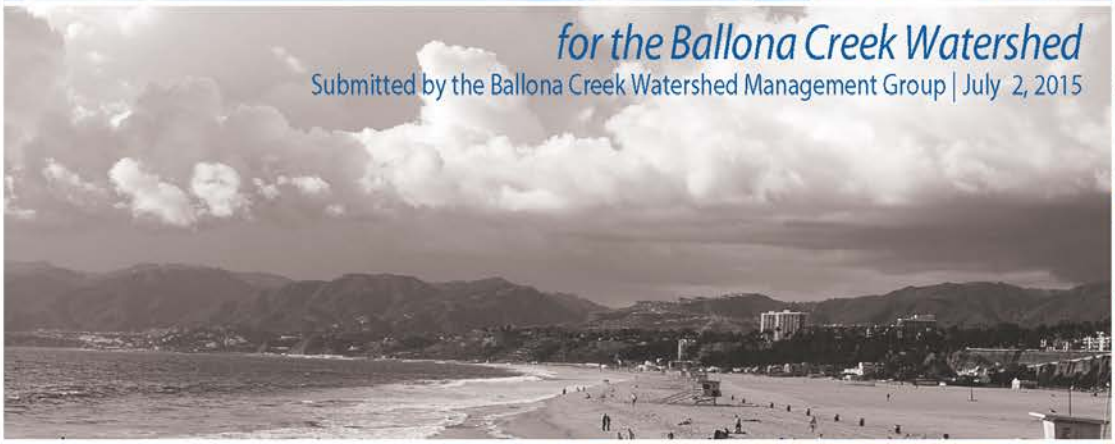
Coordinated Integrated Monitoring Program (CIMP)

for the Ballona Creek Watershed

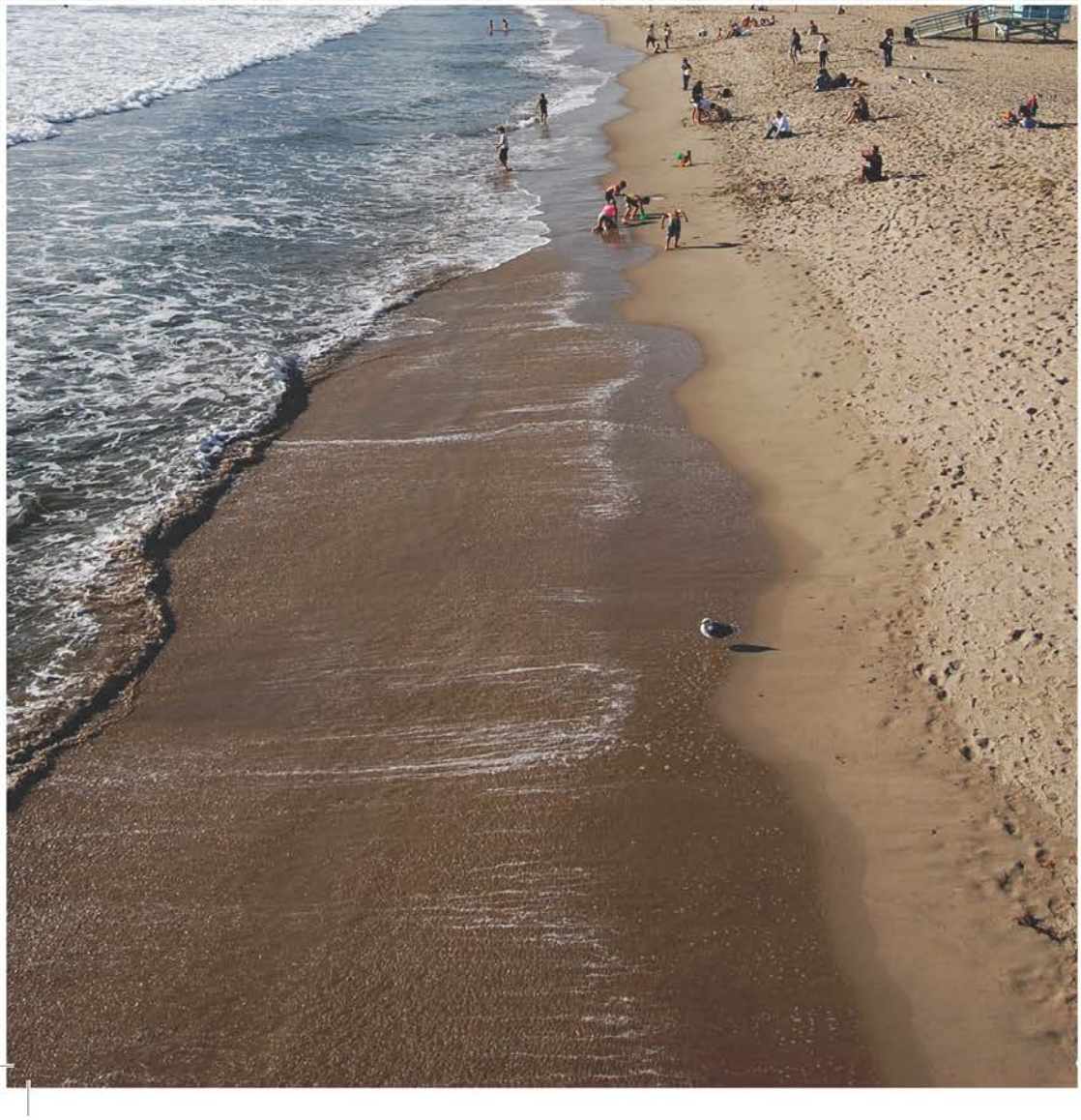
Submitted by the Ballona Creek Watershed Management Group | July 2, 2015
















