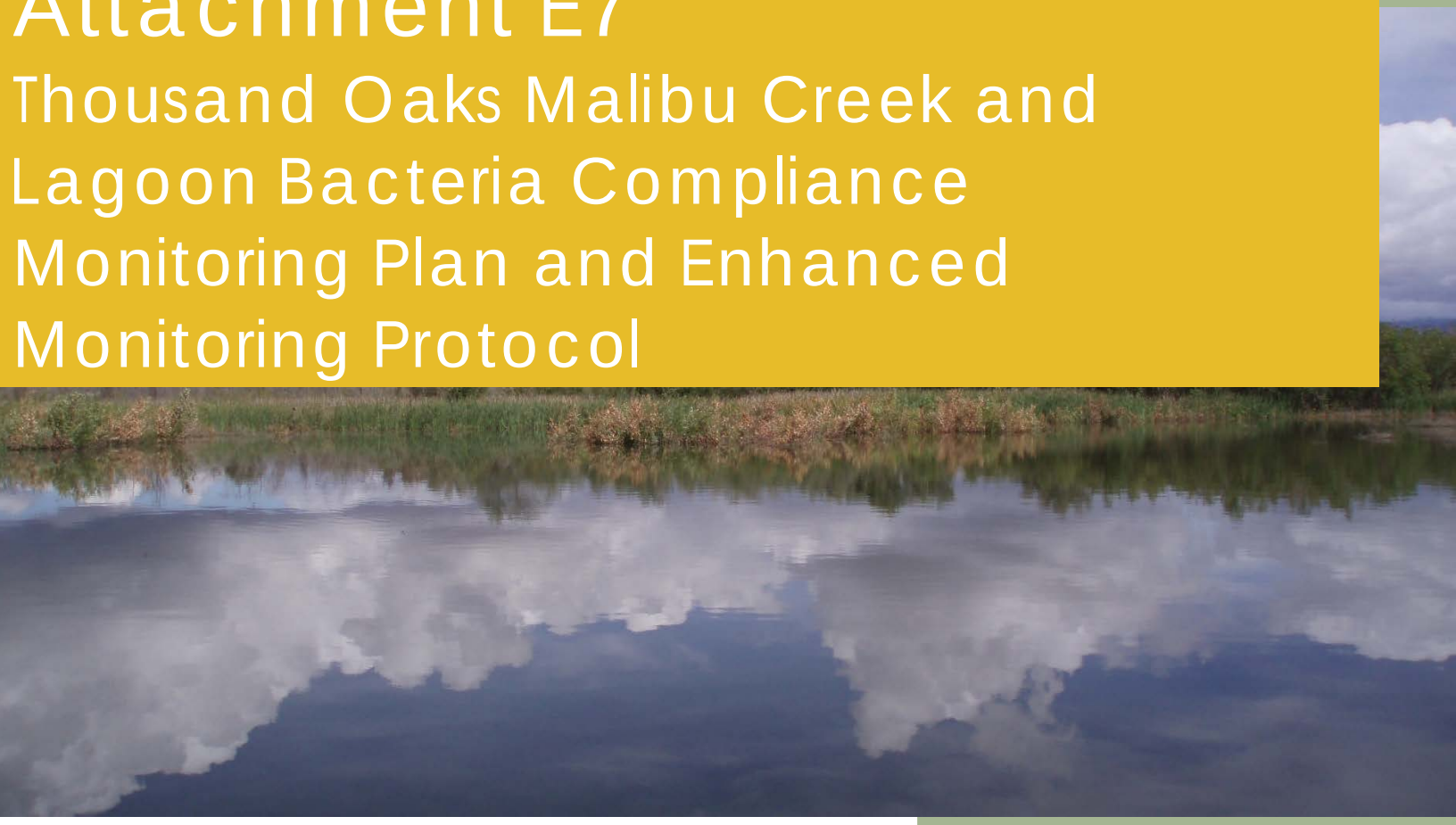
Ventura Countywide Stormwater Quality Management Program

2014-2015 Permit Year

Ventura Countywide Stormwater Quality Management Program Annual Report

Attachment E7

Thousand Oaks Malibu Creek and Lagoon Bacteria Compliance Monitoring Plan and Enhanced Monitoring Protocol



Camarillo
County of Ventura
Fillmore
Moorpark
Ojai
Oxnard
Port Hueneme
Santa Paula
Simi Valley
Thousand Oaks
Ventura
Ventura County Watershed Protection District

December 14, 2015

Malibu Creek and Lagoon Bacteria TMDL Compliance Monitoring Plan and Enhanced Monitoring Protocol

City of Thousand Oaks

SUBMITTED BY THE CITY OF THOUSAND OAKS

December 23, 2014

Table of Contents

Figures

Table of Contents (continued)

Tables

Appendix

Malibu Creek and Lagoon Bacteria TMDL Compliance Monitoring Plan and Enhanced Monitoring Protocol

Introduction

The first section of this plan recommends a compliance monitoring plan that will be followed to demonstrate routine compliance with REC-1 water quality objectives for bacteria in tributaries to Malibu Creek that are in the City of Thousand Oaks. The second part of this plan will outline a protocol for monitoring in the event that one or more sample points are found to not meet the REC-1 Waste Load Allocation for dry-weather conditions. This latter addition satisfies the requirement in Resolution No. R12-009 of the Malibu Creek and Lagoon Bacteria Total Mass Daily Loading that responsible parties submit a compliance monitoring plan with an enhanced outfall monitoring protocol to address REC-1 exceedances. This plan is being submitted on behalf of the City of Thousand Oaks.

The current receiving water sampling sites for Thousand Oaks designated as SP 14B, SP 15C and SP 17 are representative of subcatchment drainages and provide good locations to demonstrate the bacteriological safety of waters where recreational contact could occur. Weekly sampling has also been an adequate frequency to examine trends and levels of indicator bacteria. Therefore, general compliance monitoring to meet requirements of the Malibu Creek and Lagoon (MC&L) Bacteria TMDL will continue as specified in the Malibu Creek and Lagoon Bacteria TMDL Compliance Monitoring Plan (Appendix A).

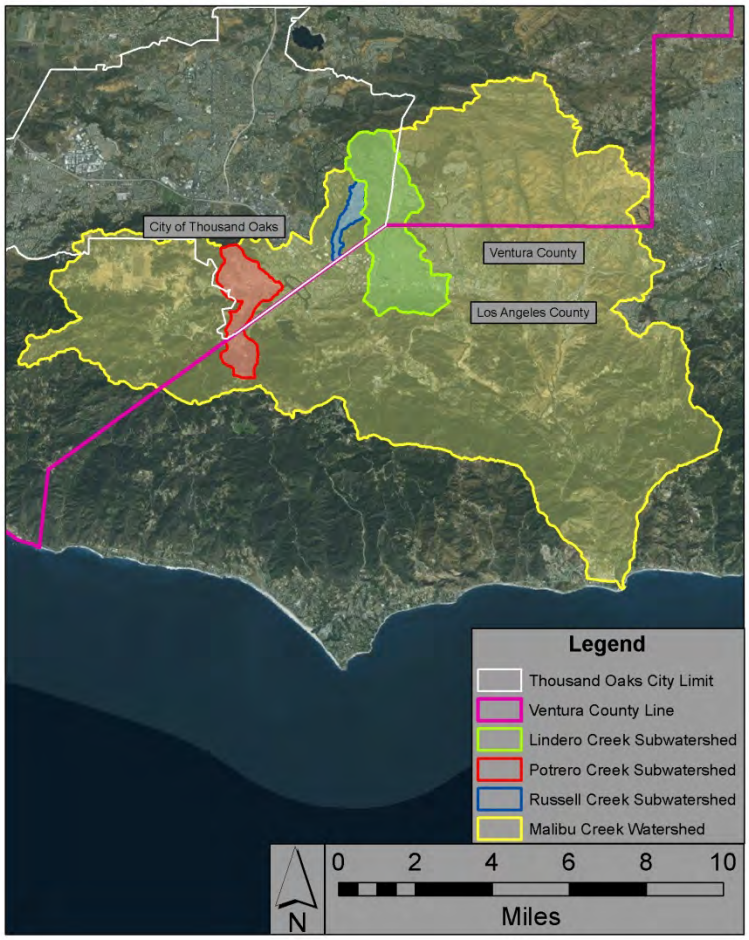
Note that this compliance monitoring plan has been updated by the inclusion of resolution R12-009 to incorporate the latest requirements of the MC&L Bacteria TMDL. A second modification to the plan is a proposal to move existing sample points 14B and 15C so that they reside within the jurisdiction whose water quality is being measured. This change will make discharge sources to a sample point vulnerable to legal remedies of the agency responsible for compliance at that sample point. These recommended location changes are shown in Figures 7 and 8.

