Marina del Rey
Coordinated Integrated Monitoring Program

Prepared For:

Marina del Rey Enhanced Watershed Management Program Agencies

County of Los Angeles
Los Angeles County Flood Control District
City of Los Angeles
City of Culver City

Version 3.0 Submitted: October 4, 2018

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%	percent
§	Section
ACP	asbestos cement pipe
BC	Ballona Creek
BMP	best management practice
Caltrans	California Department of Transportation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFS	cubic feet per second
CIMP	Coordinated Integrated Monitoring Program
CMP	Coordinated Monitoring Plans
County	County of Los Angeles
CRA	Coastal Resource Area
DDT	Dichlorodiphenyltrichloroethane
DO	Dissolved Oxygen
EIA	effective impervious area
EWMP	Enhanced Watershed Management Program
GIS	Geographic Information System
GPD	gallons per day
IC/ID	illicit connection/illicit discharge
LACDBH	Los Angeles County Department of Beaches and Harbors
LACFCD	Los Angeles County Flood Control District
LADPW	Los Angeles County Department of Public Works
LAMC	Los Angeles Municipal Code
LARWQCB	Los Angeles Regional Water Quality Control Board, also Regional Board
LAX	Los Angeles International Airport
LFD	low flow diversion
LID	Low Impact Development
MAL	Municipal Action Levels
MCM	minimum control measure
MDL	method detection limit
MdR	Marina del Rey
MdRH	Marina del Rey Harbor
ME	mass emission
MGD	million gallons per day
ML	minimum level
MRP	Monitoring and Reporting Program
MS4	Municipal Separate Storm Sewer System
Permit	Municipal Separate Storm Sewer System Permit
NHD	National Hydrography Dataset
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
NSW	Non-Storm Water
NWS	National Weather Service

OEHHA	Office of Environmental Health Hazard Assessment
PCB	polychlorinated biphenyl
pH	hydrogen ion concentration
PMRP	Plastic Pellet Monitoring and Reporting Plan
p p'-DDE	p p'-dichlorodiphenyldichloroethylene
PVC	polyvinyl chloride
QA/QC	quality assurance/quality control
RCB	reinforced concrete box
RCP	reinforced concrete pipe
RWL	Receiving Waters Limitation
SCCWRP	Southern California Coastal Water Research Project
SEA	significant ecological area
SMB	Santa Monica Bay
SMC	Stormwater Monitoring Coalition
SQO	Sediment Quality Objective
SQDV	Stormwater Quality Design Volume
SRP	Spill Response Plan
SUSMP	Standard Urban Stormwater Mitigation Plan
SWAMP	Surface Water Ambient Monitoring Program
SWRCB	State Water Resources Control Board
TDS	total dissolved solids
TIE	Toxicity Identification Evaluation
TMDL	Total Maximum Daily Load
TMRP	Trash Monitoring and Reporting Plan
TOC	total organic carbon
TSO	time schedule order
TSS	total suspended solids
USEPA	U.S. Environmental Protection Agency
WDID	Waste Discharge Identification Number
Weston	Weston Solutions, Inc.
WLA	waste load allocation
WMA	Watershed Management Area
WMG	Watershed Management Group
WMMS	Watershed Management Modeling System
WMP	Watershed Management Program
WQBEL	water quality based effluent limitations
WQO	water quality objective

EXECUTIVE SUMMARY

The Marina del Rey (MdR) watershed is a small sub-watershed located in the larger, Santa Monica Bay watershed. The Marina del Rey Harbor (MdRH) was officially opened in 1965 and is the world's largest man-made small craft harbor. The tributary area served by the municipal separate storm sewer system (MS4) that drains to MdRH is approximately 1,409 acres and consists of portions of the cities of Culver City and Los Angeles, as well as portions of the unincorporated County of Los Angeles (County). The MdR Watershed Management Area (WMA) is one of the smallest WMAs in the County of Los Angeles, but it is also one of the most important and active watersheds.

The MdR watershed has the one of most aggressive Total Maximum Daily Load (TMDL) schedules for both Toxics and Bacteria and often leads the way in TMDL implementation for the rest of the County.

The extensive ongoing efforts of the County, the Los Angeles County Flood Control District (LACFCD), and the Cities of Culver City and Los Angeles to improve water quality in the MdR watershed include conducting activities and implementing best management practices (BMPs) to help reduce pollutants from storm water runoff from the watershed to the harbor. Over the past 10 years, responsible agencies in the MdR watershed have spent tens of millions of dollars in special studies, low-flow diversions, non-structural BMPs, structural BMPs, and monitoring efforts.

The water quality in the harbor has significantly improved due to the cooperative efforts of the the County, the LACFCD, and the cities of Culver City and Los Angeles (collectively known as the MdR Enhanced Watershed Management Program [EWMP] Agencies). The MdR EWMP Agencies look forward to working with interested stakeholders and the Los Angeles Regional Water Quality Control Board (LARWQCB or Regional Board) to further improve water quality in the watershed.

Background

The National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit Order No. R4-2012-0175 (Permit) was adopted on November 8, 2012, by the LARWQCB and became effective December 28, 2012. This Permit replaced the previous permit (Order No. 01-182). The purpose of the Permit is to ensure the MS4s in Los Angeles County are not causing or contributing to exceedances of water quality objectives (WQOs) set to protect the beneficial uses in the receiving waters in the Los Angeles region. The requirements for the Monitoring and Reporting Program (MRP) are included as Attachment E to the Permit. The primary objectives of the MRP are as follows (II.A of the MRP):

1. Assess the chemical, physical, and biological impacts of discharges from the MS4 on receiving waters.
2. Assess compliance with receiving water limitations and water quality-based effluent limitations (WQBELs) established to implement TMDL wet weather and dry weather waste load allocations (WLAs).
3. Characterize pollutant loads in MS4 discharges.
4. Identify sources of pollutants in MS4 discharges.
5. Measure and improve the effectiveness of pollutant controls implemented under the Permit.

Section II.D of the MRP provides flexibility to allow Permittees the option to develop a Coordinated Integrated Monitoring Program (CIMP) that uses alternative approaches to meet the primary objectives of the Permit. The agencies with jurisdiction in the Marina del Rey WMA, including the unincorporated areas of the County of Los Angeles, the LACFCD, and the Cities of Los Angeles and Culver City, have elected to pursue a CIMP and have provided justification in this document demonstrating fulfillment of monitoring requirements of the Permit and TMDLs.

The monitoring requirements outlined in this CIMP are in accordance with the requirements of the Permit, the Bacteria TMDL, and the Toxics TMDL. An overview of these regulatory drivers is presented in Appendix A. Monitoring requirements differ between these three regulatory drivers on issues such as monitoring station locations, definition of wet/dry weather, monitoring duration, and monitoring constituents. One objective of this CIMP is to leverage resources to create an efficient and effective monitoring program to represent conditions within the receiving water and tributary MS4. During the third year of CIMP monitoring (2017-2018) the CIMP was updated based on knowledge gained from the first two years of CIMP monitoring. An overview of the CIMP monitoring programs is presented in this section.

Receiving Water Monitoring

The 18 receiving water monitoring stations in the Marina del Rey Harbor are shown in Figure ES-1 below. The stations were selected to address both Bacteria and Toxics TMDLs and Permit monitoring requirements. Nine receiving water stations were selected for Bacteria TMDL monitoring, eight receiving water stations were selected for only the Toxics TMDL monitoring, and one receiving water station was selected for Permit-required receiving water monitoring and the Toxics TMDL monitoring. Constituents for monitoring were selected based on water quality priorities, developed during the writing of the Marina del Rey EWMP Work Plan (Weston, 2014) (Submitted June 28, 2014). The water quality priorities were based on existing TMDLs, Clean Water Act Section (§) 303(d) lists, and exceedance of WQOs for other non-TMDL constituents equivalent to the (§) 303(d) listing policy.

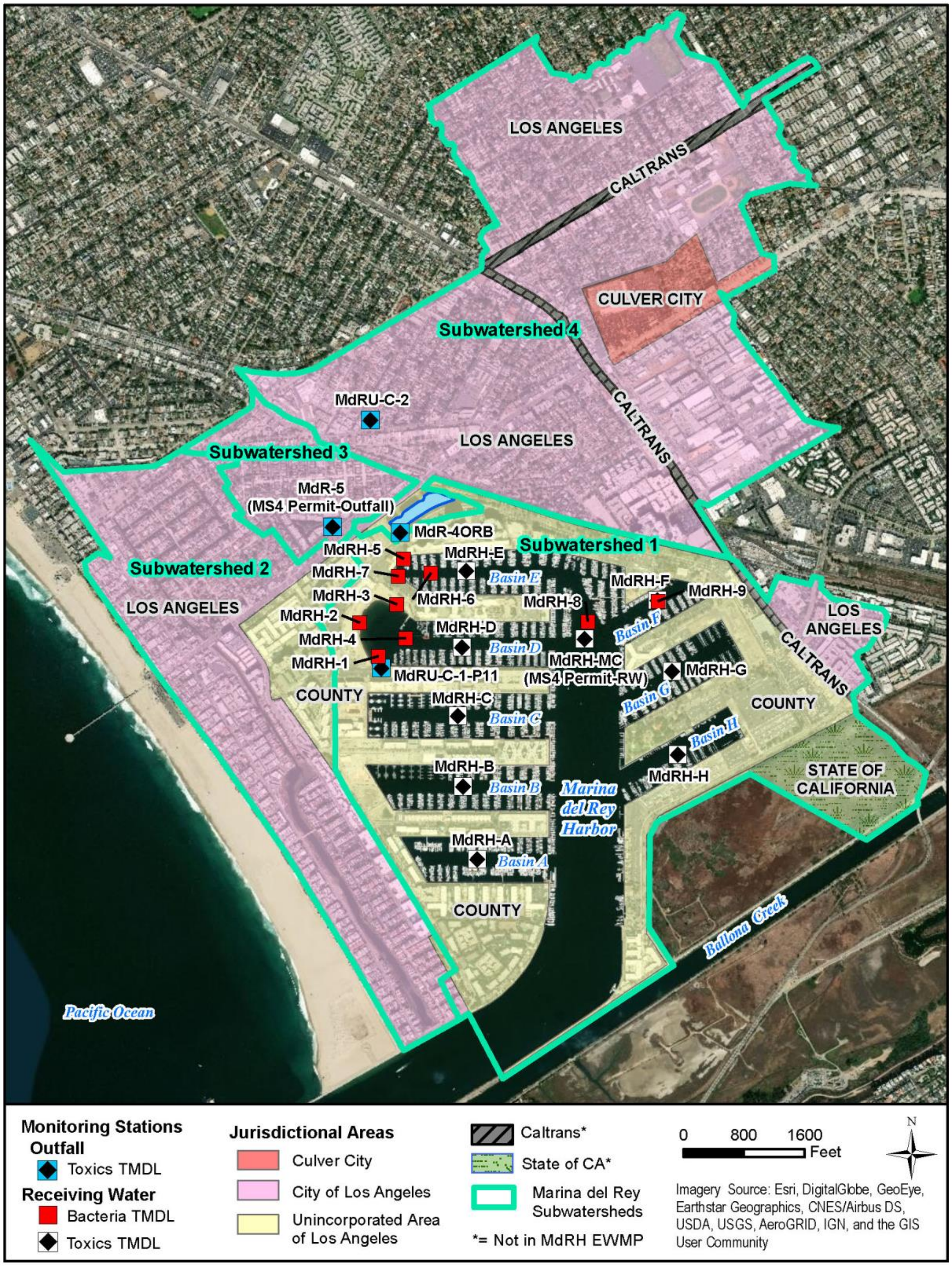

Figure ES-1. Marina del Rey WMA Agencies Receiving Water and Outfall Monitoring Locations

Storm Water Outfall Monitoring

Four outfall monitoring locations were selected for monitoring; they are displayed on Figure ES-1 above. One station (MdR-5) was selected for both Permit monitoring and Toxics TMDL monitoring, along with three additional stations which will be monitored as part of the Toxics TMDL outfall monitoring. These stations will capture runoff from representative land use areas, displayed in Figure 4-1 through Figure 4-3, of the Marina del Rey watershed and will also be used to assess Permit and Toxics TMDL compliance in accordance with applicable storm water municipal action levels (MALs) and WQBELS.

Non-Storm Water Toxics TMDL Outfall Program

One Toxics TMDL outfall monitoring location, MdR-4ORB, shown in Figure ES-1 was selected for non-storm water monitoring each year beginning in September 2018 by the LARWQCB per the approval letter dated August 30, 2018. Station MdR-4ORB is located at the tide gates in Oxford Retention Basin (ORB). Monitoring during a non-storm water event will help to characterize the pollutant load from ORB to MdRH during dry weather.

Non-Storm Water Permit Outfall Program

A majority of the non-storm water flows from the MdR watershed to the major MS4 outfalls in the MdR WMA are currently diverted to the sanitary sewer through the use of low flow diversions (LFDs).

The areas not addressed by an LFD that discharge into a major outfall are the following:

- Four catch basins that are downstream of the Boone Olive LFD and discharge into a major outfall at Basin E.
- Approximately 118 acres of land area (7.5% of total drainage area) within the City of LA are not addressed by an LFD or a biofiltration unit and discharge to a major outfall (Oxford Basin) at Basin E.
- Nine catch basins near the intersection of Mindanao Way and Lincoln Boulevard that drain into a major outfall into Basin G. Note that some of these catch basins serve Lincoln Boulevard which is owned and maintained by the California Department of Transportation (Caltrans).
- Four major outfalls in Subwatershed 2 (Grand Canal/Ballona Lagoon).

All of the major outfalls not addressed by an LFD in the MdRH are below tide level and inundated with marine waters at all times (Figure ES-2). The tidal inundation of the major outfalls surrounding the MdRH does not allow for the sampling of outfall discharge. Potential discharge (where not addressed by a LFD) is co-mingled with marine waters, making it impossible to discern the impact of potential non-storm water runoff to the receiving water.

Because all the major outfalls are inundated, as part of the Non-Stormwater Screening Program, all catch basins that are not served by an LFD or BMP that have capacity to handle non-storm water discharges and discharge to a major outfall (Figure ES-2) were visually inspected on three separate events (September 2016, April 2017, and July 2017) to determine if there was significant flow being inputted into the storm drain system. Based on the data collected during the observations, no significant flows were detected during the Non-Stormwater screening events.

Figure ES-2. Extent of Tidal Influence, Major Outfalls and Catchbasins for Visual Observations

There are close to 700 small drain outfalls that discharge to the harbor that are not considered major outfalls and are not required to be monitored per the MS4 Permit.

