

Attachment C to Resolution No. R21-001

Amendment to the Water Quality Control Plan for the Los Angeles Region to Revise the Maximum Daily Load for Bacteria in the Malibu Creek Watershed

Adopted by the California Regional Water Quality Control Board, Los Angeles Region on June 7, 2012.

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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 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.

This TMDL was revised by:

The Regional Board on June 7, 2012.

This revised TMDL was approved by:

The State Water Resources Control Board on March 19, 2013.
The Office of Administrative Law on November 8, 2013.

The U.S. Environmental Protection Agency on July 2, 2014.

This TMDL was revised by:

The Regional Board on March 11, 2021.

This revised TMDL was approved by:

The State Water Resources Control Board on [date].

The Office of Administrative Law on [date].

The U.S. Environmental Protection Agency on [date].

The following table includes the elements of this TMDL

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

TMDL Element	Key Findings and Regulatory Provisions
<i>Problem Statement</i>	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.
<i>Numeric Target</i> <i>(Interpretation of the numeric water quality objective, used to calculate the waste load allocations)</i>	<p>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.</p> <p>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:</p> <p>In Marine Waters Designated for Water Contact Recreation (REC-1)</p> <p><u>1. Geometric Mean Limits</u></p> <p>a. Total coliform density shall not exceed 1,000/100 ml.</p> <p>b. Fecal coliform density shall not exceed 200/100 ml.</p> <p>c. <i>Enterococcus</i> density shall not exceed 35/100 ml.</p>

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. The bacteriological objectives for freshwater were revised a second time by a Basin Plan amendment adopted by the Regional Board on July 8, 2010, and subsequently approved by the State Water Resources Control Board, the Office of Administrative Law and finally by U.S. EPA on December 5, 2011.

TMDL Element	Key Findings and Regulatory Provisions
<p>Numeric Target <i>(Interpretation of the numeric water quality objective, used to calculate the waste load allocations)</i> <i>(continued)</i></p>	<p>2. <u>Single Sample Limits</u></p> <p>a. Total coliform density shall not exceed 10,000/100 ml.</p> <p>b. Fecal coliform density shall not exceed 400/100 ml.</p> <p>c. <i>Enterococcus</i> density shall not exceed 104/100 ml.</p> <p>d. Total coliform density shall not exceed 1,000/100 ml, if the ratio of fecal-to-total coliform exceeds 0.1.</p> <p>In Fresh Waters Designated for Water Contact Recreation (REC-1)</p> <p>1. Geometric Mean Limits</p> <p>a. <i>E. coli</i> density shall not exceed 126/100 ml.</p> <p>2. Single Sample Limits</p> <p>a. <i>E. coli</i> density shall not exceed 235/100 ml.</p> <p>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).</p> <p>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.</p> <p>In this TMDL, 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 federal Clean Water Act and California Water Code, 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. This TMDL uses a "reference system/anti-degradation approach" to implement the water quality objectives per the implementation provisions in Chapter 3. On the basis of the historical exceedance frequency at Southern California reference reaches, a certain number of daily exceedances of the single sample bacteria objectives are permitted. The geometric mean targets may not be exceeded at any time. For the purposes of this TMDL, the geometric means shall be calculated weekly as a rolling geometric mean using 5 or more samples, for six week periods starting all calculation weeks on Sunday. For the single sample targets, each existing monitoring site in Malibu Creek and its tributaries is assigned an allowable number of exceedance days for two time periods (1) dry-weather, and (2) wet-weather (defined as days with 0.1 inch of rain or greater and the three days following the rain event.) Each monitoring site in Malibu Lagoon 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.)</p>

TMDL Element	Key Findings and Regulatory Provisions
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 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 <i>(for point sources)</i>	<p>Waste Load Allocations (WLAs) assigned to municipal separate storm sewer system discharges are expressed as the number of daily or weekly sample days that may exceed the single sample limits or 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.</p> <p>No exceedances are allowed for the 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.</p> <p>For each monitoring site in Malibu Creek and its tributaries, allowable exceedance days are set on an annual basis as well as for two time periods.</p> <p>These two periods are:</p> <ol style="list-style-type: none"> 1. dry-weather 2. wet-weather (defined as days of 0.1 inch of rain or more plus three days following the rain event). <p>For each monitoring site in Malibu Lagoon, allowable exceedance days are set on an annual basis as well as for three time periods. These three periods are:</p> <ol style="list-style-type: none"> 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).