This plan will concern itself primarily with dry weather conditions because it is the water quality standard that will be in effect until 2021. However, recommended sample locations will add information that may be useful for wet-weather modeling and determining indicator bacteria sources that are unavailable because of absent flow during dry weather.

Background

There are three catchments in the City of Thousand Oaks that contribute storm water runoff, baseflow, and nuisance runoff to the larger Malibu Creek Watershed (MCW). Accordingly, they will be referred to as subcatchments. Lindero Creek, Russell Creek, and Portrero Creek subcatchments within the Thousand Oaks jurisdiction make up 4.47% of the MCW as shown in Figure 1.

Figure 1. Thousand Oaks' Subcatchments in Relation to the MCW



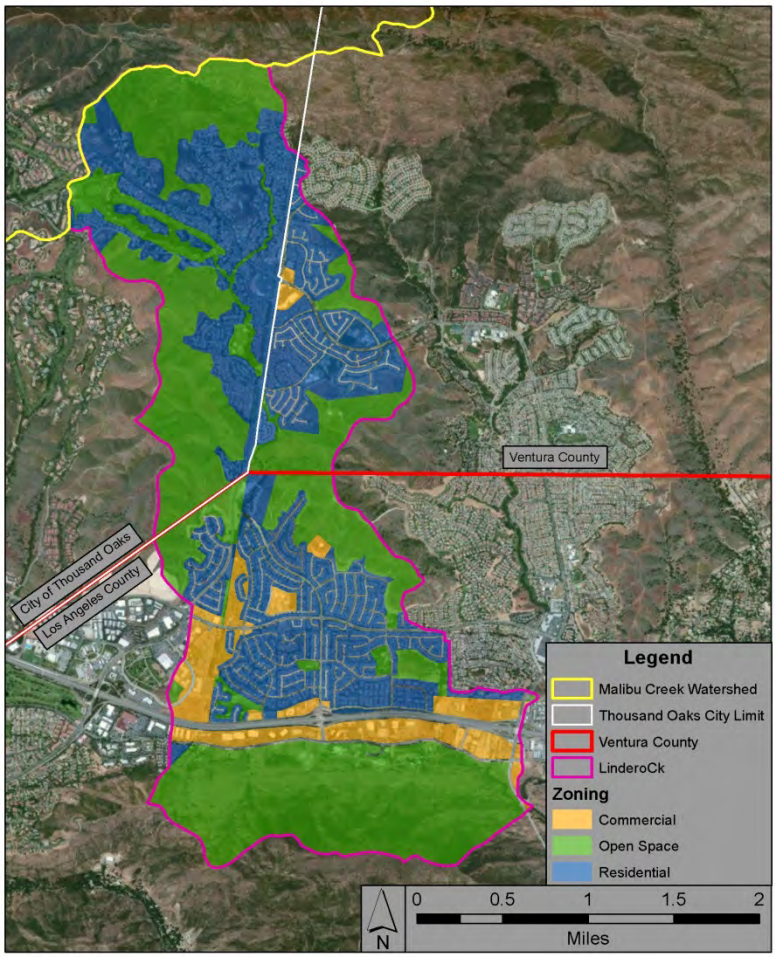
Tributaries in these subcatchments are subject to the MC&L Bacteria TMDL. Despite not having many of the usual human associated urban/agricultural bacterial inputs such as grazing animals, on-site wastewater treatment systems (OWTS), commercial food preparation facilities, or homeless encampments, monitoring data have shown that sample points for Lindero and Russell Creeks (SP 14B and 15C, respectively) do not consistently attain water quality objectives for bacterial indicators. Neither have the addition of Best Management Practices (BMPs) such as dog waste collection bag stations and outreach and education been successful thus far at reducing levels. Sample point 17, because of rarity of flow, cannot at present be realistically described as not attaining compliance for recreational use. Consequently, resources will be temporarily focused on reducing bacterial loading received at relocated sample points SP 15B and 14C, or until at least until 5-consecutive weekly samples can be obtained to determine compliance at SP 17.

Characterization of Subcatchments in Thousand Oaks

Lindero Creek

At its upper headwater, Reach 2 of Lindero Creek has areas of water table exfiltration that sustain low level flow in the summer. Before crossing the city boundary at Lindero Canyon Road, however, the flow can be lost by infiltration into the creek bed soils. Despite this intermittent connection with the continuous creek flow, there is still flow from Thousand Oaks to sample point 14B: Dry-weather runoff or nuisance flow from catch basins has been found to supply consistent flow to the creek. This subwatershed extends into jurisdictional areas of the City of Thousand Oaks and the counties of Ventura and Los Angeles (Figure 2). The approximate breakdown of land uses in this area is 49% Open Space, 45% Residential; 6% Public and Institutional Lands (e.g., schools); and 1.3% Commercial.

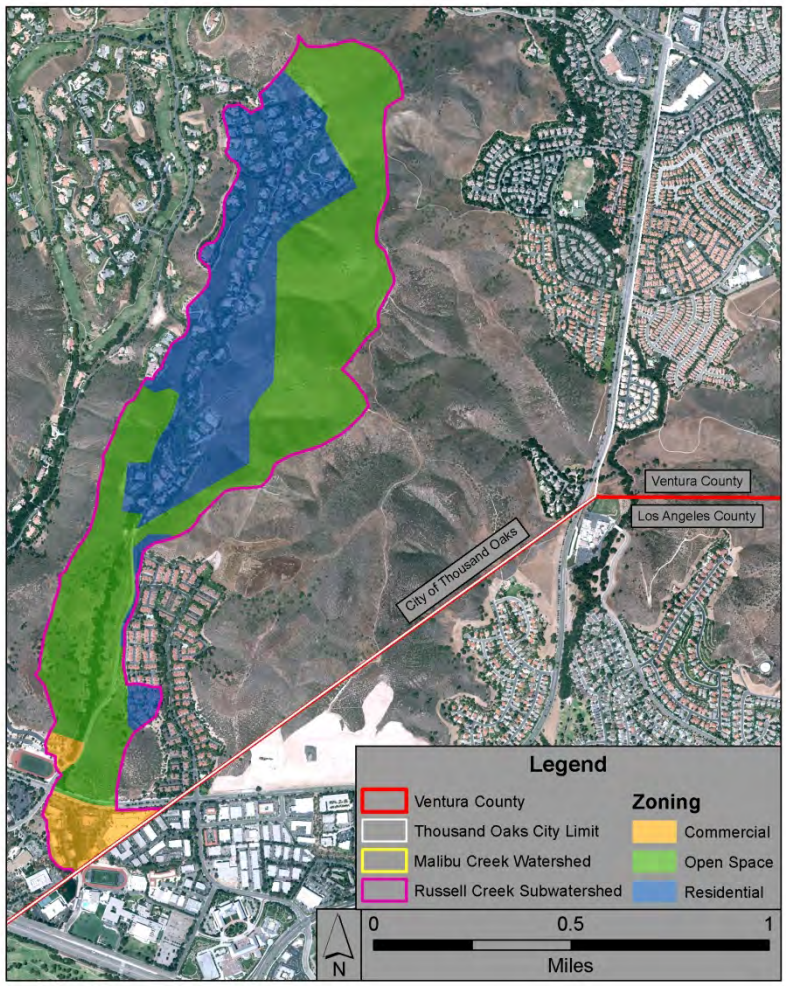
Figure 2. Land Uses in the Lindero Creek Subcatchment



Russell Creek

This creek has also been found to go dry at its upper headwater segment during summer. There is no base flow and the three residential developments with MS4 outfalls to the creek have not been found to contribute significant irrigation runoff to maintain flow year round. About 200 yards north of Thousand Oaks Boulevard, there is a spring in the creek bed that appears to provide continuous flow. Land use in this subcatchment is approximately 57% open space, 37% residential, 1% publicly owned property (school), and 5% is commercial (Figure 3).