Trash and Plastic Pellet Monitoring

The Permit requires Permittees to develop a Trash Monitoring and Reporting Plan (TMRP) to describe the methodologies that will be used to assess and monitor trash from source areas in the Santa Monica Bay (SMB) WMA and shoreline of the Santa Monica Bay. In 2012, the County submitted a TMRP to the Regional Board which is included in Appendix J of the CIMP. The City of Los Angeles will not be developing a TMRP for MdR because the implementation program for the Ballona Creek (BC) Trash TMDL covers the City's area in MdR. The City of Culver City is in compliance with the TMRP for the Ballona Creek Trash TMDL and is considered in compliance with the Debris TMDL's trash component. These plans are considered to be independent of this CIMP.

Plastic Pellet Monitoring and Reporting Plans (PMRPs) quantifying potential plastic pellet discharges to Santa Monica Bay, along with supplemental Spill Response Plans (SRPs) to address containment of spilled plastic pellets, were submitted to the Regional Board by the City of Culver City (2012), County (LADPW, 2013a), and LACFCD (2013) and are included in Appendix J. The City of Los Angeles does not have plastic pellet facilities in MdR and is therefore not subject to the pellet monitoring requirements of the PMRP; subsequently, the City will coordinate plastic pellets spill and response requirements in conjunction with the SMB and BC watersheds.

New Development and Redevelopment Effectiveness Tracking

The MdR EWMP Agencies have developed mechanisms for tracking new development/re-development projects that include post-construction BMPs pursuant to Permit Section VI.D.7. The specific tracking information for each jurisdiction is unique to each Permittee, and therefore this CIMP provides a general overview of tracking requirements and data necessary to show compliance with the Permit.

Regional Studies

The MRP requires participation in regional studies, including participation in the Southern California Monitoring Coalition's (SMC) Regional Watershed Monitoring Program (Bioassessment Program) and special studies as specified in approved TMDLs.

The LACFCD and City of Los Angeles currently participate in the SMC Monitoring Program. The LACFCD will continue to participate in the Bioassessment Program being managed by the SMC. The LACFCD, on behalf of the MdR EWMP Agencies, will continue to coordinate and assist in implementing the bioassessment monitoring requirement of the MS4 permit on behalf of the permittees in Los Angeles County. Initiated in 2008, the SMC's Bioassessment Program is designed to run over a five-year cycle. Monitoring under the first cycle concluded in 2013, with reporting of findings and additional special studies planned to occur in 2014. In 2015, a new five-year SMC Program began continuing to build off the initial survey with some additional key modifications that address knowledge gaps such as assessing non-perennial streams in addition to perennial streams, the effects of stressors of interest, and monitoring changes in regional condition over time. In addition, the SMC Bioassessment Program expanded the sample index period to

March through July (previously mid-May-July) and added some additional monitoring parameters. The second five-year cycle is scheduled to run from 2015 to 2019.

In addition to the SMC monitoring program, the MdR EWMP Agencies plan to participate in Bight ’18, which is also a regional monitoring program conducted by the Southern California Coastal Water Research Project (SCCWRP). The program is focused on regional assessment of marine waters in Southern California, including assessments of water quality, sediment quality, and bioaccumulation of toxins in fish tissue.

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1.0 INTRODUCTION

1.1 CIMP Regulatory Background

The National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit Order No. R4-2012-0175 (Permit) was adopted on November 8, 2012, by the Los Angeles Regional Water Quality Control Board (LARWQCB or Regional Board) and became effective December 28, 2012. This Permit replaced the previous permit (Order No. 01-182). The purpose of the Permit is to ensure the MS4s in Los Angeles County (County) are not causing or contributing to exceedances of water quality objectives (WQOs) set to protect the beneficial uses in the receiving waters in the Los Angeles region. The Permit allows the Permittees to customize their storm water programs through the development and implementation of a Watershed Management Program (WMP) or an Enhanced Watershed Management Program (EWMP) to achieve compliance with certain receiving waters limitations (RWLs) and water quality-based effluent limits (WQBELs).

Although extensive default monitoring requirements are specified in the Permit Monitoring and Reporting Plan (MRP), the Permittees have the option to develop a Coordinated Integrated Monitoring Program (CIMP) that uses alternative approaches to meet the primary objectives of the Permit. The agencies with jurisdiction in the Marina del Rey (MdR) Watershed, including the unincorporated areas of the County, the Los Angeles County Flood Control District (LACFCD), and the Cities of Los Angeles and Culver City have elected to pursue a CIMP and have provided justification in this document demonstrating fulfillment of monitoring requirements of the Permit and Total Maximum Daily Loads (TMDLs). More information about LACFCD participation in the CIMP is in Appendix I.

As defined in the MRP, the MdR Watershed CIMP has the potential to be a vehicle to modify TMDL monitoring requirements and other previously implemented monitoring program requirements. Modifications to the MRP and/or TMDL monitoring requirements must satisfy the primary objectives for the CIMP to be considered approvable by the Regional Board Executive Officer. Two TMDL Coordinated Monitoring Plans (CMPs) have been approved by the Regional Board for the MdR Watershed, the *Marina Del Rey Harbor Mothers' Beach and Back Basins Bacterial TMDL Coordinated Monitoring Plan* (Bacteria TMDL CMP) (Los Angeles County Department of Public Works [LADPW], 2007) and the *Marina Del Rey Harbor Toxic Pollutants TMDL Coordinated Monitoring Plan* (Toxics TMDL CMP) (LADPW, 2008a). The MdR Watershed CIMP Version 3.0 reflects modifications based on the revised Bacteria TMDL (LARWQCB, 2014), revised Toxics TMDL (LARWQCB, 2015), new Permit requirements, implemented Best Management Practices (BMPs), recent monitoring data, lessons learned from the first two years of monitoring under the CIMP, and findings and recommendations of the 2013 *Multi-Pollutant TMDL Implementation Plan for the Unincorporated Area of MdR Harbor Back Basins* (LADPW, 2013b), and the 2012 *Toxics Pollutant TMDL Implementation Plan* prepared by the California Department of Transportation (Caltrans) and the Cities of Los Angeles and Culver City (City of Los Angeles, 2012).

1.2 Enhanced Watershed Management Plan Area

The MdR Watershed is bordered by the Santa Monica Bay Watershed to the west and the Ballona Creek Watershed to the north and east. The MdR Harbor (MdRH) is open to the Santa Monica Bay through the Main Channel and shares a common breakwater with Ballona Creek. The MdRH is an active harbor for pleasure craft, consisting of the Main Channel and eight basins (A through H). Basins A, B, C, G, and H are known as the Front Basins. Basins D, E, and F are known as the Back Basins. The MdR Watershed includes the Venice Canals and the tributary area to the Ballona Lagoons, which discharge to the MdRH, near the exit to the Santa Monica Bay.

For the purposes of this CIMP, the MdR Watershed does not include the Caltrans-owned right-of-way or lands within the jurisdiction of the State of California (e.g., Ballona Wetland Area). Therefore, for the purposes of this CIMP, the MdR Watershed is limited to approximately 1,409 acres that are served by an MS4 under the jurisdiction of the MdR EWMP Agencies participating in the MdR Watershed CIMP. Four subwatersheds make up the MdR Watershed as shown in Figure 1-1. The acreage by jurisdiction and subwatershed is presented in Table 1-1.

Table 1-1. Subwatersheds and Jurisdictions within the MdR Watershed

Agency	CIMP Participant	Sub-watershed 1 (Acres)	Sub-watershed 2 (Acres)	Sub-watershed 3 (Acres)	Sub-watershed 4 (Acres)	CIMP Watershed (Acres)	% CIMP Watershed Area
City of Los Angeles	Yes	32.3	278.0	70.5	598.6	979.4	69%
City of Culver City	Yes	0.0	0.0	0.0	41.5	41.5	3%
County	Yes	340.0	46.8	0.0	10.9	397.7	28%
LACFCD	Yes	N/A	N/A	N/A	N/A	N/A	N/A
MS4 Area of MdR Agencies		**372.3**	**324.8**	**70.5**	**651.0**	**1,418.6**	**100%**
Caltrans	No	5.9	0.0	0.0	27.1	33.0	N/A
State of California	No	49.3	0.0	0.0	0.0	49.3	N/A
MdR Watershed Area		**427.5**	**324.8**	**70.5**	**678.1**	**1,500.9**	**--**

Figure 1-1 presents the MdR MS4, the subwatershed boundaries, and the jurisdictional area for each agency within the MdR Watershed. The MdRH/land area in Subwatershed 1 (427.5 acres) is composed of 340.0 acres of unincorporated County land and 32.3 acres within the boundaries of the City of Los Angeles; it has many small drains that discharge into all the Basins. Subwatershed 2 (approximately 324.9 acres) is composed of 46.8 acres of unincorporated County land and 278.0 acres within the boundaries of the City of Los Angeles; it does not drain into the MdRH Front or Back Basins, but drains into the Venice Canal and the Ballona Lagoon which discharge into the Main Channel near the harbor mouth. Boone Olive Pump Plant serves Subwatershed 3, a tributary area of 70.5 acres that lies entirely within the boundaries of the City of Los Angeles. The pump station discharges into Basin E. Subwatershed 4 lies mainly within the jurisdiction of the Cities of

Los Angeles and Culver City and totals approximately 651.0 acres. The acreages given exclude the Caltrans and State of California areas. Runoff discharges into Oxford Retention Basin, a storm water retention basin occupying approximately 10 acres within the County. Situated north of the Back Basins, Oxford Retention Basin is operated by the LACFCD and drains into Basin E through two tide gates.

The MdR Watershed includes residential, commercial, recreational, vacant, institutional, and mixed commercial/industrial land uses. The land use area by subwatershed is presented in Table 1-2 and Figure 1-2. Subwatershed 1 consists of right-of-ways, parking lots, and high-density residential land uses immediately surrounding the MdRH, as well as marine waters within the Harbor. Subwatershed 2 consists of residential areas tributary to the Grand Canal (i.e., Venice Canals and Ballona Lagoon). Subwatersheds 3 and 4 consist of a mix of residential, commercial, and mixed commercial/industrial land uses.

Table 1-2. Summary of MdR Watershed Acreage

Land Use Class	Subwatershed Acreage*				Total
	1	2	3	4	
Single Family Residential	1.4	45.8	22.9	158.6	228.8
Multi-Family Residential	149.9	131.8	21.1	99.9	402.7
Institutional/Public Facilities	8.0	10.1	2.6	67.7	88.3
Commercial and Services	107.7	22.6	1.6	135.5	267.4
Industrial/Mixed with Industrial	0.1	0.2	0.2	27.2	27.9
Transportation/Road Right-of-Way	38.7	83.4	22.0	154.3	298.4
Developed Recreation/Marina Parking	45.6	0.7	0	0.6	46.9
Beach	8.2	0	0	0	8.2
Water**	5.0	30.3	0	7.1	42.3
Vacant	7.7	0	0	0	4.4
Total	372.2	324.9	70.5	650.9	1,418.5

*Acreage excludes Caltrans- and State-owned land (Ballona Wetland) not in CIMP Area.

**Marina Boat Area Water and MdRH Water are not included in "Water" class acreage provided here. The Water class includes Ballona Lagoon (14.4 acres), Venice Canals (15.9 acres), Oxford Retention Basin (7.1 acres), and Ballona Shoreline and other water (6.4 acres).

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Figure 1-1. Marina del Rey Watershed with MS4, Catch Basins, and Subwatershed Areas

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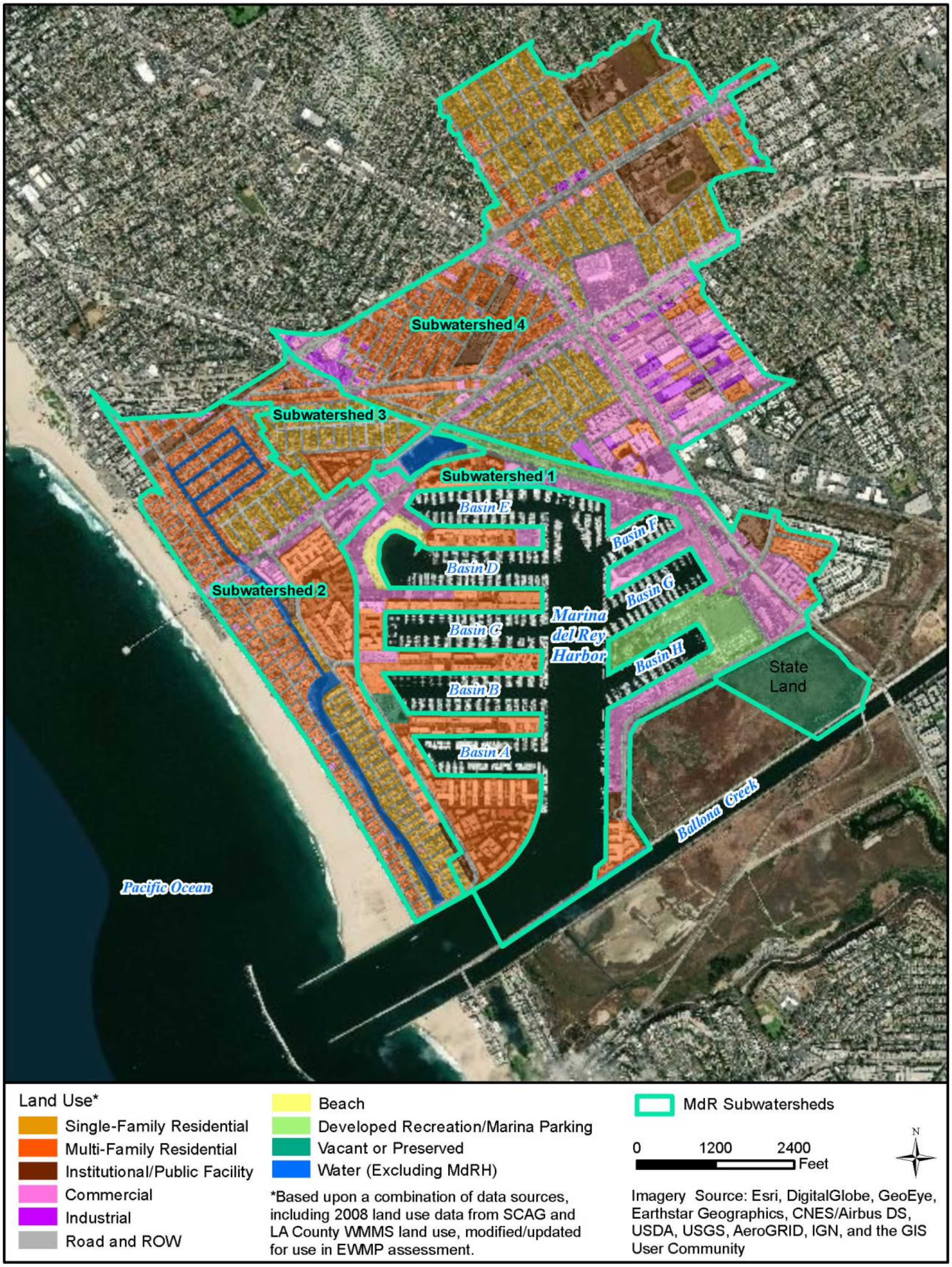

Figure 1-2. MdR Watershed Land Uses and Subwatersheds

1.3 Water Quality Priorities

Multiple monitoring programs and special studies have sought to assess conditions in the MdR receiving waters and surrounding MdR Watershed. All readily available monitoring data, source assessments, and special studies were assessed for interrelationships in terms of pollutants, potential sources, and potential data gaps. Through this evaluation, water-body pollutant combinations were classified into one of the three following categories:

- **Category 1 (Highest Priority):** Pollutants with receiving water limitation or WQBELs as established in Part V1.E and Attachments L through R of the Permit.
- **Category 2 (High Priority):** Section §303(d) listed pollutants in the receiving water that MS4 discharges may be contributing to the impairment.
- **Category 3 (Medium Priority)**: Pollutants with insufficient data to list as §303(d), but which exceed RWLs contained in the Permit, and for which MS4 discharges may be causing or contributing to the exceedance.