Basin Plan as a waterbody in the watershed. As such, it is not considered a tributary for the purposes other than addressing the bacteria TMDL for the watershed. The City of Los Angeles is the responsible agency for the Del Rey Lagoon whose tributary area is approximately 25 acres. The Ballona Wetlands encompass approximately 626 acres (541 acres of natural wetlands area and 85 acres of roads, parking lots, levees and other structures). Approximately 460 acres of the Ballona Wetlands are located within the Ballona Creek watershed and the remaining portion is located in the Marina Del Rey watershed. The Ballona Wetlands are owned and/or managed by the California Department of Fish and Wildlife (CDFW) and the State Land Commission. **Table 1** presents the major water bodies within the BCWMG Enhanced Watershed Management Program (EWMP) area. **Figure 1** displays the BCWMG and the participating jurisdictions.

Table 1. Waterbodies Associated with the BCWMG EWMP Area

Mainstem	Associated Tributaries
Ballona Creek Reach 1	
Ballona Creek Reach 2	Sepulveda Channel
Ballona Creek Estuary	Centinela Creek
Lagoons and Wetlands	
Del Rey Lagoon	Ballona Wetlands
Downstream Waters	
Santa Monica Bay	

The TMDLs addressing water body-pollutant combinations (WBPCs) within or downstream of the EWMP area are presented in **Table 2**. Part XIX.B of the MRP, the TMDL Basin Plan Amendments (BPAs), and United States Environmental Protection Agency (USEPA)-established TMDL documents include TMDL monitoring requirements and recommendations, which are summarized in **Attachment A**.

Table 2. TMDLs Applicable to the Ballona Creek Watershed EWMP

TMDL	Regional Board Resolution Number(s)	Effective Date and/or EPA Approval Date
Ballona Creek Trash (BC Trash)	2004-023	08/11/2005
Ballona Creek Estuary Toxic Pollutants (BC Toxics TMDL)	2006-011	01/11/2006
	2013-010	Not Yet Effective
Ballona Creek, Ballona Estuary, and Sepulveda Channel Bacteria (BC Bacteria TMDL)	2007-015	04/27/2007
	2012-008	07/02/2014
Ballona Creek Metals (BC Metals TMDL)	2007-015	10/29/2008
	2013-010	Not Yet Effective
Santa Monica Bay Nearshore and Offshore Debris (Debris TMDL)	2010-010	03/20/2012
Santa Monica Bay DDTs and PCBs (SMB Toxics)	NA (USEPA TMDL)	03/26/2012
Ballona Creek Wetlands TMDL for Sediment and Invasive Exotic Vegetation (Wetlands TMDL)		03/26/2012