Figure 3. Land Uses in the Russell Creek Subcatchment

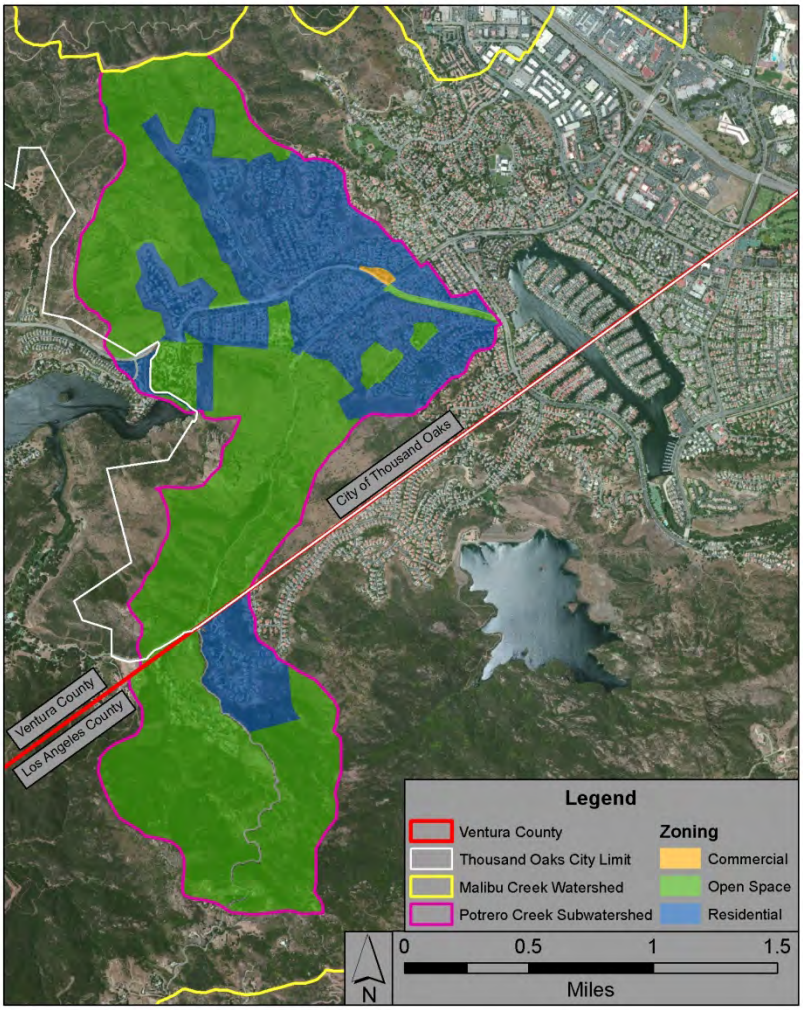


Portrero Creek

This creek is an intermittent waterway supplied only from flood control drains during storm conditions or discharge from Lake Sherwood or both. This latter flow source occurs when heightened lake levels need to be relieved and water is discharged to

Westlake Lake. These short-term discharges have resulted in inconsistently available samples at sample point 17 (SP 17). The Portrero Creek subwatershed extends into jurisdictional areas of the City of Thousand Oaks and the County of Los Angeles (Figure 4). Land use in the Thousand Oaks portion of Portrero Creek subcatchment is divided among 57.2% Open Space, 42.5% Residential, and 0.3% Commercial.

Figure 4. Land Uses in the Portrero Creek Subcatchment



Land Use Evaluation

Open space accounts for the largest portion of land use area. It is also the least likely to cause fecal bacteria loading due to infiltration. As wildlife use creeks for a water source, there could be direct contamination by some wildlife species such as ducks, geese, and terrestrial animals. Observation has discovered that creek pools can be a congregation

spot for wildlife. Development of addition DNA markers and assay protocols would help determine the whether the source of E.coli loading is MS4 or from natural sources.

Residential is the next largest land use. Its form varies from low density 1-acre estates to tract homes to closely-spaced townhomes. Observations reveal that many factors influence the likelihood for residential nuisance runoff:

- Layout of the landscape (are sprinklers located at the street curb?)
- Type vegetation used (drought tolerant vs. high water need)
- Property slope
- Adjustment/maintenance of the irrigation system
- % of impervious surface
- Proximity of development to a creek

Russell Creek receives less dry-weather runoff from its residential developments than those in Lindero Creek. Of the three developments discharging to Russell Creek, one has fewer than 10 residences and a second has only one street that discharges to the creek because the development sits on a watershed divide. Secondary factors that may increase loading to Lindero Creek sample point are that developments adjacent to Lindero Creek in North Ranch have larger lawn areas and many extend to creek's edge.

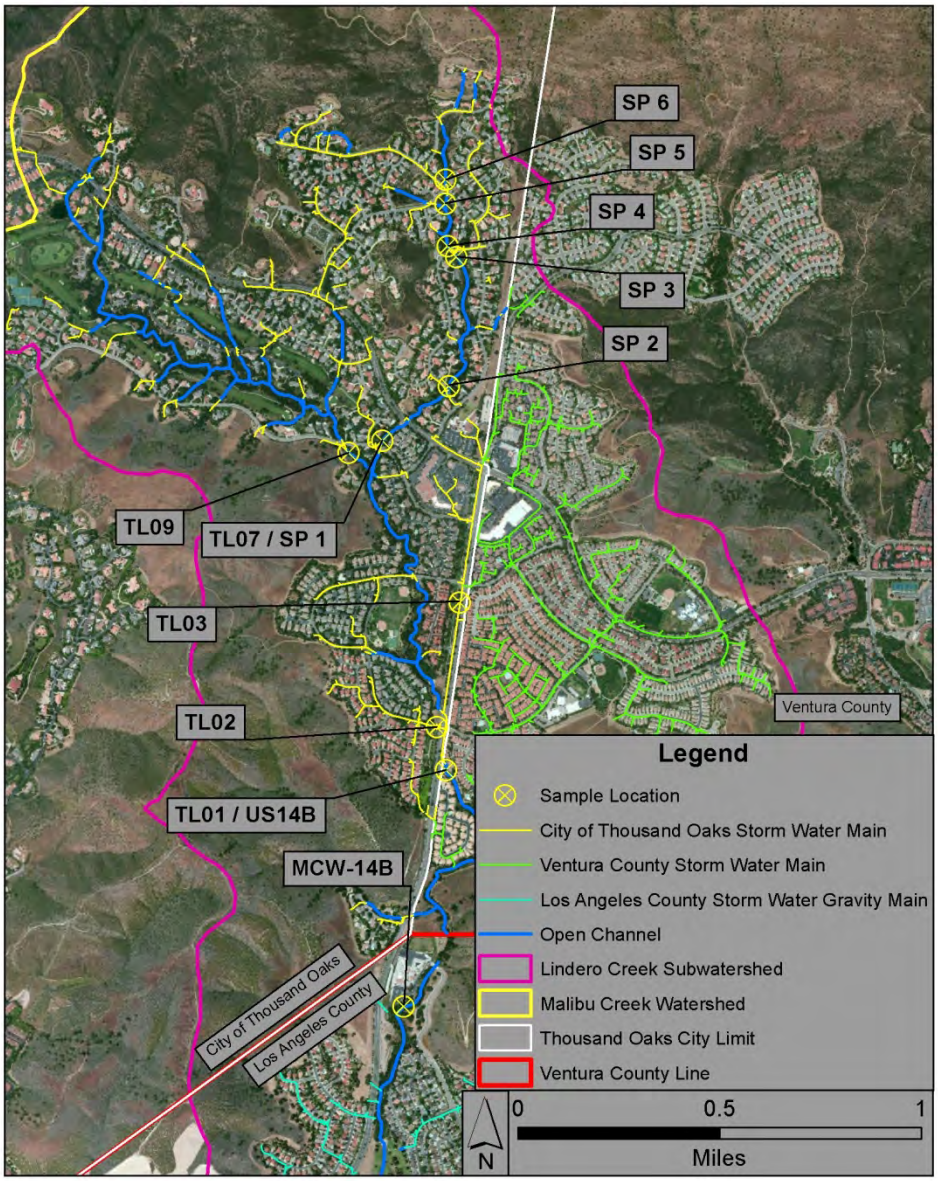
Commercial is only a small portion of land use in each of the drainage areas. Runoff was found to occur in some parking lot areas, but it was minute compare to the volume of residential runoff. Even so, an illicit connection screening may be conducted due to a human marker being found in the Lindero Creek subwatershed. Additionally, there is ambiguity about whether fecal contamination is caused by anthropogenic sources or wildlife that such a study may solve.

Review of Existing Data

Lindero Creek was targeted as the first subcatchment to be investigated for bacterial loading. It has more development than Russell Creek. Indicator bacteria levels at Lindero Creek also tend to be higher. Portrero Creek has an intermittent flow and has lesser potential of being a location for REC-1 activities.