TMDL Element	Key Findings and Regulatory Provisions
<p>Waste Load Allocations (for point sources) (continued)</p>	<p>The responsible jurisdictions and responsible agencies are the permittees and co-permittees regulated under municipal separate storm sewer system (MS4) permits including the County of Los Angeles, Los Angeles County Flood Control District, County of Ventura, Ventura County Watershed Protection District, the cities of Malibu, Calabasas, Agoura Hills, Hidden Hills, 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 MS4 permits for Los Angeles County and Ventura County, and Caltrans and any future Phase II MS4 permits. 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 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.</p> <p>The Tapia Water Reclamation Facility (TWRf) discharging to Malibu Creek is given individual WLAs equal to the bacteriological objectives contained in Chapter 3 during dry weather and wet weather.</p> <p>Discharges from general NPDES permits, general industrial storm water permits and general construction storm water permits are not expected to be a significant source of bacteria. Additionally, these discharges are not eligible for the reference system approach set forth in the implementation provisions for the bacteriological objectives in Chapter 3. Therefore, the waste load allocations for these discharges for all time periods are the bacteriological objectives contained in Chapter 3. Any future enrollees under a general NPDES permit, general industrial storm water permit or general construction storm water permit within the Malibu Creek watershed management area will also be subject to a WLA based on these bacteriological objectives.</p>

<p>Load Allocations (for nonpoint sources)</p>	<p>Load Allocations (LA) are expressed as the number of daily or weekly sample days that may exceed the single sample limits or 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.</p> <p>No exceedances are allowed for the 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.</p> <p>For each monitoring site in Malibu Creek and its tributaries, allowable exceedance days are set on an annual basis as well as for two time periods. These two periods are:</p> <ol style="list-style-type: none"> 1. dry-weather 2. wet-weather (defined as days of 0.1 inch of rain or more plus three days following the rain event). <p>For each monitoring site in Malibu Lagoon, allowable exceedance days are set on an annual basis as well as for three time periods. These three periods are:</p> <ol style="list-style-type: none"> 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). <p>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.</p>
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TMDL Element	Key Findings and Regulatory Provisions
Implementation	<p>The regulatory mechanisms to implement the TMDL may include, but are not limited to the Los Angeles County MS4 NPDES Permit, Ventura County MS4 NPDES Permit, the Caltrans Storm Water Permit, any future Phase II MS4 permits, waste discharge requirements (WDRs), Memorandum of Understandings (MOUs), revised MOUs, or other appropriate mechanisms consistent with the Nonpoint Source Implementation and Enforcement Policy, general NPDES permits, general industrial storm water permits, general construction storm water permits, the authority contained in Sections 13225, 13263, 13267, and 13383 of the California Water Code, and other appropriate regulatory mechanisms. 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 two phases as outlined in Table 7-10.3. By January 24, 2012, compliance with the allowable number of dry-weather exceedance days must be achieved. By July 15, 2026, compliance with the allowable number of wet-weather exceedance days and the geometric mean targets must be achieved.</p>
Margin of Safety	<p>A margin of safety has been implicitly included through the following conservative assumptions.</p> <ul style="list-style-type: none"> • 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 coliform 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 <i>E. coli</i> single sample standard will not be exceeded. • 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. <p>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.</p>