Table 5. Receiving Water Monitoring Sites

Site ID	Water Body/Location	Previous Site Name Used in TMDL Coordinated Monitoring Programs	Coordinates		Monitoring Type	
			Latitude	Longitude	LTA	TMDL
BC_02_SAW	Ballona Creek Reach 2 at Sawtelle Blvd	BC-2	33.998293	-118.402035	X	X
BC_02_DUQ	Ballona Creek Reach 2 at Duquesne Ave	BCB-2	34.017342(1)	-118.389191(1)		X
BC_02_ING	Ballona Creek Reach 2 at Inglewood Blvd	BC-1; BCB-5	33.989385(2)	-118.412169(2)		X
BC_01_WAS	Ballona Creek Reach 1 at W Washington Blvd	BCB-1	34.032252	-118.375328		X
BC_01_NAT	Ballona Creek Reach 1 at National Blvd	BC-3	34.027953	-118.376366		X
BCC_DUQ	Benedict Canyon Channel upstream of confluence with Ballona Creek	BCB-3	34.015141	-118.390655		X
SC_CUL	Sepulveda Channel at Culver Blvd	BC-4; BCB-4	33.998319	-118.415671		X
CC_ING	Centinela Creek at Inglewood Blvd	BCB-7	33.987368	-118.409549		X
CC_CEN	Centinela Creek at Centinela Ave	BC-5	33.985321	-118.413104		X
DRL_BCE	Del Rey Lagoon at outlet to the Ballona Creek Estuary	BCB-9	33.962820	-118.451837		X
BCE_MCC	Ballona Creek Estuary at McConnell Ave	BCB-6	33.981657	-118.422380		X
BCE_CUL(3)	Ballona Creek Estuary downstream of Culver Blvd	BCE-4	33.971000(4)	-118.439000(4)		X
BCE_PAC(3)	Ballona Creek Estuary at Pacific Ave	BCE-2; BCB-8	33.963035	-118.453415		X

1. Monitoring at this site will be suspended until the end of the BC Bacteria TMDL Time Schedule Order (TSO), which is December 15, 2019. A future annual report may propose to move the location of this site to an alternate site (e.g., below the proposed Low Flow Treatment Facility #1).
2. Bacteria monitoring will occur at 33.989891, -118.411571.
3. Bed sediment and fish tissue monitoring site.
4. General vicinity of monitoring site. Actual location where bed sediment and tissue samples are collected may vary slightly.