Figure 5 shows a composite map of various sample points that were used with the monitoring projects that are described in the in the following paragraphs.

Figure 5. Sample Points for Lindero Creek Monitoring Projects



An initial study was done to see if it could be determined whether the east or west branch of Lindero Creek was receiving high E.coli loading that could be responsible for E.coli levels at sample point 14B (Table 1). The comparison point is upstream of the compliance sample point, closer to the city limit.

Table 1. Comparison of E. coli Values at Lindero Creek Creek Branches

Date	Location		
	TL07	TL09	US14B
	E. coli, MPN/100ml	E. coli, MPN/100ml	E. coli, MPN/100ml
5/24/12	800	110	n/a
5/29/12	23	8	n/a
6/1/12	800	340	19
6/5/12	800	300	230
6/7/12	500	40	170
6/12/12	300	500	1700
6/14/12	1700	80	170
7/10/12	140	300	9000
7/12/12	300	19	5000
7/17/12	800	300	330
7/19/12	230	80	140
7/24/12	260	1300	210
7/26/12	70	40	170
7/31/12	170	40	19
8/2/12	170	80	230
Median	300	80	210
% Compliance	38	54	69

The west branch receives golf course and yard drain runoff from the estates whose properties extend to the creek bank. The east fork has a greater density of residences. Simple inspection of these resulting data show high values at either branch may not translate into an exceedance at the sample point (e.g., 6/1, 6/5, 6/7, 6/14, and 7/24). To bring technical rigor to this assumption, flow rate and samples from all contributing flows would be necessary to estimate an indicator bacteria flux balance at SP 14B.

A more detailed study was done in an attempt to locate any sections of Lindero Creek in the upper subcatchment that receive greater fecal inputs. Back-tracking could then be done to discover the source of a contaminated discharge (Table 2).

Table 2. E.coli Levels Upper Portions of Lindero Creek

Date	Location MPN/100mL							
	SP 6	SP 5	SP 4	SP 3	SP2	SP1	US14B	14B
*12/4/12	20	500	40	230	20	500	230	Rain
12/6/12	20	700	20	230	130	800	70	
12/11/12	20	170	40	300	NA	230	110	800
12/13/12	20	800	500	500	1300	500	1300	
*12/18/12	20	500	1700	1700	1700	220	300	NA
12/20/12	20	80	20	130	NA	130	110	
1/8/13	40	1300	20	230	20	210	70	40
1/10/13	20	230	40	80	20	500	20	
1/15/13	20	130	20	80	20	170	20	40
1/17/13	20	20	40	300	80	80	20	
1/29/13	20	3000	130	800	40	140	80	70
1/31/13	20	NA	230	300	20	500	130	
2/5/13	20	130	800	700	230	2400	300	270
2/7/13	20	170	500	800	110	300	130	
Median	20	230	40	300	60	265	110	70
% Compliance	100	57	71	43	83	50	79	67

NA = Data not Available *Denotes > 0.1" rainfall occurred within 72 hours of sampling

Each location, with the exception of SP 6 that is at the uppermost portion of the subcatchment with little adjacent development, attained the single sample maximum objective only 83% of the time or less. There were also random spikes at all locations in the more developed segments of the creek. As in the earlier study, it was impossible to pinpoint a consistent bacterial source at the receiving water sampling points.

It should be noted that bacteria indicator is a living species in a competitive and variable environment. Accordingly, it should not be expected to behave as a conservative pollutant. That is to say, there can be substantial reduction in bacterial density when comparing locations. This, in addition to the possibility of direct deposition, diffuse inputs, and variant growth make indicator bacteria difficult to model.

As previous sampling detected no definable pattern to E. coli loading, a follow up Source ID Study was conducted jointly with the Ventura County Watershed Protection Division using microbial source tracking to identify source species using DNA markers. In addition to receiving waters, this study included testing of MS4 outfalls that had sufficient flow to obtain a sample. This study was conducted in the summer months.

During this dry period, the Lindero Creek segment above US14B did not contribute flow to sample point 14B. Because this project's goal was to determine loading sources to SP 14B, some of the upper segments of Lindero Creek were not included (Table 3).

Table 3. Lindero Creek Source ID Study

		E. coli		Human markers		Dog markers	Bird markers			Caffeine	Cotinine		Carbamazepine		Sucralose	
ID	Date		mpn/100ml	copies / 100ml	stdev	copies/ 100ml	stdev	copies/ 100ml	stdev	ng/l	sign	ng/l		ng/l		ng/l
*FB	8/20/13	<	10	nd		nd		nd		1	<	0.6	<	0.08	<	5
FB	9/5/13	<	10	nd		nd		nd		1.3	<	0.6	<	0.08	<	5
FB	9/24/13	<	1	na		na		na		4.7	<	0.6	<	0.08	<	5
FB	9/26/13	<	10	nd		nd		nd		na		na		na		na
*Field Blank			7.8							2.3		0.6		0.08		
			10													
MCW14B	8/13/13		80	nd		nd		bdl		24		29		4.2		2200
MCW14B	8/29/13		98	nd		nd		DNQ		41		11		4		2500
MCW14B	9/5/13		74	nd		nd		2740	954	36		12		4.7		2400
MCW14B	9/18/13		3441	nd		nd		4196	912	25		12		7.6		1400
MCW14B	9/24/13		301	nd		nd		3331	1442	21		5.9		6.7		1800
MCW14B	9/26/13		135	nd		nd		2260	1306	18		6.2		4.6		1000
Mean			688.2					3131.8	1153.5	27.5		12.7		5.3		1883.3
Median			116.5													
**REC	8/22/13		327	nd		bdl		3228	1187	13		8.2		37		31000
REC	9/5/13		20	nd		nd		bdl		4.6		15		49		6100
REC	9/26/13	<	10	nd		nd		nd		1.5		7.3		81		13000
**Reclaimed			119.0					3228.0	1187.0	6.4		10.2		55.7		16700.0
water			20					3228								
TL01	8/29/13		292	nd		bdl		2679	455	66		18		4		2500
TL01	9/5/13		15530	bdl		4199	921	DNQ		59		20		2		1200
TL01	9/18/13		2609	bdl		2659	1422	4556	679	88		30		3.3		860
TL01	9/24/13		1250	nd		DNQ		2487	336	69		14		2.2		600
TL01	9/26/13		399	nd		22616	2689	1962	662	50		9.6		6.6		1600
Mean			4016.0			9824.7	1677.3	2921.0	533.0	66.4		18.3		3.6		1352.0
Median			1250			4199										
TL02	8/29/13		959	1534	256	DNQ		bdl		49		6	<	0.08		210
TL02	9/18/13		1169	DNQ		19958	3667	bdl		31		12	<	0.08		120
TL02	9/24/13		146	412	135	bdl		bdl		4	<	0.6	<	0.08		20
TL02	9/26/13		2064	DNQ		391577	53151	bdl		26		8.1	<	0.08		98
Mean			1084.5	973.0	195.5	205767.5	28409.0			27.5		6.7		0.1		112.0
Median			1064			205767.5										
TL03	08/29/13		2809	DNQ		bdl		bdl		140		12	<	0.08		93
TL03	9/18/13		4611	nd		bdl		bdl		2900		130		1.2		1500
TL03	9/24/13		393	nd		nd		bdl		110		51		3		680
TL03	9/26/13		613	nd		27619	8020	bdl		57		23		1.8		370
Mean			2106.5			27619.0	8020.0			801.8		54.0		1.5		660.8
Median			1711			27619										
TL07	8/29/13		63	nd		nd		DNQ		25		3.6	<	0.08		62
TL07	9/18/13		754	nd		nd		DNQ		9.5		7.3	<	0.08		150
TL07	9/24/13		410	nd		nd		bdl		4.1		3.1	<	0.08		81
TL07	9/26/13		292	nd		nd		bdl		1.1		2.3	<	0.08		83
Mean			379.8							9.9		4.1		0.1		94.0
Median			351													
TL09	8/29/13		487	nd		nd		DNQ		8		3.7	<	0.08		95
TL09	9/18/13		1017	nd		nd		bdl		4.7		7	DNQ	0.11		180
TL09	9/24/13		201	nd		bdl		bdl		4.6		2.4	<	0.08		120
TL09	9/26/13		246	nd		bdl		2316	616	7.8		2.1	<	0.08		94
Mean			487.8					2316.0	616.0	6.3		3.8		0.1		122.3
Median			366.5													

Analysis of Source ID Study Data

Review of these results elucidates several findings:

1. Avian DNA markers were found in receiving water, not in MS4 outfalls.
2. Human and canine markers were found at MS4 outfalls TL02 and TL03 to Lindero Creek.
3. Chemical indicators caffeine and cotinine (nicotine metabolite) corroborate potential sewage contamination in the MS4.
4. Low levels of avian and canine DNA markers suggest that terrestrial wildlife may provide the balance of the E.coli sources.
5. DNA assays of reclaimed water (REC) suggest that it is not responsible for human marker detections.

