinances necessary to implement the detailed workplan and assurances that such ordinances have been adopted before the request for an extension is granted. 3. Local agencies regulating on-site wastewater treatment systems shall provide a written report to the Regional Board's Executive Officer detailing the rationale and criteria used to identify high-risk areas where on-site systems have a potential to impact surface waters in the Malibu Creek watershed. Local agencies may use the approaches outlined below in (a) and (b), or an alternative approach as approved

Date	Action
	by the Executive Officer. (a) Responsible agencies may screen for high-risk areas by establishing a monitoring program to determine if discharges from OWTS have impacted or are impacting water quality in Malibu Creek and/or its tributaries. A surface water monitoring program demonstration must include monitoring locations upstream and downstream of the discharge, as well as a location at mid-stream (or at the approximate point of discharge to the surface water) of single or clustered OWTS. Surface water sampling frequency will be weekly for bacteria indicators and monthly for nutrients. A successful demonstration will show no statistically significant increase in bacteria levels in the downstream sampling location(s). (b) Responsible agencies may define the boundaries of high-risk or contributing areas or identify individual OWTS that are contributing to bacteria water quality impairments through groundwater monitoring or through hydrogeologic modeling as described below: (1) Groundwater monitoring must include monitoring in a well no greater than 50-feet hydraulically downgradient from the furthermost extent of the disposal area, or property line of the discharger, whichever is less. At a minimum, sampling frequency for groundwater monitoring will be quarterly. The number, location and construction details of all monitoring wells are subject to approval of the Executive Officer. (2) Responsible agencies may use a risk assessment approach, which uses hydrogeologic modeling to define the boundaries of the high-risk and contributing areas. A workplan for the risk assessment study must be approved by the Executive Officer of the Regional Board. 4. OWTS located in high-risk areas are subject to system upgrades as necessary to demonstrate compliance with applicable effluent limits and/or receiving water objectives. 5. If a responsible jurisdiction or agency is requesting an extension to the wet-weather compliance schedule, the plan must include a description of the integrated water resources (IRP) approach to be implemented, identification of potential markets for water re-use, an estimate of the percentage of collected stormwater that can be re-used, identification of new local ordinances that will be required, a description of new infrastructure required, a list of potential adverse environmental impacts that may result from the IRP, and a workplan and schedule with significant milestones identified. Compliance with the wet-weather allocations

Date	Action
	shall be as soon as possible but under no circumstances shall it exceed 10 years for non-integrated approaches or extend beyond July 15, 2021 for an integrated approach. The Regional Board staff will bring to the Regional Board the aforementioned plans for consideration of extension of the wet-weather compliance date as soon as possible.
2 years after the effective date of this TMDL	The California Department of Parks and Recreation shall provide the Regional Board Executive Officer, a report quantifying the bacteria loading from birds to the Malibu Lagoon. The Regional Board's Executive Officer shall require the responsible jurisdictions and responsible agencies to provide the Regional Board with a reference watershed study. The study shall be designed to collect sufficient information to establish a defensible reference condition for the Malibu Creek and Lagoon watershed.
3 years after effective date of this TMDL** ** May be extended to up to 6 years from the effective date of this TMDL	Achieve compliance with the applicable Load Allocations and Waste Load Allocations, as expressed in terms of allowable days of exceedances of the single sample bacteria limits and the 30-day geometric mean limit during summer dry-weather (April 1 to October 31). In response to a written request from a responsible jurisdiction or responsible agency, the Executive Officer of the Regional Board may extend the compliance date for the summer dry-weather allocations from 3 years to up to 6 years from the effective date of this TMDL. The Executive Officer's decision to extend the summer dry-weather compliance date must be based on supporting documentation to justify the extension, including a detailed work plan, budget and contractual or other commitments by the responsible jurisdiction or responsible agency.
3 years after effective date of this TMDL	The Regional Board shall reconsider this TMDL to: (1) Consider a natural source exclusion for bacteria loadings from birds in the Malibu Lagoon if all anthropogenic sources to the Lagoon have been controlled. (2) Reassess the allowable winter dry-weather and wet-weather exceedances days based on additional data on bacterial indicator densities, and an evaluation of site-specific variability in exceedance levels to determine whether existing water quality is better than water quality at the reference watershed, (3) Reassess the allowable winter dry-weather and wet-weather exceedance days based on a re-evaluation of the selected

Date	Action
	reference watershed and consideration of other reference watersheds that may better represent reaches of the Malibu Creek and Lagoon. (4) Consider whether the allowable winter dry-weather and wet-weather exceedance days should be adjusted annually dependent on the rainfall conditions and an evaluation of natural variability in exceedance levels in the reference system(s), (5) Re-evaluate the reference year used in the calculation of allowable exceedance days, and (6) Re-evaluate whether there is a need for further clarification or revision of the geometric mean implementation provision.
6 years after the effective date of this TMDL	Achieve compliance with the applicable Load Allocations and Waste Load Allocations, expressed as allowable exceedance days during winter dry weather (November 1-March 31) single sample limits and the rolling 30-day geometric mean limit.
10 years after the effective date of this TMDL ** May be extended up to July 15, 2021.	Achieve compliance with the wet-weather Load Allocations and Waste Load Allocations (expressed as allowable exceedance days for wet weather and compliance with the rolling 30-day geometric mean limit.) The Regional Board may extend the wet-weather compliance date up to July 15, 2021 at the Regional Board's discretion, by adopting a subsequent Basin Plan amendment that complies with applicable law.