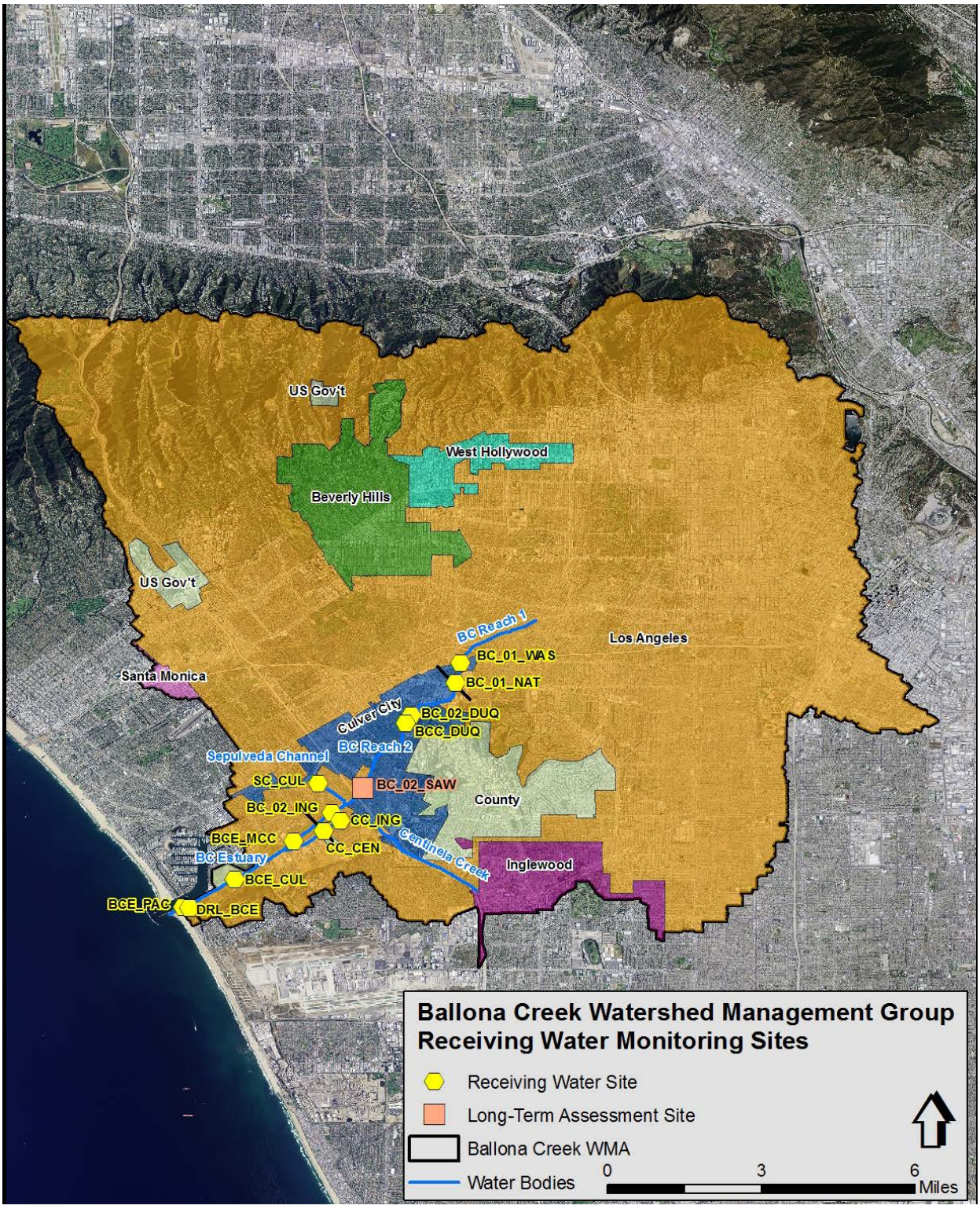


Figure 2. Overview of Receiving Water Monitoring Sites

Table 6. List of Parameters to be Monitored at Ballona Creek Mainstem and Ballona Creek Estuary Receiving Water Monitoring Sites and Annual Frequency (wet/dry)[1]

Parameters	Estuary			Reach 1		Reach 2		
	BCE_PAC	BCE_CUL	BCE_MCC	BC_01_WAS	BC_01_NAT	BC_02_SAW	BC_02_DUQ	BC_02_ING
Flow and field parameters[2]	Frequency is equal to the number of times a site is visited for monitoring							
Pollutants identified in Table E-2 of the MRP[3] and not otherwise addressed below						1[4]/1[4]		
Total Coliform, *E. coli*, Enterococcus	52[5]		52[5]					
E. coli				52[5, 6]			52[5, 7]	52[5]
Aquatic Toxicity and Toxicity Identification Evaluation (TIE), if necessary						2/1		
Hardness					3/9	3/9		
Total Suspended Solids (TSS)	3/2				3/9	3/9		3/0
Suspended Sediment Concentration (SSC)								3/0
TDS and Settleable Solids								3/0
Total Organic Carbon (TOC)								3/0
Suspended Sediment: Cadmium, Copper, Lead, Silver, Zinc, Chlordane[8], DDT[9], PCBs[10], and PAHs[11]								3/0
Tissue: Chlordane[78], DDT[9], and PCBs[10]	Annually							
Bed Sediment: TOC, grain size, Cadmium, Copper, Lead, Silver, Zinc, Dieldrin, Chlordane[8], DDT[9], PCBs[10], and PAHs[11]	Annually	Annually						
Sediment Toxicity Testing	Annually	Annually						
Bioassessment	Once every 5 years	Once every 5 years						

Parameters	Estuary			Reach 1		Reach 2		
	BCE_PAC	BCE_CUL	BCE_MCC	BC_01_WAS	BC_01_NAT	BC_02_SAW	BC_02_DUQ	BC_02_ING
Copper (total and dissolved)	3/2				3/9	3/9		
Lead (total and dissolved)	0/2				3/9	3/9		
Zinc (total and dissolved)	3/0				3/9	3/9		
Selenium (total)						3/2		
Cadmium (total and dissolved)					3/0	3/0		
Mercury (total)	3/2				3/2	3/2		
Nickel (total and dissolved)	0/2							
Silver (total and dissolved)	3/0				3/0			
Ammonia						0/2		
Dibenzo(a,h)anthracene	0/2							
Indeno(1,2,3-cd)pyrene	0/2							