Category 1 (highest priority) pollutants are defined by the MS4 Permit as those constituents that have been addressed with receiving water limitations or WQBELs established through a TMDL. The Toxics TMDL establishes waste load allocations for chlordane, total polychlorinated biphenyls (PCBs), total dichlorodiphenyltrichloroethanes (DDTs), p-p'-dichlorodiphenyl-dichloroethylene (DDE), copper, lead and zinc. In addition, the TMDL establishes numeric targets for dissolved copper and total PCBs in the water column in MdRH. The TMDL also addresses the fish consumption advisory and the sediment toxicity listing on the §303(d) list. As a result of the establishment of the TMDL for these constituents, they are classified in accordance with the MS4 Permit as Category 1 pollutants for MdRH (Table 1-3). Trash is also classified as a Category 1 pollutant due to the Santa Monica Bay Debris TMDL, for which compliance is achieved through the Ballona Creek Watershed Trash TMDL (See Appendix A). The Bacteria TMDL established numeric bacterial compliance targets for fecal coliform, *Enterococcus*, and total coliform in MdRH. As a result of the TMDL, these constituents are classified in accordance with the MS4 Permit as Category 1 pollutants for MdR (Table 1-3).

Table 1-3. Waterbody – Pollutant Classification

Waterbody	Pollutant	Classification
Marina del Rey Harbor	Dissolved Copper	Category 1
	Copper	Category 1
	Lead	Category 1
	Zinc	Category 1
	Total PCBs	Category 1
	Total DDTs	Category 1
	p,p'-DDE	Category 1
	Chlordane	Category 1
	Fecal coliform	Category 1
	Enterococcus	Category 1
	Total coliform	Category 1

Table 1-3. Waterbody – Pollutant Classification

Waterbody	Pollutant	Classification
	Trash/Debris	Category 1
	Fish consumption advisory	Category 1*
	Sediment toxicity	Category 1*
Ballona Lagoon/Venice Canal	Total PCBs	Category 1
	DDT	Category 1
	Trash/Debris	Category 1
* Sediment toxicity and fish consumption advisory are addressed by the Toxics TMDL.		

Category 2 constituents are defined in the MS4 Permit as pollutants in the receiving water that are listed on the §303(d) list and for which MS4 discharges may be causing or contributing to the impairment. Dieldrin is the only §303(d) listed constituent for MdRH that has not already been addressed by a TMDL, however, the U.S. Environmental Protection Agency (USEPA) made a finding of non-impairment for this constituent so it will not be considered a Category 2 pollutant.

Category 3 constituents are those pollutants with insufficient data to include on the §303(d) but which exceed receiving water limitations contained in the MS4 Permit and for which MS4 discharges may be causing or contributing to the exceedance. The detailed data evaluation of all available sources of data from relevant studies and monitoring completed within the past 10 years that was conducted and described in the Marina del Rey EWMP Work Plan (Work Plan Appendix F), did not result in any constituents being classified as a Category 3 constituent.

1.4 CIMP Overview

The primary purpose of this CIMP is to outline the process for collecting data to meet the goals and requirements of the MRP. This CIMP is designed to provide the MdR EWMP Agencies the information necessary to guide water quality program management decisions. This CIMP provides information on sample collection and analysis methodologies. Additionally, the monitoring will provide a means to measure compliance with the Permit. The MRP, as outlined in the Permit, is composed of five elements, including:

1. Receiving Water Monitoring
2. Storm Water Outfall Monitoring
3. Non-Storm Water (NSW) Outfall Monitoring
4. New Development/Redevelopment Effectiveness Tracking
5. Regional Studies

In addition to the five elements, which are presented as sections in this CIMP, a specific trash and plastic pellets monitoring section is included. An overview of each of the monitoring types and their monitoring objectives are described in the following subsections.

The monitoring requirements outlined in this CIMP are in accordance with the requirements of the Permit, and TMDLs applicable to the MdR EWMP area. An overview of these regulatory drivers is presented in Appendix A. Monitoring requirements differ between these regulatory drivers on issues such as monitoring station locations, definition of wet/dry weather, monitoring duration, and monitoring constituents. One objective of this CIMP is to leverage resources to create an efficient and effective monitoring program to represent conditions within the receiving water and tributary MS4. This CIMP discusses the following in the context of the MdR Watershed.

1.4.1 Receiving Water Monitoring

The objectives of the receiving water monitoring include the following:

- Determine whether the RWLs are being achieved;
- Assess trends in pollutant concentrations over time, or during specified conditions; and
- Determine whether the designated beneficial uses are fully supported as determined by water chemistry, as well as aquatic toxicity and bioassessment monitoring.

Receiving water monitoring will provide data to determine whether the RWLs and WQOs are being achieved in the MdR EWMP area and support management decisions related to EWMP implementation. Over time, the monitoring will allow the assessment of trends in pollutant concentrations. Receiving water monitoring consists of mass emission monitoring designed to meet all receiving water permit requirements and additional TMDL monitoring locations necessary to evaluate TMDL requirements, §303(d) listings, and other exceedances of RWLs. Implementation of the MdR CIMP replaces prior TMDL monitoring programs.

1.4.2 Storm Water Outfall Monitoring

Storm water outfall monitoring of discharges from the MS4 support meeting three objectives including:

- Determine the quality of storm water discharge relative to municipal action levels.
- Determine whether storm water discharge is in compliance with applicable storm water WQBELs derived from TMDL waste load allocations (WLAs).
- Determine whether the discharge causes or contributes to an exceedance of RWLs.

The storm water outfall monitoring is designed to characterize storm water discharges from MS4s at representative outfall locations within the EWMP area and support management decisions related to EWMP implementation. Additionally, implementation of the MdR CIMP will meet the TMDL outfall monitoring requirements.

1.4.3 Non-Storm Water Outfall Program

Objectives of the NSW outfall monitoring include the following:

- Determine whether a discharge is in compliance with applicable NSW WQBELs derived from TMDL WLAs.
- Determine whether a discharge exceeds NSW action levels.
- Determine whether a discharge contributes to or causes an exceedance of RWLs.
- Assist in identifying illicit discharges.

The intent of the NSW Outfall Program is to demonstrate that the Permittees are effectively prohibiting NSW discharges that are not exempt or conditionally exempt discharges to receiving waters and to assess whether NSW discharges are causing or contributing to exceedances of RWLs. By detecting, identifying, and eliminating illicit discharges, the NSW Outfall Program will demonstrate Permittees' efforts to effectively prohibit NSW discharges to and from the MS4.

Where NSW discharges are deemed “significant”, the program will discern whether they are illicit, exempt, or conditionally exempt, and demonstrate whether the discharges may be causing or contributing to exceedances of RWLs.

The NSW Outfall Screening and Monitoring Program (NSW Outfall Program) is focused on dry weather discharges to receiving waters from major outfalls.

1.4.4 New Development and Redevelopment Effectiveness Tracking

The objective of the New Development/Redevelopment effectiveness tracking is to track whether the conditions in the building permit issued by the Permittee are implemented to ensure the volume of storm water associated with the design storm is retained on-site as required by Part VI.D.7.c.i. of the Permit. Permittees are required to maintain a database to track specific information related to new and redevelopment projects subject to the minimum control measure (MCM) requirements in VI.D.7. The Permit contains data tracking requirements in Part X.A of the MRP and in Part VI.D.7.d.iv.

1.4.5 Trash and Plastic Pellet Monitoring

The objective of the trash and plastic pellet monitoring is to satisfy the monitoring requirements of the *Ballona Creek Trash TMDL* (Trash TMDL) and the *Santa Monica Bay Nearshore and Offshore Debris TMDL* (Debris TMDL) in accordance with the requirement in Part III of the MRP.

1.4.6 Regional Studies

The MRP requires participation in regional studies, including participation in the Southern California Monitoring Coalition’s (SMC) Regional Watershed Monitoring Program (Bioassessment Program) and special studies as specified in approved TMDLs.

The LACFCD and City of Los Angeles currently participate in the SMC Monitoring Program. The LACFCD, on behalf of the MdR EWMP Agencies, will continue to participate in the Bioassessment Program being managed by the SMC. The LACFCD will continue to coordinate and assist in implementing the bioassessment monitoring requirement of the MS4 permit on behalf of the permittees in Los Angeles County. Initiated in 2008, the SMC’s Bioassessment Program is designed to run over a five-year cycle. Monitoring under the first cycle concluded in 2013. The next five-year cycle is scheduled to run from 2015 to 2019.

The MdR EWMP Agencies also plan to participate in the Regional Bight monitoring program, expected to be conducted during 2018.

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2.0 RECEIVING WATER MONITORING PROGRAM

The objectives of the receiving water monitoring (Part II.E.1 of the MRP) include the following:

a. Determine whether the receiving water limitations are being achieved;
b. Assess trends in pollutant concentrations over time, or during specified conditions; and
c. Determine whether the designated beneficial uses are fully supported as determined by water chemistry, as well as aquatic toxicity and bioassessment monitoring.

The following section presents the CIMP Receiving Water monitoring program, including monitoring sites, monitoring parameters and frequency, as well as monitoring coordination. The MdR CIMP integrates the MRP and applicable TMDLs, as well as existing monitoring requirements in the MdR Watershed, into a single efficient and effective program. As such, its implementation replaces the prior TMDL CMPs applicable to the MdR Watershed.

2.1 Receiving Water Monitoring Sites

The MRP specifies that receiving water monitoring shall be performed at previously designated mass emission stations, TMDL receiving water stations (as designated in TMDL CMPs approved by the Regional Board Executive Officer), and additional receiving water locations representative of the impacts from MS4 discharges, and that in the case where monitoring at a station will be discontinued, justification should be provided. The receiving water monitoring programs in this CIMP are based on the monitoring requirements defined in the Bacteria TMDL CMP, the Toxics TMDL CMP, and the Permit.

Monitoring stations selected to conduct this monitoring are discussed below. More information about these stations can be found in Appendix B based on a site reconnaissance in support of the sites selection process. Detailed parameter lists, suggested analytical methods, and target method detection limits are provided in Appendix D. Sampling protocols, sample handling procedures, field quality control sampling requirements, and laboratory analytical methods and quality assurance/quality control (QA/QC) requirements are detailed in Appendix C, with reference to Appendix D.

2.1.1 Mass Emission Monitoring Site

Mass emission (ME) receiving water monitoring is intended to determine if RWLs are achieved, assess trends in pollutant concentrations over time, and determine whether designated beneficial uses are supported. ME monitoring provides a long-term record to understand conditions within the EWMP area, for the full suite of parameters, including TMDL parameters.

There are ME stations in seven major watersheds throughout the County. These stations are monitored per the existing NPDES Permit (CAS004001) in an effort to estimate the mass emissions from the collective MS4. There are no ME stations in the MdR watershed; the closest ME station is located in the Ballona Creek Watershed (Ballona Creek Monitoring Station (S01)). Therefore, this CIMP does not include ME station monitoring.

2.1.2 Permit Monitoring Site

MdRH-MC, located in the Main Channel of the MdRH, was selected as the MdRH receiving water station for Permit compliance monitoring. The intent of the Permit is to assess the impacts of storm water runoff on receiving waters, and therefore MdRH-MC is located at the confluence of Basins D, E, and F. The station is located to assess storm water runoff from the major outfalls located in Basin E and other outfalls located in Basin F. Storm water flows are expected to impact the area in the Back Basins near the confluence of Basins D, E, and F. The location of this station is shown in Figure 2-1.

This receiving water monitoring site meets the MRP objectives and data collected at MdRH-MC will support an understanding of potential impacts associated with MS4 discharges.

2.1.3 TMDL Monitoring Sites

The MdR Watershed is impacted by five TMDLs; the Bacteria TMDL, Toxics TMDL, Trash TMDL, Debris TMDL and the *Santa Monica Bay TMDL for DDT and PCBs* (SMB DDT and PCB TMDL). The SMB DDT and PCB TMDL is an anti-degradation TMDL, for which compliance will be achieved through the reduction in storm water volume associated with implementation of the MdR EWMP program. Harbor receiving water stations monitored as part of the Bacteria and Toxics TMDLs CMPs are summarized below (Table 2-1 and Table 2-2, respectively). More information about these stations is provided in Appendix B. The analytical procedures, sampling methods, QA/QC procedures are provided in Appendix C.

2.1.3.1 Bacteria TMDL Sites

The Bacteria TMDL requires receiving water monitoring in the Back Basins and at three shoreline stations along Marina Beach, as well as at major outfalls in the Harbor. Bacteria TMDL receiving water monitoring is conducted at nine receiving water locations; the type and location of the Bacteria TMDL monitoring stations are summarized in Table 2-1 and Figure 2-1. Note that monitoring for Bacteria is scheduled based on prevailing weather conditions during a scheduled sampling event. Dry/Wet Weather classifications are assigned post-monitoring.

Table 2-1. MdR Receiving Water Bacteria Monitoring Stations

CIMP Station ID	Media Sampled	Monitoring Station Location
MdRH-1	Water	Shoreline Site along Marina Beach at playground
MdRH-2	Water	Shoreline Site along Marina Beach at Main Lifeguard Tower
MdRH-3	Water	Shoreline Site along Marina Beach between the boat dock and lifeguard station
MdRH-4	Water	Basin D, near first slip outside swim area (surface and depth)
MdRH-5	Water	Basin E, in front of tide-gate from Oxford Retention Basin
MdRH-6	Water	Basin E, center of basin (surface and depth)
MdRH-7	Water	Basin E, in front of Boone-Olive Pump Outlet
MdRH-8	Water	Back of the Main Channel at the intersection of Basins D, E, and F (surface and depth)
MdRH-9	Water	Basin F, center of basin (surface and depth)
Monitoring Station in Harbor Receiving Water Basins A, B, C, G, and H, designated by MdRH-10, MdRH-11, MdRH-12, MdRH-13, and MdRH-14, respectively are former monitoring station where monitoring was discontinued.		