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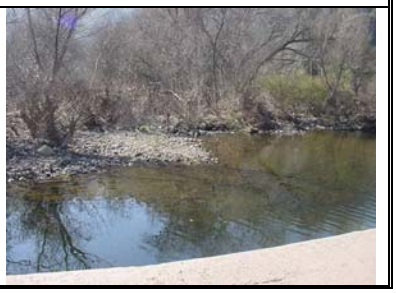
APPENDIX B

Site Id: MCW-1		
Historical Site Id: LVMWD (R-11)	**Subwatershed:** Malibu Lagoon (below PCH)	**Coordinates: N** 34°02.069' **W** 118°40.969'
Comments: This site is located below the bridge on PCH near Cross Creek Road. *LVMWD is the sampling entity & will continue to monitor at this location monthly. *Required by the TMDL.		

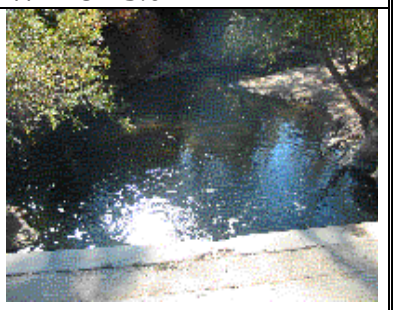
Site Id: MCW-2		
Historical Site Id: LVMWD (R-3)	**Subwatershed:** Lower Malibu Creek	**Coordinates: N** 34°02.825' **W** 118°41.371'
Comments: Inside Serra Canyon Community at 23500 Palm Canyon. This site is located 3 miles below Tapia. This site is accessed through a private community off of PCH called Serra. *LVMWD is the sampling entity & will continue to monitor at this location monthly. *Required by the TMDL.		

Site Id: MCW-3		
Historical Site Id: LVMWD (R-2)	**Subwatershed:** Middle Malibu Creek	**Coordinates: N** 34°04.654' **W** 118°42.105'
Comments: This site is located off of Malibu Canyon Road below Tapia discharge 001. *LVMWD is the sampling entity & will continue to monitor at this location monthly. *Required by the TMDL.		

Site Id: MCW-4		
Historical Site Id: LVMWD (R-9)	**Subwatershed:** Upper Malibu Creek	**Coordinates: N** 34°06.001' **W** 118°43.364'
Comments: This site is located at Malibu Creek in L.A. County unincorporated area above the confluence with Las Virgenes Creek. *LVMWD is the sampling entity & will continue to monitor at this location monthly. *Required by the TMDL.		

Site Id: MCW-5		
Historical Site Id: CC	**Subwatershed:** Cold Creek	**Coordinates: N** 34°04.739' **W** 118°41.996'
Comments: From 101 Freeway, go south on Las Virgenes Road. Make a left on Piuma Road. Off of Piuma Road, between Crater Camp Drive and Live Oak Circle Drive. There is a dead tree that has a cat carved into it which is across the street from the site. *The City of Calabasas is the sampling entity. Sampling frequency is not known at this time.		

Site Id: MCW-6		
Historical Site Id: New Site	**Subwatershed:** Stokes Creek	**Coordinates: N** 34°05.889' W 118°42.748'
Comments: This site is located in Malibu Creek State Park. Once you enter Malibu Creek State Park from the Las Virgenes Road entrance, pass the booth and make an immediate left onto the gravel road. Continue down the road until you reach the tan and green building. Access to the creek is located behind the tan and green building.		

Site Id: MCW-7		
Historical Site Id: Heal the Bay site #5	**Subwatershed:** Lower Las Virgenes Creek	**Coordinates: N** 34°05.769' **W** 118°43.072'
Comments: This site is located in Malibu Creek State Park. It is off a bridge near the Las Virgenes Road entrance. Site is located directly above area that is used for recreation so the results aren't skewed by contributions of bacteria from recreational users. *The RWQCB and Heal the Bay are the sampling entities. Sampling frequency is not known at this time. *Required by the TMDL.		

Site Id: MCW-8		
Historical Site Id: New Site	**Subwatershed:** Upper Las Virgenes Creek	**Coordinates: N** 34°08.989' **W** 118°41.892'
Comments: Northwest side at intersection of Las Virgenes Road and the 101 Freeway. Park at the Fire Station. The site access is located adjacent to the north-bound freeway on-ramp.		