1. Annual frequency listed as number of wet/dry-weather events per year, respectively (e.g., 3/2 signifies three wet and two dry weather events per year).
2. Field parameters are defined as DO, pH, temperature, and specific conductivity. Flow will not be collected at sites located in the BCE. Consistent with the BC Bacteria CMP. Flow and field parameters will not be monitored during weekly bacteria monitoring events unless additional constituents are monitored at a site during the event.
3. All pollutants identified in Table E-2 of the MRP not already explicitly addressed by monitoring at this site.
4. Monitoring frequency only applies during the first year of monitoring and will be conducted during the first significant rain event of the storm year for wet weather and during the critical dry weather event for dry weather. For constituents identified in Table E-2 of the MRP that are not detected at the Method Detection Limit (MDL) or the result is below the lowest applicable water quality objective, additional monitoring will not be conducted (i.e., the monitoring frequency will become 0/0). For constituents detected above the lowest applicable water quality objective, future monitoring will be conducted at the frequency specified in the MRP (i.e., the monitoring frequency will become 3/2).
5. Monitoring frequency is weekly regardless of the weather condition.
6. Consistent with the data analysis conducted for the BC Bacteria TMDL Staff Report, a 1:1 *E. coli* to fecal coliform ratio will be used.
7. Monitoring at this site will be suspended until the end of the BC Bacteria TMDL TSO, which is December 15, 2019. A future annual report may propose to move the location of this site to an alternate site (e.g., below the proposed Low Flow Treatment Facility #1).
8. As outlined in **Attachment D**, chlordane includes analyses for the following species: alpha-chlordane, gamma-chlordane, oxychlordane, cis-Nonachlor, and trans-Nonachlor.
9. DDT includes analyses for the following species: 2,4'-DDD, 2,4'-DDE, 2,4'-DDT, 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT.
10. As outlined in **Attachment D**, PCBs includes analyses for all aroclor species when analyzed in water and the following 54 PCB congeners when analyzed in water, tissue, sediment, or suspended solids: 8, 18, 28, 31, 33, 37, 44, 49, 52, 56, 60, 66, 70, 74, 77, 81, 87, 95, 97, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 132, 138, 141, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 174, 177, 180, 183, 187, 189, 194, 195, 201, 203, 206, and 209.
11. As outlined in **Attachment D**, PAHs includes analyses for the following species: acenaphthene, anthracene, biphenyl, naphthalene, 2,6-dimethylnaphthalene, fluorene, 1-methylnaphthalene, 2-methylnaphthalene, 1-methylphenanthrene, phenanthrene, benzo(a)anthracene, benzo(a)pyrene, benzo(e)pyrene, chrysene, dibenz(a,h)anthracene, fluoranthene, perylene, and pyrene.

Table 7. Summary of Constituents to be Monitored at Ballona Creek Tributary Receiving Water Monitoring Sites and Annual Frequency (wet/dry)[1]

Constituents	Del Rey Lagoon	Benedict Canyon Channel	Centinela Creek		Sepulveda Channel
	DRL_BCE	BCC_DUQ	CC_ING	CC_CEN	SC_CUL
Flow and field parameters[2]	Frequency is equal to the number of times a site is visited for monitoring				
Total Coliform, *E. coli*, Enterococcus	52[3]		52[3]		
E. coli		52[3]			52[3]
Hardness				3/9	3/9
TSS				3/9	3/9
SSC				3/0	3/0
TDS and Settleable Solids				3/0	
Total Organic Carbon (TOC)				3/0	
Suspended Sediment: Cadmium, Copper, Lead, Silver, Zinc, Chlordane[4], DDT[5], PCBs[6], and PAHs[7]				3/0	
Copper (total and dissolved)				3/9	3/9
Lead (total and dissolved)				3/9	3/9
Zinc (total and dissolved)				3/9	3/9
Selenium (total)				3/2	3/2
Cadmium (total and dissolved)				3/0	
Silver (total and dissolved)				3/0	
Ammonia					0/2
Indeno(1,2,3-cd)pyrene				3/0	
Chrysene				3/0	
Benzo(a)anthracene				3/0	
Benzo(k)fluoranthene				3/0	

1. Annual frequency listed as number of wet-weather/dry-weather events per year, respectively (e.g., 3/2 signifies three wet weather and two dry weather events per year).
2. Field parameters are defined as DO, pH, temperature, and specific conductivity. Consistent with the BC Bacteria CMP, flow and field parameters will not be monitored during weekly bacteria monitoring events unless additional constituents are monitored at a site during the event.
3. Monitoring frequency is weekly regardless of the weather condition.
4. As outlined in **Attachment D**, chlordane includes analyses for the following species: alpha-chlordane, gamma-chlordane, oxychlordane, cis-Nonachlor, and trans-Nonachlor.
5. DDT includes analyses for the following species: 2,4'-DDD, 2,4'-DDE, 2,4'-DDT, 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT.
6. As outlined in **Attachment D**, PCBs includes analyses for the following all aroclor species when analyzed in water and the following 54 PCB congeners when analyzed in water, tissue, sediment, or suspended solids: 8, 18, 28, 31, 33, 37, 44, 49, 52, 56, 60, 66, 70, 74, 77, 81, 87, 95, 97, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 132, 138, 141, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 174, 177, 180, 183, 187, 189, 194, 195, 201, 203, 206, and 209. The selected PCBs were identified from a variety of sources including the CTR, California Sediment Quality Objectives, and the BIGHT 2013 study.