2.1.3.2 Toxics TMDL Sites

The CIMP includes a total of nine receiving water monitoring stations, one in each of the Basins and one in the Main Channel, to comply with the Toxics TMDL monitoring requirement. These locations are summarized in Table 2-2 and Figure 2-1. Water column monitoring will be performed in the main channel every month and on an alternating schedule for the remaining eight Toxics TMDL receiving water stations. Station MdRH-A, MdRH-C, MdRH-E, and MdRH-G will be sampled one month; the following month stations MdRH-B, MdRH-D, MdRH-F and MdRH-H will be sampled. Sediment sampling will occur at each station on an annual basis. Additional discussion is provided in Appendix H.

Table 2-2. MdR Receiving Water Toxics Monitoring Stations

CIMP Station ID	Toxics TMDL CMP Station ID	Media Sampled	Monitoring Station Description
MdRH-A	MdRH-F-1	Water/Sediment	Mid-channel of Basin A
MdRH-B	MdRH-F-2	Water/Sediment	Mid-channel of Basin B
MdRH-C	MdRH-F-3	Water/Sediment	Mid-channel of Basin C
MdRH-D	MdRH-B-1	Water/Sediment	Mid-channel of Basin D
MdRH-E	MdRH-B-2	Water/Sediment	Mid-channel of Basin E
MdRH-F	MdRH-B-3	Water/Sediment	Mid-channel of Basin F
MdRH-G	MdRH-F-4	Water/Sediment	Mid-channel of Basin G
MdRH-H	MdRH-F-5	Water/Sediment	Mid-channel of Basin H
MdRH-MC	---	Water/Sediment	Main Channel
Water column monitoring will be performed at MdRH-MC every month and on an alternating schedule for the remaining eight Toxics TMDL receiving water stations. Station MdRH-A, MdRH-C, MdRH-E, and MdRH-G will be sampled one month; the following month stations MdRH-B, MdRH-D, MdRH-F and MdRH-H will be sampled. Sediment sampling will occurr annually at each station. .			

2.1.3.3 Bioaccumulation Monitoring

Fish travel throughout the MdRH; therefore, for the purposes of CIMP compliance monitoring, the entire Harbor is considered to be a single representative area for fish sampling. Trawl transects will be run throughout the Harbor to collect targeted fish species.

Mussels are filter feeders that rely on collecting organic particles as food from a large volume of water. Resident mussels have been observed throughout MdRH; however, in order to control for the period of bioaccumulation, the use of planted mussels is recommended in place of resident mussels. Mussels will be planted in the Back Basin and the Front Basin areas, and then composited into two samples representing these two areas.

More information about bioaccumulation monitoring, including the analytical procedures, sampling methods, and QA/QC procedures, is provided in Appendix C.

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Figure 2-1. MdR Watershed CIMP Monitoring Stations

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2.1.3.4 Oxford Basin Monitoring Program

The Toxics TMDL specifies that the Los Angeles County Flood Control District (LACFCD) shall monitor discharges of sediment from Oxford Retention Basin (ORB) to MdRH after completion of the ORB Multiuse Enhancement Project (ORB MEP). Additionally, the TMDL states that effectiveness monitoring developed as part of the Proposition 84 grant agreement for the ORB MEP may be used to meet the TMDL monitoring requirement; however, the monitoring must continue beyond the term of the Proposition 84 agreement.

The ORB MEP Monitoring Plan (LACFCD, 2014) proposed a tiered approach to monitoring sediments being discharged from ORB to Basin E of MdRH. During the first year of post-construction monitoring (2016-17), a Sediment and Water Exchange Study (LADPW, 2017) was conducted which focused on understanding whether there was a significant exchange of suspended sediments in and out of ORB. Because the results of this study indicated that sediment discharge to Basin E was significant, during the second year of post-construction monitoring (2017-18) a Sediment Discharge Study (LADPW, 2018) was conducted to collect and analyze suspended sediments being discharged from ORB to Basin E. The suspended sediments were analyzed for the constituents listed in the Toxics TMDL including total PCBs, total DDTs, p,p'-DDE, chlordane, copper, lead, and zinc during three wet weather events. The results of both studies are discussed below.

Sediment and Water Exchange Study – Year 1 Post Construction Monitoring:
ORB detains and filters runoff from a portion of the Marina del Rey watershed before discharging to MdRH. Two tide gates in ORB (7-foot pipe and 6-foot box culvert) are strategically operated for flood protection and to maximize the detention of runoff resulting from storm events. The Sediment and Water Exchange Study (LADPW, 2017) conducted during the first year of post-construction monitoring in ORB evaluated the sediment exchange between ORB and MdRH. The sediment exchange was based on 1) a volumetric assessment, and 2) a sediment assessment.

The volumetric assessment was based on recorded tide gate operations in ORB from June 2016 through May 2017. MdRH water elevation data from existing water level transducers located downstream of the ORB tidal gates along with storm water inflow data from LACFCD Project Numbers 5243 and 3872 were used to calculate the volume entering or leaving ORB. Flow rates in the conduits connecting ORB and MdRH were simulated using the United States Environmental Protection Agency's Stormwater Management Model (SWMM) software (5.10v)

For the sediment assessment, two YSI water quality sondes were installed near the two tide gates in ORB beginning in September 2016. Water quality was continuously monitored by the sondes during the first year of post-construction monitoring. TSS data were collected during four dry weather events and three wet weather events in 2016-17. TSS data were collected from both ebb and flood tides. A regression model was developed using TSS data and turbidity results as a predictor. Observed TSS concentrations obtained from the samples were correlated to the continuously-monitored turbidity data to estimate TSS concentrations in ORB and MdRH.

Sediment exchange between Oxford Basin and MdRH was calculated by applying the predicted TSS concentrations to the SWMM flowrate results to calculate TSS in kilograms in 15-minute time increments. Based on the analysis, the total net annual TSS discharge from ORB was 28,848 kilograms. The linear relationships between turbidity and TSS used in the study were based on limited TSS samples, therefore, it was recommended to collect additional TSS and turbidity data in future monitoring years to create a more robust correlation.

Sediment Discharge Study – Year 2 Post-Construction Monitoring and Beyond:
Based on the results of the Sediment and Water Exchange Study (LADPW, 2017), a Sediment Discharge Study (LADPW, 2018) was conducted in the second year of ORB post-construction monitoring. Suspended sediments in effluent from ORB were collected and analyzed during three storm events. A pilot study was conducted for the first monitored storm event of the season in order to determine the optimum sampling design at the two ORB tide gates for the collection of suspended sediments during a wet weather event. The final sampling design was then utilized during the following two wet weather events. During each storm event, suspended sediments were collected and analyzed for the Toxics TMDL constituents. Analytical chemistry results were used to calculate an annual load of the Toxic TMDL constituents from ORB to Basin E of MdRH for the 2017-18 monitoring year. In addition, the TSS exchange analysis was repeated using additional TSS data collected in 2017-18. The sampling design developed for this study will continue to be used for sampling the Toxics TMDL constituents for all future outfall monitoring at the new station MdR-4ORB located at the tide gates in ORB.

2.2 Monitored Parameters and Frequency of Monitoring

The CIMP monitoring programs are summarized in Table 2-3. The table lists all the receiving water stations, their corresponding monitored parameters, and frequency of monitoring for compliance with Bacteria and Toxics TMDL monitoring requirements as well as the Permit monitoring requirements. These monitoring requirements include physical, bacterial, chemical, and toxicity analyses of water, sediment, and tissue samples from the MdR receiving water. Detailed parameter lists, suggested analytical methods, and target method detection limits are detailed in Appendix D. Sampling protocols, sample handling procedures, field quality control sampling requirements, and laboratory analytical methods and QA/QC requirements are detailed in Appendix C, with reference to Appendix D.

2.2.1 Permit Compliance Monitoring

Receiving water monitoring will be conducted at the MdRH-MC receiving water station during three storm events each wet weather season. This will include monitoring during the first significant storm event of each wet weather monitoring season and two additional storm events during each wet weather monitoring season (see Section 2.3 for definition of storm event and significant storm event). During the first significant storm of the first CIMP monitoring year (2016-17) all of the parameters in Table E-2 of the MRP were monitored in addition to those required in MRP Section VI.C.d. If a parameter from Table E-2 was detected exceeding the lowest applicable WQO in samples from this initial wet weather event, then the parameter will continue to be analyzed for the remainder of the Permit term during wet weather at MdRH-MC (see Appendix D for analyte list). In addition, toxicity monitoring shall be conducted at MdRH-MC to evaluate a sublethal effect (e.g., reduced growth, reproduction) twice per year and in accordance with the toxicity clarification memo issued by the LARWQCB on August 7, 2015. See Appendix C for additional detail.

Dry weather monitoring will be conducted at MdRH-MC twice annually. One of these monitoring events will occur in the month of July, which is historically the driest month in the region (LADPW, 2015). Monitoring will be conducted in accordance with MRP Section VI.D.1.b.i, on days with less than 0.1 inch of rain and not less than three days after a rain event of 0.1 inch or greater within the watershed (as measured at the rain gauge located at Electric Avenue Pump Plant). During the first dry weather event conducted in July 2016 of the first CIMP monitoring year (2016-17), all of the parameters in Table E-2 of the MRP were monitored in addition to those required in MRP Section D.1.c. If a parameter from Table E-2 was detected exceeding the lowest applicable WQO in samples from this July dry weather event, then the parameter will continue to be analyzed for the remainder of the Permit term during dry weather at MdRH-MC (see Appendix D for analyte list). In addition, aquatic toxicity monitoring shall be conducted once per year during the July dry weather monitoring event. See Appendix C for additional detail.

2.2.2 Bacteria TMDL Compliance Monitoring

For Bacteria TMDL compliance monitoring, sampling is performed on a scheduled basis. The MdR EWMP Agencies conduct weekly compliance monitoring at all Bacteria TMDL stations, except at two stations along the Marina Beach shoreline where enhanced monitoring efforts have been implemented voluntarily for informational purposes. Daily sampling (Monday through Saturday) has been initiated at Station MdRH-1. At Station MdRH-2, samples are collected twice per week (Monday and Saturday). Bacteria grab samples are collected from the Harbor receiving water from a boat/skiff or from the ankle deep water of an incoming wave along Marina Beach. As a safety consideration, samples are not collected during rainfall. Grab samples are collected on a scheduled basis. Bacteria grab samples collected within the 72-hour window after a storm event are classified as wet weather samples, whereas all other samples are classified as dry weather samples.

2.2.3 Toxics TMDL Compliance Monitoring

The prior Toxics TMDL CMP monitoring program was modified to improve the effectiveness and efficiency of the program, to take advantage of the increased knowledge of the environmental conditions within MdRH as a result of the past 10 years of monitoring, and to meet the revised monitoring requirements of the reconsidered Toxics TMDL, as amended by Resolution No. R14-004 (LARWQCB, 2014). For Toxics TMDL receiving water compliance monitoring, water, sediment and tissue samples will be collected from a boat/skiff. Modifications to the prior CMP were made based on the historical monitoring experience and data gained by the MdR EWMP Agencies. Data analysis supporting the changes below is included in Appendix H.

Samples will be collected as follows:

- Dry weather water quality grab samples will be collected from five Harbor receiving water stations on a monthly basis for copper and total PCBs. Monitoring will be performed in the main channel every month and on an alternating schedule for the remaining eight Toxics TMDL receiving water stations. Station MdRH-A, MdRH-C, MdRH-E, and MdRH-G will be sampled one month; the following month stations MdRH-B, MdRH-D, MdRH-F and MdRH-H will be sampled (Table 2-2, Figure 2-1).
    - Monthly monitoring of dissolved copper has been conducted in both the Front and Back Basins of the Harbor since 2010. Monitoring results have remained relatively consistent over time, and while they do vary somewhat between Basins, it is

possible to monitor a sub-set of Basins each month and rotate the monitoring stations so that they are monitored every other month, without losing important information regarding dissolved copper concentrations. (See Appendix H for details).

  - Due to the logistical, technical, and cost issues for low-detection limit analysis (see additional details in Appendix H) of PCBs, total PCBs will be monitored in the Harbor water column on the same alternating schedule as dissolved copper.

- Sediment chemistry and toxicity analyses will be conducted on an annual basis in each of the Basins and the Main Channel at the stations identified in Table 2-2. Sediment samples will be analyzed for copper, lead, zinc, chlordane, total PCBs, total DDTs, p,p'-DDE, total organic carbon, grain size, and toxicity (Appendix D).
- Sediment Quality Objectives (SQO) monitoring (sediment triad sampling) will be conducted once every five years. For the first five year term, SQO monitoring was fulfilled by a Stressor Identification study conducted in 2016 and participation in the Bight program in 2018. For the next five year term, SQO monitoring will occur once at the annual Toxics TMDL sediment monitoring locations identified in Table 2-2.
- Tissue monitoring (fish and mussel), which provides a strong measure of environmental contamination, will be conducted annually within the Harbor, and will provide a measure of bioaccumulation of total PCBs and other organics from the water column. Sites for planted mussel installation will be selected based on prevailing conditions, as determined by a field reconnaissance conducted prior to sampling. Nine individuals from two species of fish will be collected (halibut and white croaker), in accordance with Office of Environmental Health Hazard Assessment (OEHHA) guidance. See Appendix C for more information.