Site Id: MCW-9		
Historical Site Id: New Site	**Subwatershed:** Chesebro Canyon	**Coordinates: N** 34°09.082' **W** 118°44.058'
Comments: This site is located in Los Angeles County unincorporated. From the 101 Freeway exit Cheseboro and go north on Palo Comado Canyon Road. Make a right onto Chesebro Road and continue until you reach a small bridge. Chesebro Creek is to the right side of the bridge and Palo Comado Canyon Creek is to the left side. There is a low wooden fence to climb over to access the site.		

Site Id: MCW-10		
Historical Site Id: Site #3	**Subwatershed:** Palo Comado	**Coordinates: N** 34°08.585' **W** 118°45.468'
Comments: From the 101 Freeway, exit Kanan Road and go south. Make a left onto Agoura Road and enter the Los Angeles County yard (on your right side). *LACDPW was the sampling entity. Sampling at this site has concluded		

Site Id: MCW-11		
Historical Site Id: Med2	**Subwatershed:** Lower Medea	**Coordinates: N** 34°06.921' **W** 118°45.339'
Comments: This site is situated in Paramount Ranch (Santa Monica Mountains National Recreation Area) at the Cornell Road entrance at the bridge at the edge of the parking lot. *The RWQCB and the City of Calabasas is the sampling entity. Sampling frequency is not known at this time. *Required by the TMDL.		

Site Id: MCW-12		
Historical Site Id: Med1	**Subwatershed:** Upper Medea	**Coordinates: N** 34°10.230' **W** 118°45.765'
Comments: From the 101 Freeway, exit Kanan Road and go north. Turn left onto Conifer Street. Sampling location is south of metal culvert on left hand side. *LACDPW and the City of Calabasas were the sampling entities. Sampling at this site has concluded..		

Site Id: MCW-13		
Historical Site Id: Site #5	**Subwatershed:** Lower Lindero	**Coordinates: N** 34°08.592' **W** 118°45.842'
Comments: Downstream of Lindero Lake at the end of an underground concrete culvert on the south side of Agoura Road west of Kanan Road. It outlets to a scour pond of concrete riprap leading to a natural channel. *LACDPW was the sampling entity. Sampling at this site has concluded..		

Site Id: MCW-14		
Historical Site Id: Lin1	**Subwatershed:** Upper Lindero	**Coordinates: N** 34°09.327' **W** 118°47.406'
Comments: This site is located in the City of Westlake Village. From the 101 Freeway, exit Lindero Canyon Road, go north onto Lindero Canyon Road. Make a right onto Thousand Oaks Blvd. The site is located on the left side of Thousand Oaks Blvd between Portola Center Drive and Lake Lindero Drive (at country club/golf course). Flow from this Lake Lindero Country Club site drains into Lake Lindero, which sits at the bottom of the watershed. *The City of Calabasas is the sampling entity. Sampling frequency is not known at this time.		

Site Id: MCW-15		
Historical Site Id: RUS	**Subwatershed:** Westlake (Russel Creek)	**Coordinates: N** 34°08.346' **W** 118°49.168'
Comments: Site is located above reaching Westlake. From the 101 Freeway, exit Lindero Canyon Road and go south. Make a left onto Lakeview Canyon Road. Enter the flood access road at the corner of Lindero Canyon Road and Lakeview Canyon Road. Park next to Los Angeles County Fire Station 144. *The City of Calabasas is the sampling entity. Sampling frequency is not known at this time.		No available photograph at this time.

Site Id: MCW-16		
Historical Site Id: TRI	**Subwatershed:** Triunfo Creek	**Coordinates: N** 34°06.438' **W** 118°46.073'
Comments: Triunfo Creek before it feeds into Malibou Lake. From the 101 Freeway, exit Kanan Road and go south on Kanan Road. Make a left on Troutdale Drive. Make a left onto Mulholland Hwy, then make a right on Lake Vista Drive. Make a right into Green Willow Ranch and stop at the bridge. *The RWQCB and the City of Calabasas are the sampling entities. Sampling frequency is not known at this time. *Required by the TMDL		

Site Id: MCW-17		
Historical Site Id: POT	**Subwatershed:** Potrero Canyon Creek	**Coordinates: N** 34°08.696' **W** 118°50.165'
Comments: From the 101 Freeway, exit Westlake Blvd/23 and go south, make a left on Triunfo Canyon Road. Cross over a bridge and make an immediate right on Glastonbury Road and go about 100 feet (across from Hillsbury Road) to the access road. Need to obtain the flood control access road key from Ventura County Flood Control District: (805) 654-5000.		

Site Id: MCW-18		
Historical Site Id: New Site	**Subwatershed:** Hidden Valley Creek	**Coordinates: N** 34°08.474' **W** 118°52.673'
Comments: North of "Ventura Farms, Arabian Division" at 235 Stafford Road" and Lake Sherwood. Likely to be dry during the summer. This site is located in Ventura County.