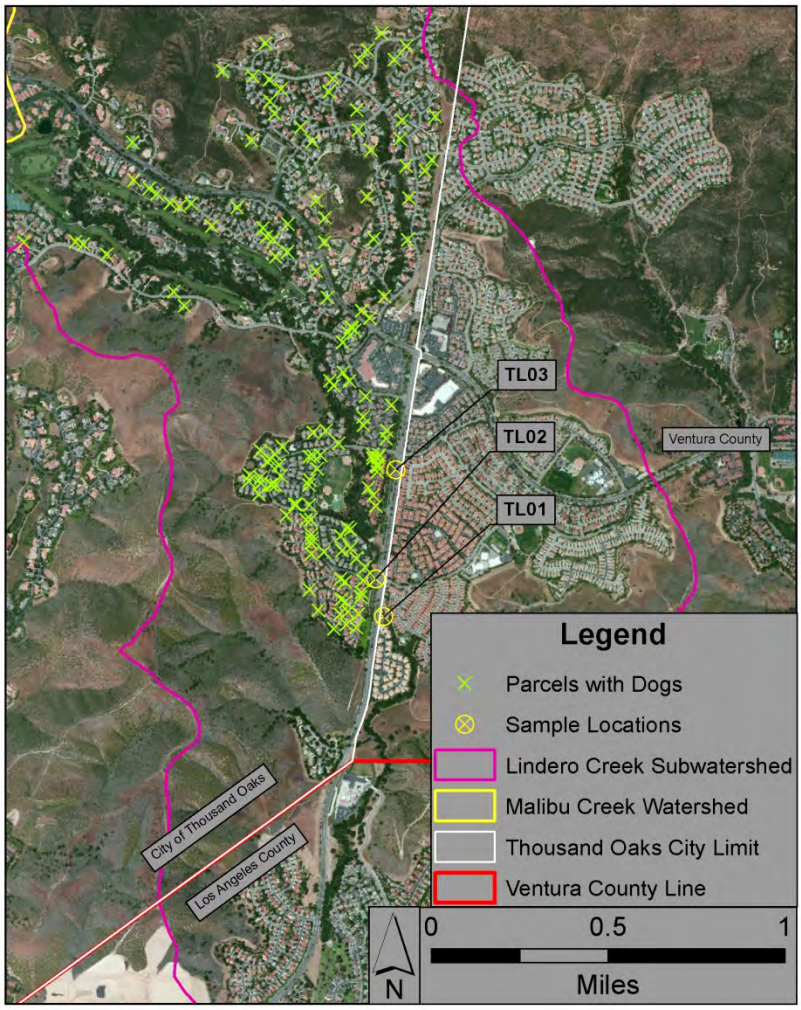
Actions were taken in response to findings 2 and 3. For example, a robotic video inspection of the storm drain was done. No certain source of wastewater was found and the storm drain lines were found to be in good condition. From this a referral was made to the Triunfo Sanitation District to do further surveillance for possible inflow from sewer lines. Other actions are pending depending on preliminary results.

Finding 4 further suggests that there is a sizeable contribution of fecal waste from wildlife that inhabits this area. This agrees with the high percentage of open space (with riparian habitat) in the Lindero Creek subwatershed, as discussed in the land use analysis section. Until proven microbial testing protocols exist for additional species, this assertion will remain unproven.

Space Left Intentionally Blank

To gain understanding of canine marker in the MS4 (finding 2), residences with one or more licensed dogs were plotted on a map of the subcatchment. Figure 6, shows the sampling locations where canine marker was found was at the area with the greatest amount of residences with dogs. Dog waste bag stations have been installed in this area and directed mailing of educational literature has been made to owners of licensed dogs.

Figure 6. Distribution of Dog-owning Households Lindero Creek



In addition to the indicator bacteria data from sample point 15C, an upstream location of Russell Creek was sampled just below one of the three residential developments with drainage to the creek (Table 4).

Table 4. E.coli Sampling at Russell Creek

Date	Location	Date (cont.)	Location (Cont.)
	RCDBO		RCDBO
	E. coli, MPN/100ml		E. coli, MPN/100ml
5/24/12	130	7/12/12	800
5/29/12	130	7/17/12	500
6/1/12	500	7/19/12	500
6/5/12	130	7/24/12	270
6/7/12	130	7/26/12	40
6/12/12	300	7/31/12	70
6/14/12	80	8/2/12	40
Median			130
% Compliance			62

RCDBO is a miniature wetland pool below a debris basin spillway (same as ROMP2 in Figure 8). Fecal inputs from wildlife may explain the spike values in the data set. By mid-summer, this location has been found to be dry. These data do not suggest a consistently high-level loading source that may indicate sewage contamination. Nevertheless, sampling is being considered for assurance there is no human source.

As mentioned, there is rarely flow that can be sampled at Portrero Creek. Table 5 presents E. coli data and shows the infrequent availability of samples.

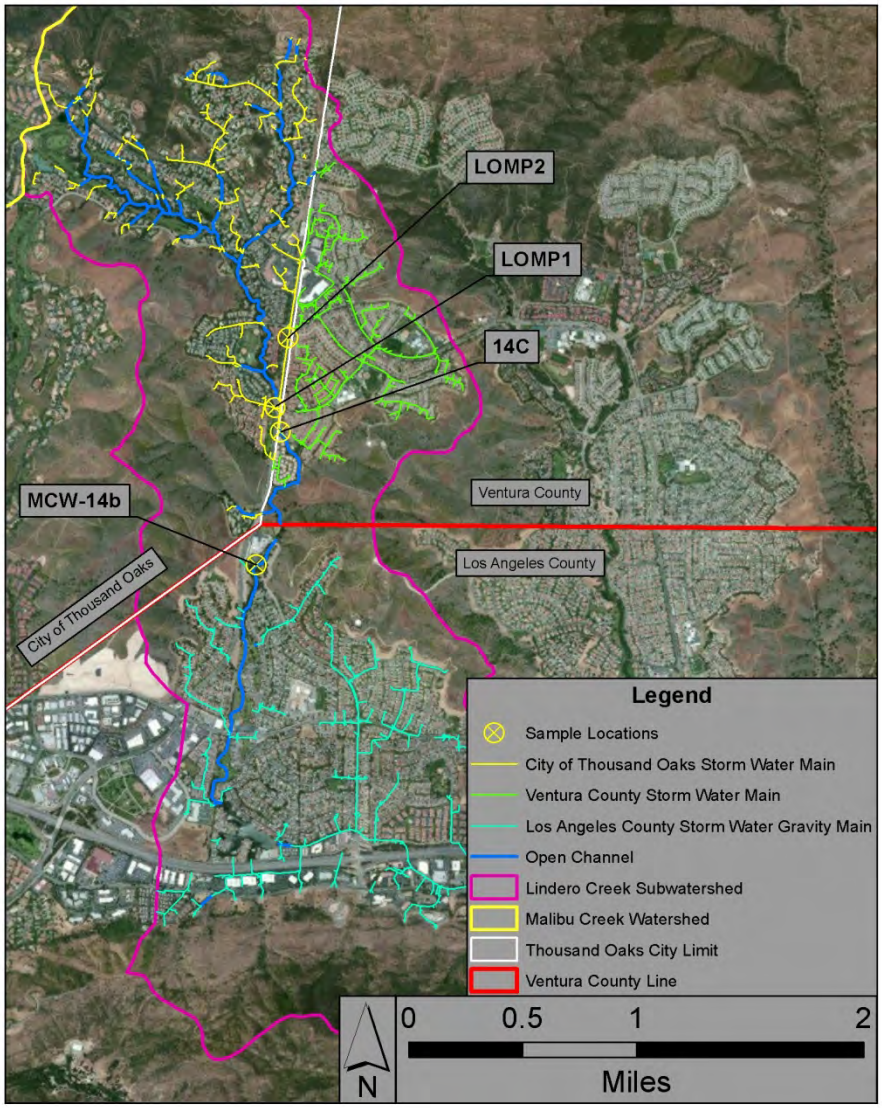
Table 5. E. coli levels at SP 17

Date	SP 17 E.coli, MPN/100mL	Date (Cont.)	SP 17 E.coli, MPN/100mL (Cont.)
3/11/08	13	4/27/10	110
3/17/08	300	5/1/10	110
3/25/08	900	5/4/10	130
3/31/08	110	5/11/10	1300
4/1/08	220	5/18/10	130
4/6/09	130	5/25/10	20
4/1/10	9	7/5/11	230
4/6/10	500	7/12/11	500
4/13/10	500	4/17/12	19
4/20/10	40		
		Median	130
		% Compliance	68