7. As outlined in **Attachment D**, PAHs includes analyses for the following species: acenaphthene, anthracene, biphenyl, naphthalene, 2,6-dimethylnaphthalene, fluorene, 1-methylnaphthalene, 2-methylnaphthalene, 1-methylphenanthrene, phenanthrene, benzo(a)anthracene, benzo(a)pyrene, benzo(e)pyrene, chrysene, dibenz(a,h)anthracene, fluoranthene, perylene, and pyrene as these are the PAHs identified in the California Sediment Quality Objectives.

relatively consistent throughout the watershed, so additional focus on geographic differences is not necessary. This means that only a handful of sites are needed to adequately characterize residential land use discharge quality within the watershed. Realistically achievable changes in stormwater runoff quality or loads (e.g., 20–50% reductions) are statistically demonstrable only over relatively long periods of time (≥10 years). The approach to monitor one outfall for each major waterbody will provide the representative data needed to meet the specific MRP objectives for stormwater outfall monitoring and support management decisions of the BCWMG. Additional monitoring sites will not provide significant improvements in representation or characterization of discharge quality, or additional information for discharge quality management. For additional details on the analysis to support the approach to one site per major waterbody, please see **Attachment B**.

Summary information for the three stormwater outfall monitoring sites is presented in **Table 11** and the locations are shown on **Figure 3**. **Table 12** identifies the outfalls which would be considered representative of each of the BCWMG members. Additionally, **Table 12** identifies the receiving waters to which the outfall sites may be considered applicable. That is, if an exceedance was observed in a receiving water, the outfall data would be reviewed to determine if an individual BCWMG member caused or contributed to the exceedance.

Attachment B presents additional details of the sites. Additionally, alternate sites are identified in **Attachment B** in the event the primary sites are not accessible, are determined to backflow during high flow conditions to the extent that a representative sample cannot be obtained, or are unsafe for sampling. For all three stormwater outfall monitoring sites, if determined to be preferable, sampling may occur at a manhole located upstream of each of the location where the outfall discharges to a receiving water.

Table 11. Stormwater Outfall Monitoring Sites

Site Characteristic	Waterbody The Outfall Directly Discharges To		
	Ballona Creek	**Sepulveda Channel**	**Centinela Creek**
Site Name	BC_SW_FAI	SC_SW_WAS	CC_SW_LAC
Jurisdiction Where Site is Located	City of Los Angeles	Culver City	Inglewood
Jurisdictions Discharging to Site	City of Los Angeles, West Hollywood	City of Los Angeles, Culver City	City of Los Angeles, County of Los Angeles, Inglewood
Drain Name	BI 0054 –Pico Blvd	BI 0425 Line G - S Culver City	BI 0273 – BI 0443 U1
Size	136 inches	66 inches	186 inches
Shape	Rectangular	Round	Rectangular
Material	Reinforced Concrete Box	Reinforced Concrete Pipe	Reinforced Concrete Box
Latitude	34.03825	33.99986	33.96777
Longitude	-118.36910	-118.41757	-118.37057