Table 2-3. MdR Receiving Water Monitoring Stations Sampling Parameters and Frequency for Wet and Dry Weather

Parameter	Permit		Toxics TMDL (Dry Weather)									Bacteria TMDL								
	MdRH-MC		MdRH-A	MdRH-B	MdRH-C	MdRH-D	MdRH-E	MdRH-F	MdRH-G	MdRH-H	MdRH-MC	MdRH-1	MdRH-2	MdRH-3	MdRH-4	MdRH-5	MdRH-6	MdRH-7	MdRH-8	MdRH-9
	Wet Weather *	Dry Weather**																		
WATER QUALITY																				
Field Parameters[a]	3x/year	2x/year	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pollutants identified in Table D-1 (wet) and Table D-2 (dry) in Appendix D *(not otherwise listed below)*	3x/year #	2x/year # #	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Suspended Solids	-	2x/year																		
Aquatic Toxicity	2x/year†	1x/year Ω†	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<u>Indicator Bacteria:</u> Total Coliform, *E. coli*, *Enterococcus*	3x/year[i]	2x/year[i]	-									6x/week[b]	2x/week[d]	1x/Week[c]	1x/week[c]at surface 1x/week at depth	1xWeek[c	x/week[c]at surface 1x/week at depth	1x/Week[c]	x/week[c]at surface 1x/week at depth	x/week[c]at surface 1x/week at depth
Copper (total/dissolved) and hardness	-	2x/year***	1x/month on an alternating schedule (Station MdRH-A, MdRH-C, MdRH-E, and MdRH-G will be sampled one month; MdRH-B, MdRH-D, MdRH-F and MdRH-H will be sampled the following month)								1x/month	-								
Total PCBs	3x/year	2x/year***										-								
FISH / MUSSEL TISSUE QUALITY – DRY WEATHER SAMPLING																				
Chlordane	-	-	1x/year[e] (Harbor-wide sampling)									-								
Total PCBs																				
Total DDTs																				
p,p'-DDE																				
DRY WEATHER SEDIMENT SAMPLING																				
Grain Size, TOC and Percent Solids	-	-	1x/year at each of the Toxics TMDL Receiving Water stations (9 stations)									-								
Copper, Lead, Zinc																				
Chlordane, total DDTs, p,p'-DDE[h]																				
Total PCBs																				
Sediment Toxicity																				
TRIAD ASSESSMENT – DRY WEATHER SEDIMENT SAMPLING																				
Grain Size and Percent Solids	1x/5 years[f][g]	-	1x/5 years[f][g] at the Toxics TMDL Receiving Water stations (9 stations)									-								
SQO Parameters[f]																				
Sediment Toxicity																				
Benthic Infaunal Analysis																				

Table 2-3 NOTES:

* First significant storm event and two additional storm events each year

** One of the two dry weather events will occur in the month of July each year, historically the driest month in the region.

*** Twice a year during dry weather monitoring, results of copper (total/dissolved), hardness, and total PCB samples at MdRH-MC will be used for both Permit and Toxic TMDL programs.

All the parameters listed in Table E-2 of the MRP were monitored during the first large storm of the first permit monitoring year (2016-17). Only constituents detected above the lowest applicable water quality objective in 2016-17, or those listed separately in the MS4 Permit, will continue to be monitored during wet weather events (3x/year) at the station for the remainder of the permit term (see Table D-1 in Appendix D)

All the parameters listed in Table E-2 of the MRP were monitored during the July monitoring event in the first permit monitoring year (2016-17). Only constituents detected above the lowest applicable water quality objective in 2016-17, or those listed separately in the MS4 Permit, will continue to be monitored during dry weather (2x/year) for the remainder of the permit term (see Table D-2 in Appendix D). † Aquatic Toxicity monitoring will follow the guidelines in the August 7, 2015 Toxicity Memo from the LARWCQB.

Ω During the July dry weather monitoring event.

(a) Field parameters are defined as dissolved oxygen (DO), hydrogen ion concentration (pH), temperature, and specific conductivity.

(b) Samples collected daily (Mondays through Saturdays). Samples collected during an incoming wave.

(c) Monitoring frequency is weekly regardless of the weather condition. A dry/wet classification is assigned post-monitoring.

(d) Samples collected twice a week, on Mondays and Saturdays. Samples collected during an incoming wave.

(e) Historically, tissue sampling occurs in October of each year.

(f) SQO Parameters include: Total organic carbon (TOC), Cadmium, Copper, Lead, Mercury, Zinc; lower and higher molecular weighted polycyclic aromatic hydrocarbons (PAHs); PCBs (congeners); DDTs; Chlordane; and Dieldrin.

(g) For the first five years of the CIMP, SQO monitoring was fulfilled by conducting a Stressor Identification study conducted in 2016 and by participation with the Bight program in 2018. For the next five year term, SQO monitoring will be conducted once at the annual Toxic TMDL sediment monitoring stations.

(h) Chlordane in sediment samples will be calculated by summing cis and trans chlordane; cis and trans nonachlor; and oxychlordane

(i) Permit monitoring includes total and fecal coliforms, *E. coli*, and *Enterococcus*

2.3 Wet Weather Monitoring Mobilization

The Permit requires storm water monitoring during the first significant storm of the year. Section C.1.b(iii) of the MRP establishes mobilization criteria for the first significant storm as the first storm of the year with a 70 percent (%) probability of at least 0.25-inch rainfall, at least 24 hours prior to the start of a rainfall event.

According to both the Permit and the Bacteria TMDL, wet weather events shall be separated by a minimum of three days of dry conditions (e.g., less than 0.1 inch of rain each day). A minimum of three days of dry conditions (i.e., 72 hours) is also required between a qualified storm event and a non-storm water monitoring event.

For purposes of this CIMP, mobilization for wet weather receiving water monitoring will occur when the following criteria are met:

1. 70% probability of at least 0.25-inch rainfall, at least 24 hours prior to the start of a rainfall event using National Weather Service (NWS) forecast tools. If the criteria cannot be met to fulfill the required number of wet weather events, then smaller storms may be sampled (i.e. 0.1 inch rainfall). Every attempt will be made to monitor acceptable storms; however, if a storm is not predicted at least 24 hours in advance, it may not be possible to monitor the event.
2. At least three days of dry conditions (e.g., less than 0.1 inch of rain each day) prior to the storm event.

2.4 Monitoring Coordination

Monitoring requirements of the Permit, Bacteria TMDL, and Toxics TMDL include several iterative elements that are incorporated into the overall design and implementation of this CIMP. Considering the multiple possible avenues to demonstrate TMDL compliance, such as BMP implementation and/or water quality monitoring, development of the monitoring approaches will require ongoing stakeholder engagement with the Regional Board and affected responsible parties.

Monitoring under the Bacteria and Toxics TMDLs is conducted by two different agencies. Toxics TMDL monitoring is conducted by the County, whereas Bacteria TMDL monitoring is conducted by the City of Los Angeles and samples are collected and analyzed by Hyperion Laboratory.

2.5 Receiving Water Monitoring Summary

Eighteen receiving water stations in the MdR Harbor were selected to address both Bacteria and Toxics TMDLs and Permit monitoring requirements. Nine receiving water stations were selected for Bacteria TMDL monitoring, eight receiving water stations were selected for only the Toxics TMDL monitoring, and one receiving water station was selected for Permit-required receiving water monitoring and Toxics TMDL monitoring. Monitoring parameters and frequency are summarized in Table 2-3 by regulatory driver and station.

3.0 MS4 INFRASTRUCTURE DATABASE

To meet the requirements of Part VII.A of the MRP, a map(s) and/or database of the MS4's storm drains, channels, and outfalls must be submitted with this CIMP and include detailed information (as described in the Permit, page E20-21). An inventory of storm drains, channels, and MS4 outfalls (Inventory) will be maintained by each of the MdR EWMP Agencies in accordance with these Permit requirements. The Inventory will be developed using existing data from Illicit Connection/Illegal Discharge (IC/ID) investigations, institutional knowledge of the MdR Watershed, and other data and observations documenting outfall conditions from historical studies (i.e., Weston Solutions, Inc. [Weston], 2008a; Los Angeles County Department of Beaches and Harbors [LACDBH], 2004). Each EWMP Agency is responsible for the development, maintenance, and upkeep of the MS4 outfall database and will maintained the database for Permit compliance.

The Non-Storm Water Outfall Program requires the development of an MS4 outfall database by the time that this CIMP is submitted. The objective of the MS4 database is to geographically link the characteristics of the outfalls within the MdR Watershed with watershed characteristics including: subwatershed, waterbody, land use, and effective impervious area (EIA). The information will be compiled into Geographic Information System (GIS) layers as described below.

3.1 Available Information

This section summarizes the GIS database submitted with the CIMP and the existing infrastructure information available for the MdR Watershed.

3.1.1 CIMP GIS Database

The GIS database submitted concurrently with this CIMP (Appendix G) was developed using a compilation of data described in this section. Data are continually gathered by the MdR EWMP Agencies and are continually imported into the GIS database. The information is summarized in Table 3-1.

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Table 3-1. GIS Database Elements Submitted with CIMP

Permit Section	Database Element	Status	GIS File Names	Original Sources[5]
VII.A.1	Surface water bodies within MdR Watershed	Submitted	surface_waterbody_polygons_MdR	National Hydrography Dataset (NHD)
VII.A.2	HUC-12 boundary	Submitted	MdR_boundary_rev2018	Los Angeles County Sub Watersheds, LADPW
			MdR_subwatersheds_rev2018	Los Angeles County Sub Watersheds, LADPW
VII.A.3	Land Use overlay	Submitted	landuse_with_jurisdiction_MdR_rev2018	Based upon a combination of data sources, including 2008 land use data from SCAG and LA County Watershed Management Modeling System (WMMS) land use, modified/updated for use in EWMP assessment. Intersected with jurisdictional boundaries.
VII.A.4	Effective Impervious Area (EIA) overlay (if available)	Submitted	hruimp061913_as_is_clip_MdR_rev2018	LA County WMMS land use, LADPW
VII.A.5	Jurisdictional boundaries	Submitted	jurisdictional_bndries_MdR_rev2018	Los Angeles County Department of Regional Planning
VII.A.6	Location and length of all open channel and underground pipes 18 inches in diameter or greater	Submitted	Open_Channels_MdR	Storm Drain network data from LADPW
			SDLateral_LADPW_MdR_rev2018	Storm Drain network data from LADPW
			SDMain_LADPW_MdR_rev2018	Storm Drain network data from LADPW
			Storm_Drain_Line_A	Digitized by Weston from as-built drawings
			SDMain_CulverCity	City of Culver City
			SDLateral_CulverCity	City of Culver City
VII.A.7	Location of all Dry Weather Diversions	Submitted	Dry_Weather_Diversions_MdR	Mapped from coordinates in table provided by LADPW
VII.A.8	Location of all major MS4 Outfalls* within the EWMP Agency's jurisdictional boundary. Each major outfall has been assigned an alphanumeric identifier and mapped.(1)	Submitted	County_Outfalls_GE18LT36in_MdRH County_Major_Outfalls_GE36in_MdRH	LACFCD owned outfalls, provided by LADPW
			City_of_LA_Outfall_GE18LT36in_MdRsw2 City_of_LA_Major_Outfalls_GE36_MdRsw2	City of Los Angeles

Table 3-1. GIS Database Elements Submitted with CIMP

Permit Section	Database Element	Status	GIS File Names	Original Sources[5]
VII.A.10	Storm drain outfall catchment areas of each major outfall within the MdR Agencies' jurisdiction.(2)	Submitted	MdR_MS4_Drainage_Areas_rev2018	Delineated by Weston
VII.A.11a	MS4 Outfall Ownership(3)	Submitted	See files listed for VII.A.8	Files based on public agency data provider
VII.A.11b	MS4 Outfall Coordinates	Submitted	See files listed for VII.A.8	Provided in GIS file
VII.A.11c	Physical Description of MS4 Outfall	Submitted	See files listed for VII.A.8	Provided in GIS file, see report for additional details recorded during field activities.
VII.A.11d	Photographs of the Outfall, where possible, to provide baseline information to track operation and maintenance needs over time.(4)	Ongoing/ Submitted		

*All major Outfalls greater than 36 inches have been identified and defined.

(1) Permit MRP Section VII.A.6 requires the MS4 database and maps to include "all open channel and underground pipes 18 inches in diameter or greater" as part of the Outfall-based assessment program and MS4 database. Due to tidal inundation, these Outfalls have been included for reference purposes only and generally are not considered monitorable for non-storm water assessment.

(2) Drainage areas were not built for the four 36" outfalls identified in Venice Canal.

(3) To the maximum extent feasible.

(4) Photographs were included in historic Outfall assessments and have been provided as an electronic attachment to this CIMP in support of field reconnaissance activities. The MdR EWMP Agencies also collect and manage photos which are maintained and managed by each member separately.

(5) This column provides the original source of the data. Data have been modified from original as needed for use in CIMP (for example, clipped to MdR watershed boundary or intersected with other datasets for combined attribute information).

3.1.2 Existing Infrastructure

In 2004, the County, City of Los Angeles, City of Culver City, and Caltrans conducted an assessment of small storm drains across the MdR Watershed (LACDBH, 2004). The MS4 infrastructure in the MdR Watershed includes four MS4 major outfalls. For the purposes of this MdR CIMP, an MS4 major outfall, as defined by Attachment A of the Permit, is an MS4 outfall that discharges from a single pipe with an inside diameter of 36 inches or more or its equivalent (discharge from a single conveyance other than a circular pipe that is associated with a drainage area of more than 50 acres; or for municipal separate storm sewers that receive storm water from lands zoned for industrial activity [based on comprehensive zoning plans or the equivalent], an outfall that discharges from a single pipe). The characteristics and locations of each major outfall have been summarized in Table 3-2 and are represented on Figure 1-1 as yellow dots. Outfalls with an inner diameter of greater than or equal to 18 inches and less than 36 inches are represented on Figure 1-1 as green dots. The available infrastructure information from digitized MS4 data provided by the MdR EWMP Agencies is summarized in Table 3-4. As indicated by the 2004 Small Drain Report (LACDBH, 2004) and MS4 reconnaissance conducted in 2013 as part of the development of this CIMP (Appendix B), the MS4 system in the MdR Watershed is strongly influenced by tide and a majority of the drains that discharge to the Harbor are partially or fully submerged at their discharge to the receiving water. Due to tidal inundation, these outfalls have been included for reference purposes only and generally are not considered monitorable for non-storm water assessment.

Major outfall CSTL-022A represents discharge from Subwatershed 3 to Basin E, approximately 17.5% (324.7 acres) of the total drainage area of the MdR Watershed. Major outfalls CSTL-022B and C are connected to Oxford Retention Basin, which receives discharge from Subwatershed 4. These major outfalls discharge to Basin E and represent approximately 36.2% (671.1 acres) of the total drainage area of the MdR Watershed. All three major outfalls in Basin E are fully submerged during a majority of the tide cycle. The tides gates protecting CSTL-022A are located upstream within the MS4 near the Boone Olive Pump Station. Tide gates have been installed at adjoining outfalls CSTL-022B and CSTL-022C for flow regulation and flood control protection for Oxford Retention Basin. The fourth major outfall in the MdR Watershed (CSTL-023B) discharges from MdR subwatershed 1 to Basin G. CSTL-023B drains roads and parking lots within the County and Caltrans jurisdictional areas. The drainage area is flat and the publicly available MS4 data are limited. The tributary area was approximated using a combination of GIS software and field observations. Based on this desktop analysis, CSTL-023B represents approximately 2.3% (41.8 acres) of the total drainage area of the MdR Watershed. CSTL-023B is fully submerged during the entire tidal cycle and the upstream MS4 is tidally inundated.

The MS4 network tributary to the Grand Canal (i.e., Venice Canals and Ballona Lagoon) includes four major outfalls. It is, however, separated from the MdRH receiving water by a large tide gate.