MS4 Infrastructure and Monitoring Point Locations

The maps that follow show the storm drain infrastructure and the locations of proposed outfall monitoring locations in each subcatchment. These maps also show the proposed relocations of Sample Points 14B and 15C. The first is Lindero Creek (Figure 7). Note that sample point 14B is about ¾ of a mile outside of Thousand Oaks. The recommended relocation for this sample point is about 20 feet east of Lindero Canyon Road. Sample point 14B is shown relocated to SP 14C. The enhanced protocol monitoring locations are also shown, LOMP1 and LOMP2. They are a renaming of sample points TL02 and TL03 where human marker was found as discussed in the source ID study above.

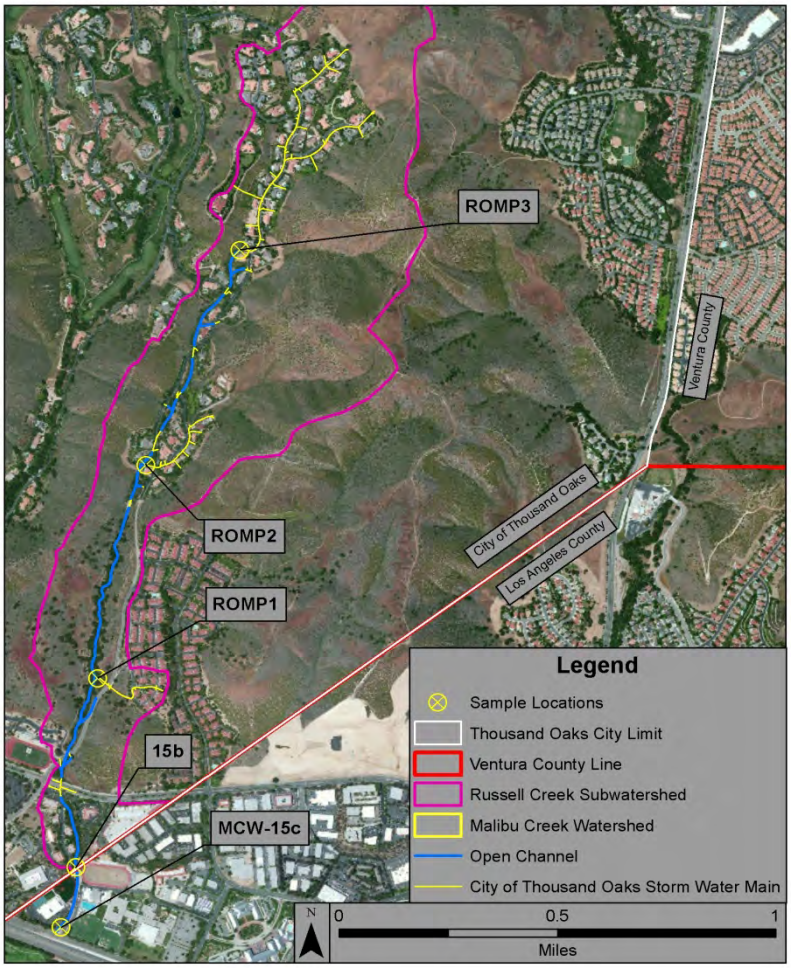
Figure 7. Lindero Creek MS4 Infrastructure and Monitoring Points



Russell Creek

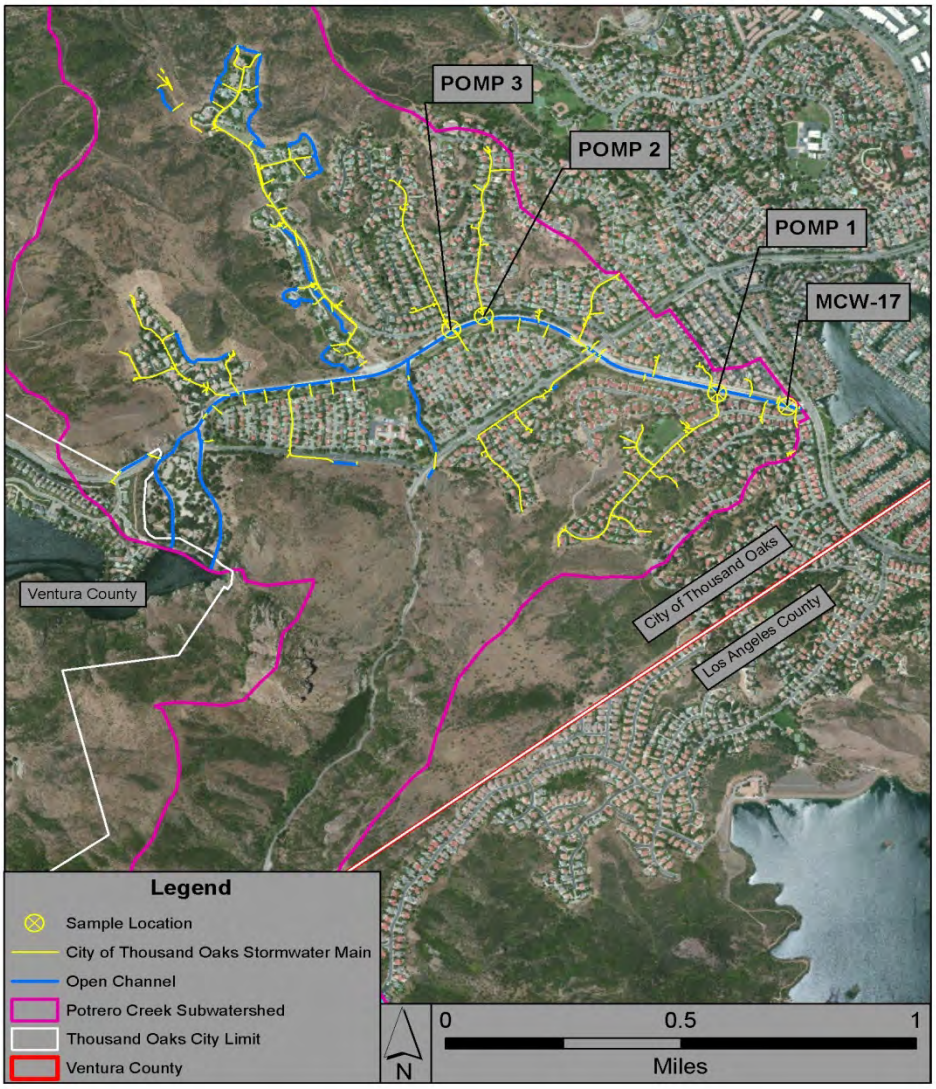
Similar to SP 14B, the Russell Creek sample point is outside of the Thousand Oak city limits, in this case, two-tenths of a mile. At its current location, SP 15C has been seen to be susceptible to discharges from Oaks Christian High School and Oaks Christian School. Maintenance of sport fields and other facility activities could affect the indicator bacteria level even through sample point 15C's intent is to measure drainage from the Russell Creek subcatchment in Thousand Oaks. An alternative location restoring SP 15C to its original position at SP 15B as shown in Figure 8. The enhanced protocol outfall monitoring locations are also shown.

Figure 8. Russell Creek MS4 Infrastructure and Monitoring Points



No Changes are proposed for the location of SP 17. Its position as well as the locations of enhance protocol outfall monitoring are shown in figure 9.

Figure 9. Portrero Creek MS4 Infrastructure and Monitoring Points



Protocol for Enhanced Monitoring

Inputs causing high fecal indicator bacteria (FIB) in MS4 systems and its receiving waters can be from human sources, domestic animals, wildlife, and natural growth. Many of the bacteria sources are not easily controllable as evidenced by few, if any, municpalities achieving WQOs for indicator bacteria. There is also a finite supply of available resources for addressing such a problem. Given these circumstances, a defined adaptive BMP approach is recommended for non-attainment of REC-1 standards.