TMDL Element	Key Findings and Regulatory Provisions
<p><i>Seasonal Variations and Critical Conditions</i></p>	<p>Seasonal variations are addressed by developing separate waste load allocations for two time periods (dry-weather, and wet-weather) in Malibu Creek and its tributaries, and three time periods (summer dry-weather, winter dry-weather, and wet weather) in Malibu Lagoon based on public health concerns and observed natural background levels of exceedance of bacterial indicators.</p> <p>The critical condition for this bacteria TMDL is wet weather generally, when data for the reference system indicate that the single sample bacteria objectives are exceeded on 19% of the wet-weather days sampled in Malibu Creek and its tributaries and on 22% of the wet-weather days sampled in Malibu Lagoon. To more specifically identify a critical condition within wet weather in order to set the allowable exceedance days, the 90th percentile 'storm year'² in terms of wet days is used as the reference year. The number of wet-weather days in the 1993 reference year was 75 days, and the number of dry-weather days was 290 days (210 summer dry-weather days and 80 winter dry-weather days).</p>
<p><i>Compliance Monitoring</i></p>	<p>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 as compliance points. Responsible jurisdictions and agencies shall submit an outfall monitoring plan within 6 months of the effective date of the TMDL revised by Resolution R12-009. The outfall monitoring plan shall propose an adequate number of representative outfalls to be sampled, a sampling frequency, and protocol for enhanced outfall monitoring as a result of an in-stream exceedance. Responsible jurisdictions and agencies can use existing outfall monitoring stations in the MS4 permit, where appropriate for both the permit and TMDL objectives.</p> <p>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 deemed non-attaining if the outfall monitoring described in the paragraph above demonstrates that bacterial sources originating within the jurisdiction of the responsible agency have not caused or contributed to the exceedance.</p> <p>The County of Los Angeles, Los Angeles County Flood Control District, County of Ventura, Ventura County Watershed Protection District, 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.</p>

²For purposes of this TMDL, a 'storm year' means November 1 to October 31. The 90th percentile storm year was 1993 with 75 wet days at the LAX meteorological station.

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

Compliance Deadline		January 24, 2012		July 15, 2026	
Station ID	Location Name	Dry Weather ^		Wet Weather ^	
		Daily sampling (No. days)	Weekly sampling (No. days)	Daily sampling (No. days)	Weekly sampling (No. days)
LA RWQCB	Triunfo Creek	5	1	15	2
LA RWQCB	Lower Las Virgenes Creek	5	1	15	2
LA RWQCB	Lower Medea Creek	5	1	15	2
LVMWD (R-9)	Upper Malibu Creek, above Las Virgenes Creek	5	1	15	2
LVMWD (R-2)	Middle Malibu Creek, below Tapia discharge 001	5	1	15	2
LVMWD (R-3)	Lower Malibu Creek, 3 mi below Tapia	5	1	15	2
LVMWD (R-4)	Malibu Lagoon, above PCH	5	1	15	2
LVMWD (R-11)	Malibu Lagoon, below PCH	9*	2*	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.	5	1	15	2

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 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 number of allowable exceedance days is for the winter dry-weather period. No exceedance days are allowed for the summer dry-weather period.

Date	Action
(continued)	<p>(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).</p> <p>(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:</p> <p>(1) Groundwater monitoring must include monitoring in a well no greater than 50-feet hydraulically downgradient from the furthest 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.</p> <p>(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.</p> <p>3. 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.</p>

Date	Action
January 24, 2008	<p>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.</p> <p>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.</p>
January 24, 2012	Achieve compliance with the applicable Load Allocations and Waste Load Allocations, expressed as allowable exceedance days during dry weather.
July 15, 2018	The Regional Board shall reconsider the TMDL.
July 15, 2021	Achieve compliance with the wet-weather Load Allocations (expressed as allowable exceedance days for wet weather) and compliance with the geometric mean limit.
July 15, 2026	Achieve compliance with the wet-weather Waste Load Allocations (expressed as allowable exceedance days for wet weather) and compliance with the geometric mean limit.