The characteristics and locations of these major outfalls have been summarized in Table 3-2 and are represented on Figure 1-1 as yellow dots.

Table 3-2. Major Outfalls in the MdR Watershed (Diameter ≥ 36 inches)

Outfall ID	Location	MdR Subwatershed	Diameter (inches)	Material	Tidal Influence
CSTL-022A	Basin E	3	51	RCP	Yes; Fully submerged Majority of Tide Cycle; Tide Gate
CSTL-022B	Basin E	4	72	RCP	
CSTL-022C	Basin E	4	72	RCP	
CSTL-023B	Basin G	1	54	RCP	Yes; Always Submerged
22	Grand Canal	2	64	RCB	Half Submerged, Controlled by Tide Gate
21	Grand Canal	2	66	RCB	
7	Grand Canal	2	84	RCB	Fully Submerged
10	Grand Canal	2	84	RCB	Fully submerged, Controlled by Tide Gate

RCB - Reinforced Concrete Box; RCP - Reinforced Concrete Pipe

Several improvements have been made to control runoff to the MS4 infrastructure in the MdR Watershed. Immediately upstream of the tidally influenced zone, LFDs have been installed to redirect non-storm water discharges from the MS4 to the sanitary sewer, that otherwise would have discharged through outfalls CSTL-023A, B, and C into Basin E. Details of the three LFD projects are summarized in Table 3-3. In 2007, Line A, a storm water diversion system, was constructed. This system captured storm water runoff from parking lots and land uses surrounding Marina Beach and directed it to Basin C (Figure 1-1). The outfall for storm drain Line A is a 30-inch RCP that diverts the 10-year frequency runoff storm event from Parking Lots 10 and 11, neighboring restaurants, and streets (an approximate 11-acre area, adjacent to Basin D) into Basin C.

Table 3-3. Existing Low Flow Diversion Structures in MdR Watershed

Location of Diversion	Design	Outfall ID	Receiving Water	Diversion Discharge Endpoint
Project 5243: Intersection of Washington Blvd. and Thatcher Ave[a]	Low Flow Diversion with a capacity of 92,000 GPD and overtopping flow (significant flow) of 0.22 CFS.	CSTL-022B, CSTL-022C	Basin E	Sanitary Sewer
Project 3872: Oxford Flood Control Basin Pump House[a]	Low Flow Diversion with a capacity of 288,000 GPD and overtopping flow (significant flow) of 0.45 CFS.	CSTL-022B, CSTL-022C	Basin E	Sanitary Sewer
Project 3874: Boone-Olive Pump Station Control House[a]	Low Flow Diversion with a capacity of 92,000 GPD and overtopping flow (significant flow) of 0.22 CFS.	CSTL-022A	Basin E	Sanitary Sewer

[a] Completed 03/2007
CFS – cubic feet per second; GPD – gallons per day

Table 3-4. MdR Watershed Outfalls with Diameters Greater than or Equal to 18 Inches and Less than 36 Inches

Outfall ID	Location	MdR Subwatershed	Diameter (inches)	Material	Tidal Influence
MdR Harbor					
CSTL-019	Main Channel	1	18	CMP	Likely None
CSTL-020A	Basin A	1	18	RCP	Fully Submerged
CSTL-020B	Basin A	1	18	RCP	Fully Submerged
CSTL-020C	Basin B	1	18	RCP	Possibly submerged at High tides
CSTL-021	Basin B	1	18	RCP	Possibly submerged at High tides
CSTL-022D	Main Channel	1	18	CMP	Tidal
CSTL-023A	Basin F	1	18	RCP	Tidal
CSTL-024A	Basin H	1	18	CMP	Fully Submerged
CSTL-024B	Main Channel	1	21	RCP	Possibly submerged at High tides
CSTL-024C	Main Channel	1	18	ACP	Fully Submerged
Storm Drain Line A	Basin D → Basin C	1	30	RCP	Possibly submerged at High tides
Grand Canal (Venice Canals / Ballona Lagoon)					
33	Ballona Lagoon	2	18	Unknown	Fully Submerged
30	Ballona Lagoon	2	18	Unknown	Fully Submerged
9	Ballona Lagoon	2	18	Unknown	Fully Submerged
6	Ballona Lagoon	2	18	Catch basin	Fully Submerged
5	Ballona Lagoon	2	18	Catch basin	Fully Submerged
4	Ballona Lagoon	2	18	Concrete	Fully Submerged
3	Ballona Lagoon	2	18	Concrete	Fully Submerged
23	Ballona Lagoon	2	18	PVC	Visible[#]
31	Ballona Lagoon	2	18	Concrete	Visible
24	Ballona Lagoon	2	18	Concrete	Visible
11	Ballona Lagoon	2	18	PVC	Half Submerged[#]
8	Ballona Lagoon	2	18	Concrete	Half Submerged[#]
12	Ballona Lagoon	2	18	PVC	Visible[#], Controlled by Tide Gate
13	Ballona Lagoon	2	18	PVC	Visible[#]
15	Ballona Lagoon	2	18	PVC	Half Submerged[#]
16	Ballona Lagoon	2	18	PVC	1/3 Submerged[#]
18	Ballona Lagoon	2	18	PVC	Half Submerged[#]
19	Ballona Lagoon	2	18	PVC	1/3 Submerged[#]
20	Ballona Lagoon	2	18	PVC	Half Submerged[#]
17	Ballona Lagoon	2	18	PVC	Submerged[#]
14	Ballona Lagoon	2	18	PVC	Half Submerged[#]
32	Ballona Lagoon	2	22	Concrete	Visible
26	Ballona Lagoon	2	24	Concrete	Visible[#]
28	Ballona Lagoon	2	24	Concrete	Tide Gate
29	Ballona Lagoon	2	34	Concrete	Half Submerged

Table 3-4. MdR Watershed Outfalls with Diameters Greater than or Equal to 18 Inches and Less than 36 Inches

Outfall ID	Location	MdR Subwatershed	Diameter (inches)	Material	Tidal Influence

Table 3-4 NOTES:
ACP - Asbestos Cement Pipe; CMP - Corrugated Metal Pipe; RCB - Reinforced Concrete Box; RCP - Reinforced Concrete Pipe; PVC - Polyvinyl Chloride
#Downstream End of Venice Canals

3.2 Pending Information and Schedule for Completion

The elements described in Table 3-5 represent pending information that is primarily expected to be an outcome of implementing this CIMP and outfall-based monitoring programs. As such, a schedule for completing each of the elements is provided. As the data become available, they will be entered into the GIS and water quality databases. Each year, the storm drains, channels, outfalls, and associated databases will be updated to incorporate the most recent characterization data for outfalls. The updates will be included as part of the annual reporting to the Regional Board.

Table 3-5. Pending Information for MS4 Database and Elements to be developed through CIMP Implementation

Permit Section	MS4 Database Requirement/Element	Status	Date of Submission
VII.A.9	Notation of outfall with significant non-storm water discharges	Generally not applicable	June 2016
VII.A.10	Details of analysis of outfall catchment areas for potential new outfall monitoring locations	As needed	Ongoing assessment of Venice Canals
VII.A.11.e	Determination of whether the outfall conveys significant non-storm water discharges	Generally not applicable	June 2016
VII.A.11.f	Outfall monitoring data	Ongoing. Anticipated to be limited to storm water data.	Ongoing

4.0 STORM WATER OUTFALL MONITORING

As outlined in MRP Section VIII.A, storm water discharges from the MS4 shall be monitored at outfalls and/or alternative access points upstream of outfalls, such as manholes or in channels representative of the land uses within the Permittee's jurisdiction to support meeting the three objectives of the storm water outfall based monitoring program:

a. Determine the quality of a Permittee's discharge relative to municipal action levels, as described in Attachment G of Permit;
b. Determine whether a Permittee's discharge is in compliance with applicable WQBELs derived from TMDL WLAs; and
c. Determine whether a Permittee's discharge causes or contributes to an exceedance of RWLs.

4.1 Storm Water Outfall Monitoring Sites

Outfall monitoring stations are monitoring stations within the MS4 system of the MdR Watershed. These stations are used to evaluate watershed conditions in accordance with the Toxics TMDL CIMP and related special studies. The sites were selected based on an evaluation of the representativeness of the land uses draining to the outfall location, the jurisdictions draining to the outfall location, the safety and accessibility of the site, and the ability to use autosampling equipment at the location. The data collected at the monitored outfalls will be considered representative of all MS4 discharge within the MdR Watershed EWMP area and will be applied to all MdR EWMP Agencies, regardless of whether a site is located within a particular jurisdiction. Assessment of whether an MdR Agency caused or contributed to exceedances of WQBELs and/or RWLs may be based on the evaluation of comingled discharges. This approach will provide the representative data needed to meet the specific MRP objectives for storm water outfall monitoring and support management decisions of the MdR EWMP Agencies.

The MdR Watershed includes four outfall stations MdR-4ORB, MdR-5, MdRU-C-1P11, and MdRU-C-2. In September 2018, with Regional Board approval (letter dated August 30, 2018), previous outfall stations MdR-3 and MdR-4, monitored from 2016-2018, were removed from the Toxics TMDL monitoring program and replaced by a new outfall station at MdR-4ORB that captures the drainage areas for both MdR-3 and MdR-4. In addition, the outfall station MdRU-C-1, monitored from 2016-18, was moved to Parking Lot 11 and renamed MdRU-C-1P11. The locations of these outfalls are summarized in Table 4-1. The tributary drainage area, MS4, jurisdictional boundaries, land uses, and downstream outfall for these Toxics TMDL monitoring stations are presented in Figure 4-1 through Figure 4-3. Note that in 2013, outfall stations MdR-1 and MdR-2 were removed from the Toxics TMDL monitoring program and CMP due to redundancy with downstream outfall station MdR-3 and a decision to focus on an integrated compliance monitoring approach rather than a jurisdiction-specific pollutant reduction compliance monitoring approach.

Table 4-1. MdR Outfall Monitoring Stations

CIMP Station ID[ab]	Media Sampled	Monitoring Station Description
MdR-4ORB	Water, Storm-Borne Suspended Sediment filtered by lab	Toxics TMDL Outfall Station at the Oxford Retention Basin tide gates.
MdR-5[c]	Water, Storm-Borne Suspended Sediment filtered by lab	Toxics TMDL Outfall Station at the Boone-Olive Pump Station control house. LFD Project No. 3874
MdRU-C-1P11	Water, Storm-Borne Suspended Sediment filtered by lab	Toxics TMDL Outfall Station at Parking Lot 11 located on the corner of Via Marina and Panay Way adjacent to Mother's Beach
MdRU-C-2	Water, Storm-Borne Suspended Sediment filtered by lab	Toxics TMDL Outfall Station at the catch basin located north of Abbot Kinney Blvd. and Woodlawn Ave.

[a]Former Outfall monitoring stations MdR-1 and MdR-2 were removed from the Toxics TMDL CMP with Regional Board approval.
[b]Former Outfall monitoring stations MdR-3 and MdR-4 were removed from the Marina del Rey CIMP with Regional Board approval (letter dated August 30, 2018).
[c]Low flow diversions (LFDs) have been installed and divert all known significant Non-storm Water flows to the sanitary sewer. Only Storm Water monitoring is anticipated to be necessary.

Outfall station, MdR-5, is the representative Permit monitoring station. The station selected for Permit compliance monitoring is the most representative of watershed impacts to the Harbor. MdR-5 was selected as the MdR outfall station based on total tributary drainage area, mix of land uses, diversity of jurisdictions, and presence of BMPs (see Appendix B). A map of the tributary drainage area to MdR-5, as well as the land uses and jurisdictional boundaries within the drainage area, is presented in Figure 4-3.

All four outfall stations MdR-4ORB, MdR-5, MdRU-C-1P11, and MdRU-C-2 are monitoring stations under the Toxics TMDL compliance monitoring.

In general, a higher concentration of constituents from urban runoff enters the MS4 during the initial stages of flow and during peak flow and/or peak rainfall intensity for small rainfall events, which are typical in southern California (Tiefenthaler et al., 2001). Therefore, a successful storm water monitoring event for sampling within the MS4 will be determined by capturing (at a minimum) the initial rise and peak of runoff from the storm event, and by demonstrating that water levels have decreased in relation to the overall storm hydrograph when monitoring is discontinued. A minimum of three days of dry conditions (i.e., 72 hours) is required between qualified storm events.

Flow-weighted or time-weighted storm water composite sampling will be conducted at all outfall stations for Permit compliance, Toxics TMDL compliance (except at MdR-4ORB), and watershed assessments for special studies. Storm water composite sampling at MdR-4ORB will consist of multiple grab samples (see Section Appendix C for details). In addition, grab samples will be collected for analysis of parameters not amenable to composite sampling (e.g., bacteria). A full list of these parameters is included in Appendix D. Storm-borne suspended sediment will be analyzed from the composite samples collected at each outfall station using high-resolution analytical methods for PCBs and pesticides and standard methods for metals analysis. The duration of monitoring at the outfalls will be determined by the characteristics of the storm event and will consist of a minimum of 3 hours and a maximum of 24 hours.