Triggers that initiate enhanced monitoring:

1. Exceeding the allowable exceedance days for dry-weather conditions (precipitation < 0.1" within three days) or
2. Exceedance of the geometric mean of E. coli samples.

Once triggered, the following measures that attempt to lessen FIB levels found at the sample point will be initiated:

Step 1.

Sample outfall monitoring locations listed in Table 6, if sufficient flow is available. Sampling will be done a minimum of three times in a six month period. The MS4 will be deemed in compliance with WLA if outfall monitoring data indicate MS4 outfalls have not caused or contributed to an exceedance at a sample point.

Step 2.

Based on outfall data obtained in Step 1, selectively initiate actions to reduce sources that have likely caused exceedance of the WLA for indicator bacteria. This will be done within a 6 month to one year period depending on the complexity of the methodology. Possible remedial actions/BMPs include:

- Leaking sewer detection
  - Smoke testing
  - video robot inspection
  - dye testing
- Outreach messaging
  - Direct targeted mailing
  - Presentations and public service announcements at local schools
- Erradication of illicit connections and discharges
- Nuisance flow control
- Microbial source tracking for specificity of bacteria sources

Step 3. After BMP addition, review data from routine sample point (5 samples minimum)

- Consider additional measures or refinements if outfalls still cause or contribute to sample point exceedance of WLA.

Table 6. Outfall Monitoring Locations-Weekly E. coli Testing

Subwatershed Exceedance	Outfall Monitoring Locations	GPS Coordinates	Comment
SP 14C (Lindero Creek)	1. LOMP1 2. LOMP2	1. (34.17567, -118.78778) 2. (34.18015, -118.78683)	
SP 15B (Russell Creek)	1.ROMP1 2.ROMP2 3.ROMP3	1. (34.16083, -118.81076) 2. (34.16812, -118.80891) 3. (34.17549, -118.80521)	
SP 17 (Portrero Creek)	1.POMP1 2.POMP2 3.POMP3	1. (34.14540, -118.83873) 2. (34.14798, -118.84742) 3. (34.14746, -118.84863)	When flowing, usually wet- weather

Appendix A

MALIBU CREEK AND LAGOON BACTERIA TMDL COMPLIANCE MONITORING PLAN

PREPARED BY THE VENTURA COUNTY WATERSHED PROTECTION DISTRICT

SUBMITTED ON BEHALF OF:
COUNTY OF VENTURA

VENTURA COUNTY WATERSHED PROTECTION DISTRICT
CITY OF THOUSAND OAKS

MARCH 4, 2008

TABLE OF CONTENTS

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 December 22, 2005, and came into effect on January 24, 2006. One of the TMDL's first requirements was the submittal of a Compliance Monitoring Plan (CMP) within 120 days of the effective date.

Subsequent to the development of the first CMP, governmental agencies within the County of Ventura's jurisdiction opted to develop their own monitoring program. This CMP describes that effort.

1.2 Participants

This CMP was developed by the Ventura County Watershed Protection District in coordination with the other responsible jurisdictions and agencies under the TMDL, including the County of Ventura, the Ventura County Watershed Protection District and the City of Thousand Oaks. Implementation of this monitoring program will be funded jointly by these responsible agencies.

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:

- Characterize the existing water quality as compared to water quality at the reference watershed;
- Measure compliance with the allowable number of exceedances days set forth by the TMDL; and
- Provide data to support the reevaluations 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 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
Single Sample Limits (Fresh Waters)	
Indicator	**mpn/100ml**
E. Coli	235

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 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[2] Mean Limit	Single Sample Limit	Geometric[2] Mean Limit
Dry Weather weather	1/24/12	5	0	1	0
Wet weather[2]	7/15/21	15	0	2	0

.

[1] The geometric mean is defined in Webster's Dictionary as "the n th root of the product of n numbers." Thus, the 30day 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] 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

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

- At least one site in each subwatershed;
- Areas where frequent REC-1 use is known to occur;
- Availability of previous water quality data; and
- Safe and legal access.

Five of the seven sites have been previously monitored by the Ventura County Watershed Protection District. Table 4 lists all seven 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 reconsidered 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.

Table 4. List of Sampling Sites.

Site ID	Subwatershed	Coordinates	Comment	Historical VCWPD
MCW-8b	Upper Las Virgenes Creek	N 34° 10.115' W 118° 42.102'	Replaced MCW-8	LV-1
MCW-9	Chesebro Creek	N 34° 09.082' W 118° 44.058'		N/A
MCW-12	Upper Medea Creek	N 34° 10.230' W 118° 45.765'		MC-1
MCW-14C	Upper Lindero Creek	N 34° 10.448' W 118° 47.243'	Replaces MCW-14B	LC-2
MCW-15B	Westlake Creek / Russell Branch	N 34° 09.263' W 118° 48.693'	Replaces MCW-15C	N/A
MCW-17	Potrero Canyon Creek	N 34° 08.696' W 118° 50.165'		PT-1
MCW-18	Hidden Valley Creek	N 34° 08.474' W 118° 52.673'		HV-1

Figure 1. Monitoring Locations in Ventura and Los Angeles Counties

4.0 METHODOLOGY

4.1 Sampling Procedure

Sampling will be conducted by qualified professionals with proper training and in accordance with accepted industry protocols. 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 Tuesdays. 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

Freshwater samples will be tested by Pat-Chem Laboratories (Moorpark, CA) for the presence of *E. coli* and fecal coliform. When selecting analytical bacterial methods for TMDL monitoring, the importance of fast turnaround times (48 hours or less) should be emphasized. 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.

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. For the sake of consistency, the CMP for Ventura County will use the same gage as the CMP for L.A. County (L.A. County Department of Public

Works' ALERT Rainfall Gage 317 in Agoura).

4.4 Quality Assurance/Quality Control

Pat-Chem 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). Pat-Chem Laboratories must maintain ELAP certification.

Attachment A to Resolution No. R12-009

Malibu Creek and Lagoon Bacteria Total Maximum Daily Load

Amendment to the Water Quality Control Plan for the Los Angeles Region to Revise the Total 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.

Amendments:

Table of Contents

Add:

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

List of Figures, Tables and Inserts

Add:

Chapter 7. Total Maximum Daily Loads (TMDLs)
Tables
7-10 Malibu Creek and Lagoon Bacteria TMDL
7-10.1. Malibu Creek and Lagoon Bacteria TMDL: Elements
7-10.2. Malibu Creek and Lagoon Bacteria TMDL: Final Allowable Exceedance Days by Sampling Location
7-10.3. Malibu Creek and Lagoon Bacteria TMDL: Significant Dates

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.

Attachment A to Resolution No. R12-009

This TMDL was revised and adopted by the Regional Water Quality Control Board on June 7, 2012.

This revised TMDL was approved by:

The State Water Resources Control Board on [Insert Date].
The Office of Administrative Law on [Insert Date].
The U.S. Environmental Protection Agency on [Insert Date].

The following table includes the elements of this TMDL.

Attachment A to Resolution No. R12-009

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. 2. Single Sample Limits a. *E. coli* density shall not exceed 235/100 ml. These objectives are generally based on an acceptable health risk for

[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.

Attachment A to Resolution No. R12-009

Element	Key Findings and Regulatory Provisions
	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. 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.)
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,

Attachment A to Resolution No. R12-009

Element	Key Findings and Regulatory Provisions
	no degradation or dilution allowance is provided.
Waste Load Allocations *(for point sources)*	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. 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. 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: 1. dry-weather 2. wet-weather (defined as days of 0.1 inch of rain or more plus three days following the rain event). 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: 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 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

Attachment A to Resolution No. R12-009

Element	Key Findings and Regulatory Provisions
	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. 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. 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.
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 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. 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. 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: 1. dry-weather 2. wet-weather (defined as days of 0.1 inch of rain or more plus three days following the rain event). 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: 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).

Attachment A to Resolution No. R12-009

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 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, 2021, compliance with the allowable number of wet-weather exceedance days and the geometric mean targets must be achieved.
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 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 *E. coli* 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.

Attachment A to Resolution No. R12-009

Element	Key Findings and Regulatory Provisions
	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 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. 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).
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 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. 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

[2] For 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.

Attachment A to Resolution No. R12-009

Element	Key Findings and Regulatory Provisions
	contributed to the exceedance. 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.

Attachment A to Resolution No. R12-009

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, 2021	
		Dry Weather ^		Wet Weather ^	
Station ID	Location Name	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.