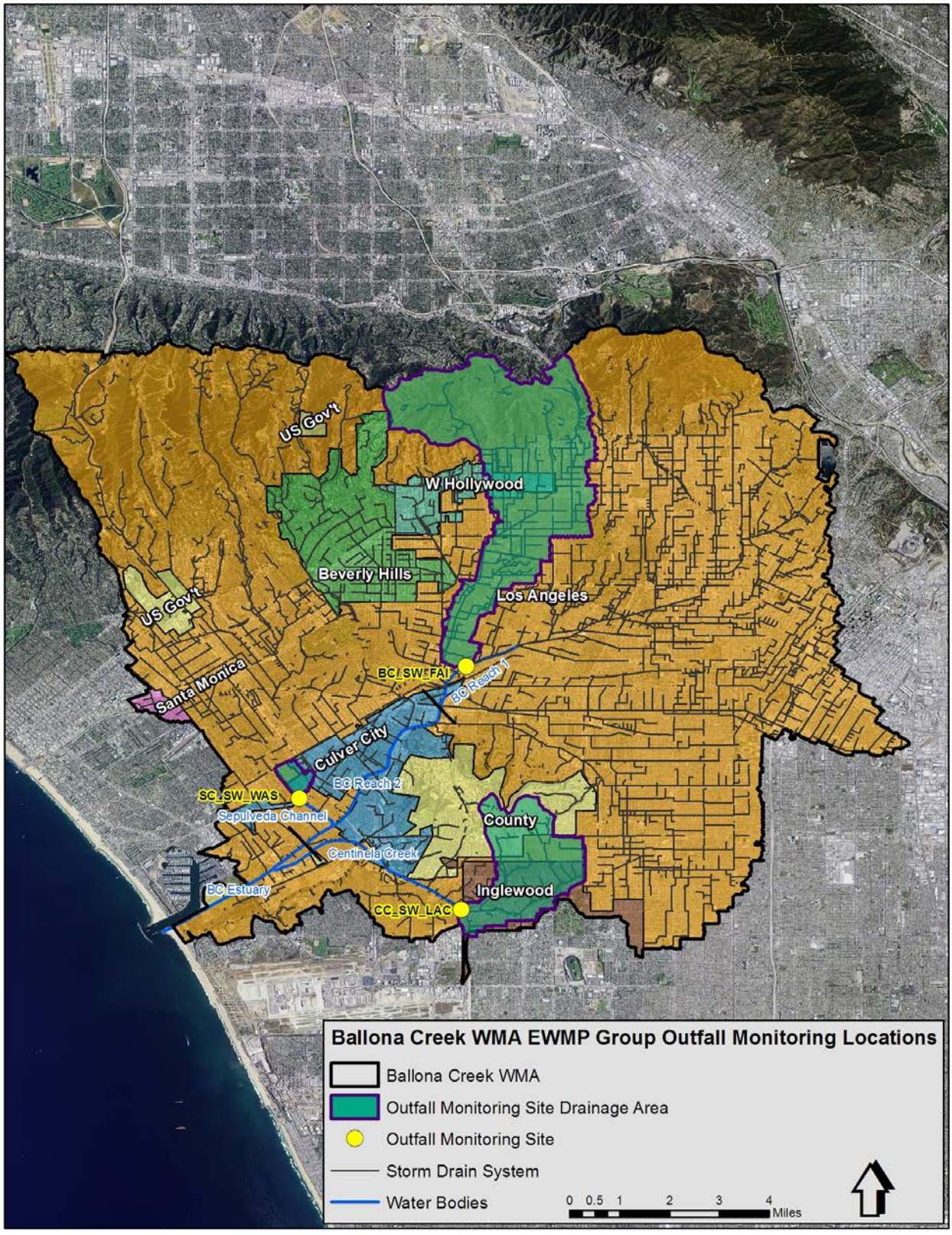


Figure 3. Stormwater Outfall Monitoring Locations Overview

4.2 MONITORED PARAMETERS AND FREQUENCY

The requirements for parameters to be monitored are outlined in the Part VIII.B.1.c of the MRP. Parameters that will be monitored during three events at each stormwater outfall monitoring site are presented in **Table 14** and are based on the monitoring requirements of the waterbody to which they discharge, as well as downstream waterbodies. This list was generated from the current list of constituents monitored during wet weather in the receiving waters and will be updated as the constituents monitored during wet weather in the waterbody to which they discharge, as well as downstream waterbodies, are updated and/or changed based upon the data collected at the individual outfall site. Outfalls will be monitored for all required constituents except toxicity. Toxicity monitoring will occur when triggered by receiving water toxicity monitoring and Toxicity Identification Evaluation (TIE) results. Wet weather events for stormwater outfall monitoring will occur simultaneously with receiving water monitoring to the extent possible. To be consistent with receiving water monitoring, stormwater outfall monitoring will consist of collecting composite samples (except in certain situations as described in **Section 2.3**). Wet weather conditions for targeted storm events are described in **Section 2.3** and **Attachment C**. Analytical methods, detection limits, sampling methods, sample handling procedures, and details regarding the collection of QA/QC samples are detailed in **Attachment C**.