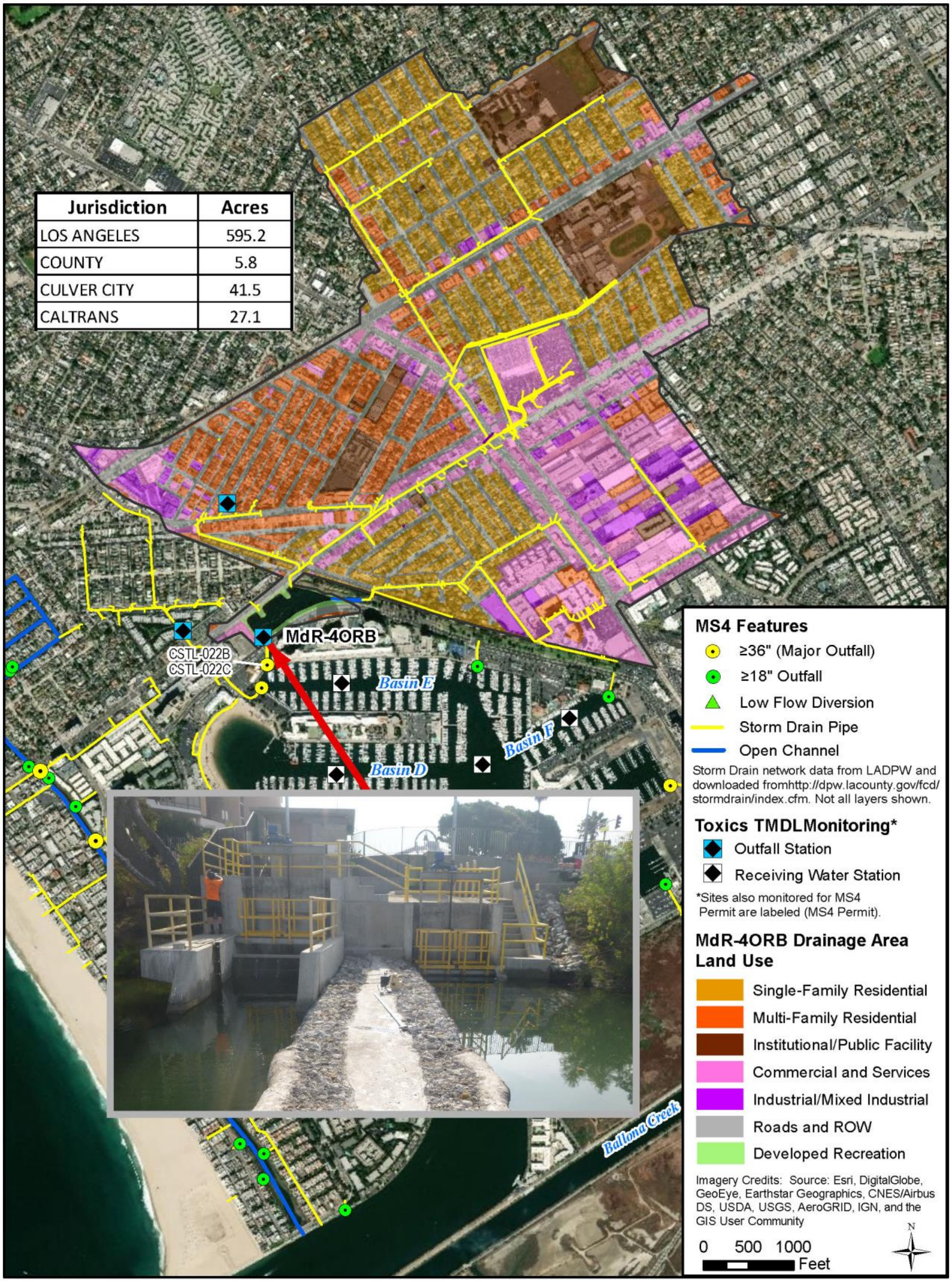

Figure 4-1. Outfall Station MdR-4ORB – Toxics TMDL Monitoring

Figure 4-2. Outfall Station MdRU-C-1P11 - Toxics TMDL Monitoring

Figure 4-3. Outfall Stations MdR-5 (Permit and Toxics TMDL Monitoring) and MdRU-C-2 (Toxics TMDL Monitoring)

4.2 Monitored Parameters and Frequency

This section presents an overview of outfall storm water and outfall storm-borne sediment monitoring frequency and parameters. Refined parameter lists, complete with suggested analytical methods and target method detection limits are provided in Appendix D. Sampling methods, sample handling procedures, and details regarding the collection of QA/QC samples are detailed in Appendix C.

Outfalls will be monitored for all required constituents in accordance with the Toxics TMDL, as amended by Resolution No.R14-004. In addition, the representative Permit monitoring station, MdR-5, will be monitored in accordance with MRP Section VIII.B.c. Monitoring will be conducted during the wet weather monitoring season of October 1st through April 15th. The WMG Agencies will attempt to capture storms occurring in September and early May, if feasible, based upon readiness and other constraints.

Permit monitoring at MdR-5 will occur during the first significant storm event of each wet weather monitoring season and two additional storm events during each wet weather season (see Section 4.2 for mobilization criteria). Toxics TMDL storm water and storm-borne suspended sediment outfall monitoring will occur during three storms per wet weather season. Flow data will be collected or modeled for non-monitored storm events. Storm water samples collected during each storm event will be filtered for storm-borne suspended sediment by the analytical laboratory and analyzed for the constituents listed in Appendix D. In addition, for each of the three monitored storm events, pre-storm suspended sediment samples will be collected at MdR-4ORB when the Los Angeles Flood Control District places the tide gate logic into Storm Mode and while the basin is draining during ebb tide (see Appendix C for additional details).

The amount of storm-borne suspended sediment collected varies at each of the Toxic TMDL outfall stations based on many factors including the size of the sub-watershed draining to the outfall and the land use of the area surrounding the outfall, as well as physical attributes of the outfall itself. Additionally, storm-borne suspended sediment collected during a wet weather event at MdR-5 is only included in the load calculation when storm water flows exceed the capacity of the LFD. If the LFD capacity is not exceeded during a particular wet weather event, then there is no storm flow discharging from this station into Basin E and the storm-borne suspended sediment collected would not be used in the load calculation (Table 4-1 and Figure 4-3).

An overview of the monitoring frequency and constituents for monitoring, including physical, bacterial, chemical, and toxicity analyses of water and storm-borne sediment samples from the MdR outfalls, is presented in Table 4-2.

Toxicity sampling will be conducted at the MdR-5 outfall station for Permit compliance monitoring in accordance with the MRP and the August 7, 2015 LARWQCB Toxicity Memo. Toxicity sampling will only occur at MdR-5 if it is triggered by the steps outlined in the MRP and clarified in the Toxicity Memo (See Appendix C for additional details). Toxicity testing shall be conducted on a flow-weighted composite sample. If the sample from the outfall discharge exhibits aquatic toxicity, then a Toxicity Identification Evaluation (TIE) shall be conducted in accordance with the requirements outlined in Appendix C.

Additionally, in accordance with MRP Section VIII.B.1.d, parameters listed in Table E-2 of the MRP that were identified as exceeding the lowest applicable WQO at the nearest downstream receiving water station (MdRH-MC) during the first significant storm event of 2016-17 will be monitored during subsequent storm events at MdR-5 for the remainder of the Permit term.

Table 4-2. Storm Water Outfall Monitoring Stations Sampling Parameters and Frequency

Parameter	Permit, Toxics TMDL*	Toxics TMDL**			
	MdR-5	MdR-4ORB	MdR-5	MdR-CU-1P5	MdR-CU-2
WATER QUALITY					
Flow (measured or modeled)	3/year	6/year Ω	3/year	3/year	3/year
Field Parameters[(a)]	3/year	-	-	-	-
Pollutants identified in Table D-1 in Appendix D *(and not otherwise listed below)*[#]	3/year	-	-	-	-
Aquatic Toxicity	(b)	-	-	-	-
Indicator Bacteria: Total and Fecal Coliform, E. coli, Enterococcus	3/year	-	-	-	-
Hardness	3/year	-	-	-	-
Total Dissolved Solids (TDS)	3/year	6/year Ω	3/year	3/year	3/year
Total Suspended Solids (TSS)	3/year	6/year Ω	3/year	3/year	3/year
Settleable Solids	3/year	6/year Ω	3/year	3/year	3/year
Total Organic Carbon (TOC)	-	6/year Ω	3/year	3/year	3/year
STORM-BORNE SUSPENDED SEDIMENT					
Copper	Storm-borne sediment filtered and analyzed by analytical laboratory at each outfall station for 3 storms per year; flow data collected or modeled for non-monitored storms; additional 3 pre-storm events at MdR-4ORB only.				
Lead					
Zinc					
Chlordane [(c)]					
Total PCBs					
Total Dichlorodiphenyltrichloroethane (DDTs)					
p,p'-DDE					

*Permit monitoring will occur during the first significant storm of the year and two additional storms each wet weather season (October 1st – April 15th).

**TMDL monitoring will be performed for 3 storms peryear during the wet weather season (October 1st – April 15th). See Section 4-3 for additional discussion.

Table 4-2. Storm Water Outfall Monitoring Stations Sampling Parameters and Frequency

Parameter	Permit, Toxics TMDL*	Toxics TMDL**			
	MdR-5	MdR-4ORB	MdR-5	MdR-CU-1P5	MdR-CU-2

[#] Table E-2 constituents detected above relevant objectives at the MS4 receiving water monitoring station during the first storm event of 2016-17 monitoring.

[Ω]Additional 3 pre-storm events will be sampled at MdR-4ORB only.

(a) Field parameters are defined as dissolved oxygen (DO), pH, temperature, and specific conductivity.

(b) Toxicity sampling at outfall stations for Permit compliance will be as needed and conducted in accordance with the MRP and the Regional Board's Toxicity Clarification Memo dated August 7, 2015.

(c) Chlordane will be calculated by summing cis and trans chlordane; cis and trans nonachlor; and oxychlordane

4.3 Storm Water Monitoring Mobilization Criteria

The Permit requires storm water monitoring during the first significant storm of the year. Section C.1.b(iii) of the MRP establishes mobilization criteria for the first significant storm as the first storm of the year with a 70% probability of at least 0.25-inch rainfall, at least 24 hours prior to the start of a rainfall event.

According to both the Permit and the Bacteria TMDL, wet weather events shall be separated by a minimum of three days of dry conditions (e.g., less than 0.1 inch of rain each day). A minimum of three days of dry conditions (i.e., 72 hours) is also required between a qualified storm event and a non-storm water monitoring event.

For purposes of this CIMP, mobilization for storm water monitoring will occur when the following criteria are met:

1. 70% probability of at least 0.25-inch rainfall, at least 24 hours prior to the start of a rainfall event using NWS forecast tools. If the criteria cannot be met to fulfill the required number of wet weather events, then smaller storms may be sampled (i.e. 0.1 inch rainfall). Every attempt will be made to monitor acceptable storms; however, if a storm is not predicted at least 24 hours in advance, it may not be possible to monitor the event.
2. At least three days of dry conditions (e.g., less than 0.1 inch of rain each day) prior to the storm event.

If during implementation of this CIMP, it becomes necessary to adjust the mobilization criteria to improve the likelihood of capturing qualifying storm events, the EWMP Agencies will do so and will notify the Regional Board.

A review of rainfall data from 1940 to 2014 at the Los Angeles International Airport (LAX) rain gauge was conducted to determine the number of storm events with rainfall greater than 0.25 inches with 72 hours of antecedent dry weather and the number of events that ranged between 0.1 to 0.25 inches during the wet weather monitoring months of October through April (Table 4-3). Results showed that 74% of storms were >0.25 inches and 26% were between 0.1-0.25 inches. Based on this analysis, larger storms of >0.25 inches were selected for mobilization in order to maximize the capture of sufficient storm water for analysis. The maximum number of storm events to be monitored each wet weather season (three events) was selected in order to maintain consistency with the Permit monitoring requirement and other CIMP groups that are also subject to a Toxics TMDL.

Table 4-3. Number of Storm Events > 0.25 inches from 1940-2014

Rainfall Total	Frequency	Percent
0.1-0.25in	254	26%
>0.25in	712	74%

The Bacteria TMDL compliance monitoring program will not be impacted because bacteria samples are collected and analyzed on a scheduled basis (daily and/or weekly). The wet/dry weather season classification of bacteria samples will continue to be characterized based on the 0.1-inch storm threshold of the Bacteria TMDL.

4.4 Storm Water Outfall Monitoring Summary

Four outfall monitoring locations were selected for monitoring. One station (MdR-5) was selected for both Permit monitoring and Toxics TMDL monitoring, along with three additional stations which will be monitored as part of the Toxics TMDL outfall monitoring. These stations will capture runoff from representative land use areas, represented in Figure 4-1 through Figure 4-3, of the MdR Watershed and will also be used to assess Permit and Toxics TMDL compliance in accordance with applicable storm water Municipal Action Levels (MALs) and WQBELs.

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5.0 NON-STORM WATER OUTFALL PROGRAM

5.1 TMDL Non-Storm Water Monitoring

For the third year of CIMP monitoring (2018-19), a new TMDL outfall station, MdR-4ORB, will be introduced in place of the two previous CIMP outfall stations MdR-3 and MdR-4 (both monitored during the first two years of the CIMP). The location of MdR-4ORB is shown in Figure 2-1. The Regional Board requested additional non-storm water monitoring be conducted at MdR-4ORB beginning in September 2018 (per approval letter dated August 30, 2018). Station MdR-4ORB is located at the tide gates in ORB. During one non-storm water event per year when the ORB tide gates automated system is set to a dry weather tide gate logic, non-storm water sampling will occur during one ebb tide to characterize the pollutant load from ORB to MdRH. One non-storm water composite sample will be collected for laboratory analyses of the suspended sediment for all TMDL pollutants including copper, lead, zinc, total chlordane, total PCBs, total DDTs, and p,p'-DDE. In addition, TSS, TDS, settleable solids, and TOC will be analyzed in the water from the composite sample. The monitoring frequency and constituents for monitoring are presented in Table 5-1.

Sampling methods and sample handling procedures are detailed in Appendix C. Parameter lists, complete with suggested analytical methods and target method detection limits are provided in Appendix D.

Table 5-1. MdR-4ORB Non-Storm Water Outfall Monitoring Sampling Parameters and Frequency

<table>
<tr><th rowspan="2">Parameter</th><th>Toxics TMDL</th></tr>
<tr><th>MdR-4ORB</th></tr>
<tr><td colspan="2">WATER QUALITY</td></tr>
<tr><td>Flow</td><td>1/year</td></tr>
<tr><td>Total Dissolved Solids (TDS)</td><td>1/year</td></tr>
<tr><td>Total Suspended Solids (TSS)</td><td>1/year</td></tr>
<tr><td>Settleable Solids</td><td>1/year</td></tr>
<tr><td>Total Organic Carbon (TOC)</td><td>1/year</td></tr>
<tr><td colspan="2">SUSPENDED SEDIMENT</td></tr>
<tr><td>Copper</td><td rowspan="7">Suspended sediment filtered and analyzed by analytical laboratory for one non-storm water event per year; flow data modeled.</td></tr>
<tr><td>Lead</td></tr>
<tr><td>Zinc</td></tr>
<tr><td>Total Chlordane*</td></tr>
<tr><td>Total PCBs</td></tr>
<tr><td>Total DDTs</td></tr>
<tr><td>p,p'-DDE</td></tr>
</table>

*Chlordane will be calculated by summing cis and trans chlordane; cis and trans nonachlor; and oxychlordane

5.2 Permit Non-Storm Water Outfall Program

The objectives of the NSW Outfall Program as described in the Permit include the following (Part II.E.3 of the MRP):

a. Determine whether a Permittee's discharge is in compliance with applicable NSW WQBELs derived from TMDL WLAs;
b. Determine whether a Permittee's discharge exceeds NSW action levels, as described in Attachment G of the Permit;
c. Determine whether a Permittee's discharge contributes to or causes an exceedance of RWLs; and
d. Assist a Permittee in identifying illicit discharges as described in Part VI.D.10 of the Permit.