Attachment A to Resolution No. R12-009

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

Date	Action
May 24, 2006	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.
January 24, 2007	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 dry weather compliance schedule, including but not limited to a detailed timeline for all categories 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. 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 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

Attachment A to Resolution No. R12-009

Date	Action
	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. 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.
January 24, 2008	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.
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 and Waste Load Allocations (expressed as allowable exceedance days

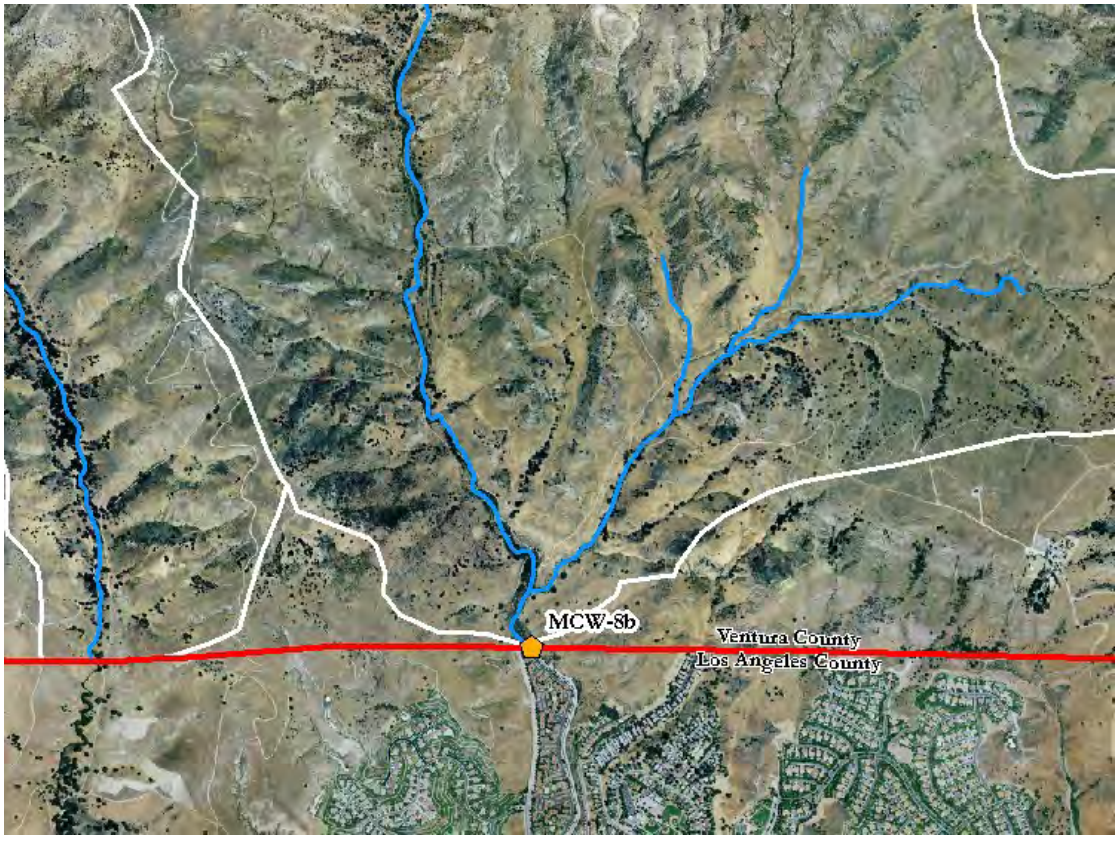
Attachment A to Resolution No. R12-009

Date	Action
	for wet weather) and compliance with the geometric mean limit.

APPENDIX B – Sampling Locations

Monitoring Site MCW-8b (Upper Las Virgenes Creek)

Site is located at north end of Las Virgenes Road and is accessed through a Los Angeles County Flood Control gate. Sample is taken just downstream county line demarcated by chain link fence.

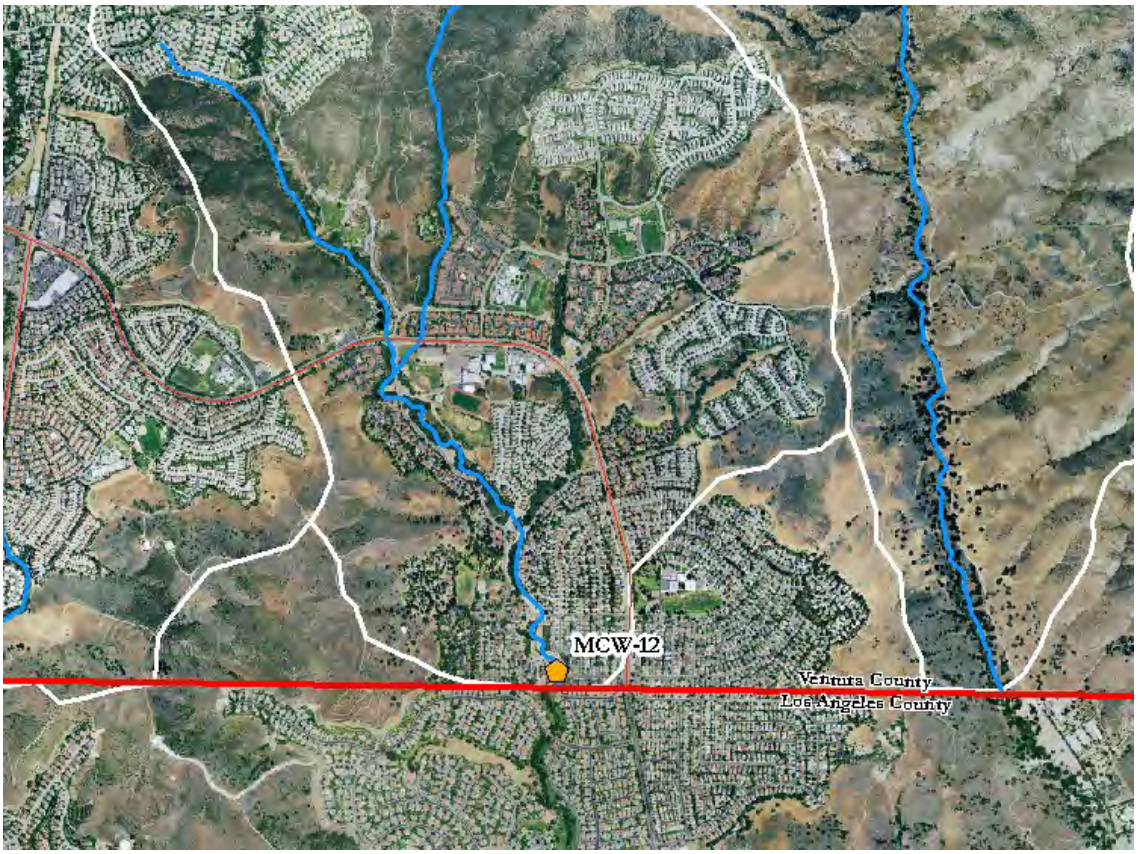


Monitoring Site MCW-9 (Chesebro Creek)

Site is located on Chesebro Road. approximately 0.5 miles north of Driver Ave. and is accessed from bridge crossing over creek. Sample is taken just upstream confluence of Palo Comado Creek and Chesebro Creek.

Monitoring Site MCW-12 (Upper Medea Creek)

Site is located at the west end of Tamarind Street and is accessed by climbing down publicly accessed embankment. Sample is taken upstream of the pedestrian bridge.



Monitoring Site MCW-14b (Upper Lindero Creek)

Site is located near the Yerba Buena Elementary School at the north end of Reyes Adobe Rd. and is accessed by using a gate on the east side of the parking lot. Sample is taken at end of dirt path leading from access gate.

Monitoring Site MCW-15b (Westlake Creek / Russell Branch)

Site is located on La Tienda Drive just west of Oaks Christian High School and is accessed through a Los Angeles County Flood Control gate. Sample is taken downstream of the debris basin.

Monitoring Site MCW-17 (Portrero Canyon Creek)

Site is located on Triunfo Canyon Road approximately 0.4 miles south of Westlake Boulevard and is accessed through a Ventura County Watershed Protection District gate. Sample is taken from the middle channel of the concrete apron.

Monitoring Site MCW-18 (Hidden Valley Creek)

Site is located on Potrero Road approximately 0.45 miles south of Thornton Ranch Road and is accessed near the bridge crossing. Sample is taken upstream the bridge.