Table 14. List of Parameters for Stormwater Outfall Monitoring

Parameters[1]	Receiving Water to Which Outfall is Discharging		
	Ballona Creek	Centinela Creek	Sepulveda Channel
Flow, hardness, pH, dissolved oxygen, temperature, and specific conductivity	X	X	X
Table E-2 pollutants of the MRP detected above relevant objectives and not otherwise addressed below	X	X	X
E. coli	X	X	X
TSS	X	X	X
SSC	X	X	X
TDS	X		X
Settleable Solids	X		X
Chlordane[2]	X	X	X
DDTs[2]	X	X	X
PCBs[2]	X	X	X
PAHs[2]	X	X	X
Copper (total and dissolved)	X	X	X
Lead (total and dissolved)	X	X	X
Zinc (total and dissolved)	X	X	X
Mercury (total)	X	X	X
Cadmium (total and dissolved)	X	X	X
Silver (total and dissolved)	X	X	X
Indeno(1,2,3-cd)pyrene		X	
Chrysene		X	
Benzo(a)anthracene		X	

Parameters[1]	Receiving Water to Which Outfall is Discharging		
	Ballona Creek	Centinela Creek	Sepulveda Channel
Benzo(k)fluoranthene		X	

1. As described in **Section 11**, data collected as part of this CIMP will be reviewed and changes to the constituents and frequencies as a result of exceedances in the receiving waters or as a result of toxicity testing will be discussed in the annual report and implemented starting no later than the first CIMP event of the next monitoring year (i.e., the first event after July 1 of the year following the annual report submittal).
2. See **Table 6** for a summary of the constituents that comprise chlordane, DDTs, PCBs, and PAHs.

4.3 STORMWATER OUTFALL MONITORING SUMMARY

A summary of how the stormwater outfall monitoring program meets the intended objectives of the stormwater outfall monitoring program outlined in Part VIII.A of the MRP is presented in **Table 15**. The schedule for implementing stormwater outfall monitoring is presented in **Section 13**.

Table 15. Summary of Stormwater Outfall Monitoring Program Objectives

MRP Objective	CIMP Component Meeting Objective
Determine the quality of a Permittee's discharge relative to municipal action levels, as described in Attachment G of MS4 Permit.	• Stormwater outfall monitoring sites chosen using a representative land use approach. • Stormwater outfall monitoring sites chosen to be representative of entire BCWMG EWMP area. • Extensive list of constituents being collectively monitored at stormwater outfall monitoring sites.
Determine whether a Permittee's discharge is in compliance with applicable WQBELs derived from TMDL WLAs.	• Stormwater outfall monitoring sites located in waterbodies with applicable WQBELs. • Stormwater outfall monitoring sites chosen using a representative land use approach. • List of constituents based on the water quality priorities which includes constituents with WQBELs derived from TMDL WLAs.
Determine whether a Permittee's discharge causes or contributes to an exceedance of RWLs.	• One stormwater outfall monitoring site located in each waterbody. • Monitoring frequency equal to receiving water monitoring frequency to enable determination of whether the Permittee's discharge is causing or contributing to any observed exceedances of water quality objectives in the receiving water. • Stormwater outfall monitoring sites chosen using a representative land use approach. • List of constituents based on the monitoring requirements of the waterbody to which they discharge, as well as downstream waterbodies.

based upon the data collected at the individual outfall site. To be consistent with receiving water monitoring, NSW monitoring will consist of collecting grab samples. Note that constituents associated with suspended sediments transported during wet weather (i.e., PCBs, DDTs, dieldrin, chlordane, and PAHs) are not included in the list of constituents presented in **Table 19** and should not be monitored during NSW outfall monitoring.

Analytical methods, detection limits, sampling methods, and sample handling procedures are detailed in **Attachment C**. In addition, details regarding the collection of QA/QC samples are outlined in **Attachment C**.

Table 19. List of NSW Outfall Monitoring Parameters

Parameters[1]	Receiving Water to Which Outfall is Discharging		
	Ballona Creek	Centinela Creek	Sepulveda Channel
Flow, hardness, pH, dissolved oxygen, temperature, and specific conductivity	X	X	X
Table E-2 pollutants detected above relevant objectives and not otherwise addressed below	X	X	X
E. coli	X	X	X
TSS	X	X	X
Copper (total and dissolved)	X	X	X
Lead (total and dissolved)	X	X	X
Zinc (total and dissolved)	X	X	X
Mercury (total)	X	X	X
Nickel (total and dissolved)	X	X	X
Ammonia	X		X

1. As described in **Section 11**, data collected as part of this CIMP will be reviewed and changes to the constituents and frequencies as a result of exceedances in the receiving waters or as a result of toxicity testing will be discussed in the annual report and implemented starting no later than the first CIMP event of the next monitoring year (i.e., the first event after July 1 of the year following the annual report submittal).

5.7 NON-STORMWATER OUTFALL MONITORING SUMMARY

A summary of how the NSW outfall monitoring program meets the intended objectives of the NSW outfall monitoring program outlined in Part II.E.3 of the MRP is presented in **Table 20**. The schedule for implementing the NSW Outfall Monitoring Program is presented in **Section 13**.