The intent of the NSW Outfall Program is to demonstrate that the Permittees are effectively prohibiting NSW discharges that are not exempt or conditionally exempt discharges to receiving waters and to assess whether NSW discharges are causing or contributing to exceedances of RWLs. By detecting, identifying, and eliminating illicit discharges, the NSW Outfall Program will demonstrate Permittees' efforts to effectively prohibit NSW discharges to and from the MS4. Where NSW discharges are deemed "significant", the program will discern whether they are illicit, exempt, or conditionally exempt, and demonstrate whether the discharges may be causing or contributing to exceedances of RWLs.

The NSW Outfall Program is focused on NSW discharges (i.e., discharges occurring during dry weather) to receiving waters from major outfalls (≥36 in diameter or ≥12 in from industrial areas).

5.2.1 Non-Storm Water Outfall Screening and Monitoring Program

There are eight major outfalls (≥36 inch diameter) in the MdR Watershed (Table 3-2). Four of these outfalls are located in Subwatershed 2 and four of them are located in Subwatershed 1 (Figure 1-1). There are LFDs installed upstream of three of the four major outfalls in Subwatershed 1, CSTL-022A, B, and C), that divert non-storm water flows to the sanitary sewer. The remaining major outfall, CSTL-023B, is strongly tidally influenced throughout the system and tidal flow is not discernable from non-storm water discharges. All four of the major outfalls located in Subwatershed 2 are tidally influenced and are inundated with marine waters at all times.

The tidal inundation of the major outfalls in the MdR Watershed does not allow for the sampling of outfall discharge. Potential discharge (where not addressed by a LFD) is co-mingled with marine waters, making it impossible to discern the impact of potential non-storm water runoff to the receiving water. Since all the major outfalls are inundated, the WMG Agencies conducted visual observations on September 2016, April 2017, and July 2017 at all catch basins (that are not served by an LFD or BMP) that have capacity to handle non-storm water discharges and that discharge to a major outfall (Figure 5-1). During all three observation events, there were no significant flow inputs to the major outfalls.

Figure 5-1. Extent of Tidal Influence, Major Outfalls and Catchbasins for Visual Inspection in the MdR Watershed

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5.2.2 Identification of Outfalls with Significant Non-Storm Water Discharges

Field reconnaissance conducted in January 2014 confirmed that the MS4 in the MdR Watershed is strongly tidally influenced, limiting opportunities for identification of new monitorable stations representative of all watershed drainage areas (Appendix B). Aside from the three LFDs upstream of three of the four major outfalls in Subwatershed 1, the remaining MdR Watershed MS4 infrastructure that discharges to the Harbor or the Grand Canal is frequently submerged during a period of or the entire tidal cycle. Marine water and other signs of tidal inundation, such as mussels and shells, may be found far up into the watershed. Figure 5-1 draws an approximation of the boundary of tidal influence in the MdR Watershed based on the field reconnaissance summarized in Appendix B.

To determine whether outfalls contribute significant non-storm water discharge, three (3) non-storm water catch basin observation events were performed for catch basins that discharge into a major outfall. These catch basins are indicated in Figure 5-1. A standard field data collection form was used, consisting of:

- Visual estimate of flow rate
- Clarity
- Presence of odors and foam

If there was flow more than a garden hose entering the catch basins for at least two of the three observation events, that outfall was deemed as exhibiting significant non-storm water discharge. The screening process for determining significant non-storm water discharge is presented in Table 5-2. The non-stormwater screening events were completed in September 2016, April 2017, and July 2017 where there were no significant non-stormwater discharge.

Table 5-2. Screening Process for Determining Significant Non-storm Water Discharge

Component	Description
Data Collection	Visual flow measurement at identified catch basins
Frequency	Three times
Definition	Outfalls will be determined to be significant non-storm water discharges if the flow entering the catch basins is greater than a garden hose for two of the three observation events.
Timeline	Initiation of the screening process will occur within 90 days of approval of the CIMP.

5.2.3 Inventory of MS4 Outfalls with Non-Storm Water Discharges

The inventory of MS4 outfalls identified during outfall screening will be developed and updated by the MdR EWMP Agencies to classify outfalls with known significant non-storm water discharges and those requiring no further assessment (Part IX.D of the MRP). If the MS4 outfall requires no further assessment, then the inventory will include the rationale for the determination of no further action required based on the following:

- The outfall is not within the geographical scope of the EWMP Watershed Management Area (WMA);
- The outfall does not have flow since the upstream catch basins have no flow;
- The outfall does not have a known significant non-storm water discharge based on catch basins observation; or
- Discharges observed were determined to be exempt during the source identification

The inventory will be recorded in the database as required in Part VII.A of the MRP. Each year, the inventory will be updated to incorporate the most recent characterization data for outfalls with significant non-storm water discharges. The following physical attributes of outfalls with significant non-storm water discharges will be included in the inventory and collected as part of the screening process in accordance with Section IX.D of the MRP:

a. Date and time of last visual observation or inspection;
b. Outfall alpha-numeric identifier;
c. Description of outfall structure, including size;
d. Description of receiving water at the point of discharge;
e. Latitude/longitude coordinates;
f. Nearest street address;
g. Parking, access and safety considerations;
h. Photographs of outfall condition;
i. Photographs of significant non-storm water discharge (or indicators of discharge) unless safety considerations preclude obtaining photographs;
j. Estimation of discharge rate;
k. All diversions either upstream or downstream of the outfall; and
l. Observations regarding discharge characteristics such as turbidity, odor, color, presence of debris, floatables, or characteristics that could aid in pollutant source identification.

5.2.4 Significant Non-Storm Water Discharge Source Identification

Part IX.A.2 of the MRP requires Permittees to classify the source identification results into the following types as summarized below:

A. **IC/ID:** If the source is determined to be an illicit discharge, then the Permittee must implement procedures to eliminate the discharge consistent with IC/ID requirements (Permit Part VI.D.10) and document actions.

B. **Authorized or Conditionally-Exempt Non-Storm Water Discharges:** If the source is determined to be an NPDES permitted discharge, a discharge subject to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), or a conditionally exempt essential discharge, then the Permittee must document the source. For non-essential conditionally exempt discharges, the Permittee must conduct monitoring consistent with Part IX.G of the MRP for the Regional Board Executive Officer to determine whether the discharge should remain conditionally exempt or be prohibited.

C. **Natural Flows:** If the source is determined to be natural flows, then the Permittee must document the source.

D. **Unknown Sources:** If the source is unknown, then the Permittee must conduct monitoring consistent with Part IX.G of the MRP.

E. **Originates Upstream of EWMP WMA**: If the source is determined to originate from an upstream WMA, then the Permittee will inform the upstream WMA and the Regional Board in writing within 30 days of identifying the presence of the discharge, provide all available characterization data and determination efforts, and document actions taken to identify its source.

Source identification will be conducted using site-specific procedures based on the characteristics of the non-storm water discharge. Investigations could include:

- Performing field measurements to characterize the discharge;
- Following dry-weather flows from the location where they are first observed in an upstream direction along the conveyance system; and
- Compiling and reviewing available resources, including past monitoring and investigation data, land use/MS4 maps, aerial photography, and property ownership information.

Where the source identification has determined the non-storm water source to be authorized, natural, or essential conditionally-exempt flows, the outfall will require no further assessment. However, if the source identification determines that the source of the discharge is non-essential conditionally exempt, an illicit discharge, or is unknown, then further investigation will be conducted to eliminate the discharge or to demonstrate that it is not causing or contributing to receiving water impairments and the outfall will be added to the monitoring list until non-storm water discharge is eliminated. In some cases, source investigations may ultimately lead to prioritized programmatic or structural BMPs. Where the MdR EWMP Agencies have determined that they will address the non-storm water discharge through modifications to programs or by structural BMP implementation, the MdR EWMP Agencies will incorporate the approach into the implementation schedule developed in the EWMP, and the outfall will be eliminated from the monitoring list.

5.2.5 Non-Storm Water Discharge Monitoring

As outlined in the MRP (Part II.E.3), outfalls with significant non-storm water discharges that remain unaddressed after source investigation shall be monitored to meet the following objectives:

a. Determine whether a Permittee's discharge is in compliance with applicable dry-weather WQBELs derived from TMDL WLAs;
b. Determine whether the quality of a Permittee's discharge exceeds non-storm water action levels, as described in Attachment G of the Permit; and
c. Determine whether a Permittee's discharge causes or contributes to an exceedance of receiving water limitations.

Thus, catch basins that have been determined to convey significant non-storm water discharges where the source identification concluded that the source is attributable to a continued illicit discharge, non-essential conditionally exempt or unknown source must be monitored. Monitoring will be implemented within 90 days of completing the source identification and will be coordinated with the next receiving water dry-weather monitoring event.

After the catch basins observations and determination of which outfalls have significant non-storm water flows; non-storm water monitoring sites will be monitored for two (2) monitoring events. Identified significant non-storm water outfalls will be monitored for all required constituents, per receiving water bodies, as outlined in Part IX.G.1.a-e of the MRP, except toxicity. Toxicity monitoring is only required when triggered by recent receiving water toxicity monitoring where a TIE on the observed receiving water toxicity test was inconclusive. Outfalls on the monitoring list will be monitored for at least the duration of the Permit term, or until the non-storm water discharge is eliminated.

5.2.6 Non-Storm Water Outfall Monitoring Summary

The MdR Watershed is strongly tidally influenced and tidal flow is not discernable from non-storm water discharges. In addition, improvements have been made to the MS4 infrastructure to mitigate and eliminate potential water quality impacts of the MS4 on the Harbor receiving waters. These improvements include the installation of LFDs upstream of the three major outfalls to Basin E.

A brief summary of the non-storm water outfall program for the MdR WMA is as follows:

1. **Catch Basin Observation:** Since all the major outfalls are inundated, all catch basins that are not served by an LFD or BMP that have capacity to handle non-storm water discharges and discharge to a major outfall were visually inspected to determine if it requires further investigation.
2. **Identification of Outfalls with Significant Non-Storm Water Discharge:** Based on the data collected during the observations, the group will did not identify any significant non-storm water discharges.

The remaining steps outlined in the non-storm water outfall based screening and monitoring section of the MRP (Section IX) are not required to be completed because no significant non-storm water discharges were identified.

The MdR EWMP Agencies completed 100% of the source identification of identified significant non-storm water outfalls by December 28, 2017. After completion of this source identification, and in accordance with the Attachment E, Part IX.B.2 of the Permit, the non-storm water monitoring component of the CIMP will be evaluated and re-assessed during the Permit term.

6.0 TRASH AND PLASTIC PELLET MONITORING

The monitoring and reporting requirements of the *Santa Monica Bay Nearshore and Offshore Debris TMDLs* (Debris TMDL) may be broken up into two categories: (1) Trash and (2) Plastic Pellets. The following subsections detail how the MdR EWMP Agencies will meet the requirements specific to each category.

6.1 Trash

The Debris TMDL became effective on March 20, 2012. The Responsible Agencies identified in the Debris TMDL that also have jurisdiction in the MdR Watershed include the County, LACFCD, City of Los Angeles, City of Culver City, and Caltrans. The Debris TMDL specifies that compliance with the trash WLA (zero discharge) applicable to the MS4 Permittees shall be achieved through implementation of the Ballona Creek Trash TMDL (Resolution No. R08-007). The MdR WMG agencies have met the final compliance deadline in the Ballona Creek Trash TMDL, and corresponding schedule in the 2012 MS4 Permit, through installation of full capture devices. In the City of Los Angeles area of the MdR watershed, 293 catch basins have been retrofitted with trash screens (103 City-owned and 190 LACFCD-owned catch basins with trash screens). The City of Culver City has retrofitted four catch basins and the County has retrofitted 40 catch basins in the MdR with full-capture devices.

The Permit requires Permittees to develop a Trash Monitoring and Reporting Plan (TMRP) to describe the methodologies that will be used to assess and monitor trash from source areas in the Santa Monica Bay (SMB) WMA and shoreline of the Santa Monica Bay. In 2012, the County submitted a TMRP to the Regional Board (Appendix J). The City of Los Angeles will not be developing a TMRP for MdR because the implementation program for the Ballona Creek (BC) Trash TMDL covers the City's area in MdR. The City of Culver City is in compliance with the TMRP for the Ballona Creek Trash TMDL and is considered in compliance with the Debris TMDL's trash component.

Trash monitoring will be conducted to assess the quantities of trash in the Harbor receiving water associated with storm events. Visual observations of trash will be made and photographs will be taken at MdRH-MC prior to the start of storm event monitoring and again at the end of the storm water monitoring. One photograph will be taken across the Main Channel of MdRH, perpendicular to direction of flow along the channel. The photograph will show as much as possible of both sides of the Main Channel when feasible. The post storm photograph must be taken from the same vantage point. Ideally the two photographs will display relative volumes of trash that were deposited by storm flows, if trash is present.

6.2 Plastic Pellets

Plastic Pellet Monitoring and Reporting Plans (PMRPs) quantifying potential plastic pellet discharges to Santa Monica Bay, along with supplemental Spill Response Plans (SRPs) to address containment of spilled plastic pellets, were submitted to the Regional Board by the City of Culver City (2012), County (LADPW, 2013a), and LACFCD (2013) (Appendix J). The City of Los Angeles does not have plastic pellet facilities in MdR and is therefore not subject to the pellet monitoring requirements of the PMRP; subsequently, the City of Los Angeles will coordinate plastic pellets spill and response requirements in conjunction with SMB and BC watersheds.

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7.0 NEW DEVELOPMENT/RE-DEVELOPMENT EFFECTIVENESS TRACKING

The MdR EWMP Agencies have developed mechanisms for tracking new development/re-development projects that have been conditioned for post-construction BMPs pursuant to Permit Section VI.D.7. The MdR EWMP Agencies have also developed mechanisms for tracking the effectiveness of these BMPs pursuant to Permit Attachment E.X. A sample tracking mechanism is attached for reference (Appendix E).

In 2002, the Permittees developed and implemented the Standard Urban Storm Water Management Plan (SUSMP), a Development Planning Program that outlines BMP requirements for development and re-development projects. The Permit expanded the requirements of the SUSMP program outlined in the previous version of the NPDES permit. The goal of the revised program is to reduce water quality impacts associated with urban development by minimizing impervious surfaces and controlling runoff from impervious surfaces (i.e., smart growth). New Development and Re-Development Projects, defined in Table 7-1, are required to retain on-site the volume of water produced by the greater of the following sources:

- Storm Water Quality Design Volume (SQDV) (i.e., 0.75-inch, 24-hour rain event).
- 85^{th} percentile 24-hour rain event (in accordance with the County's 85^{th} percentile Precipitation Isohyetal Map).

If the analysis determines that on-site containment of the full design volume is technically infeasible, alternative compliance measures such as groundwater replenishment and off-site management should be considered. The technical infeasibility threshold must be demonstrated through an analysis of the maximum application of green roofs and rainwater harvest and use, and the analysis must be endorsed by a registered professional engineer, geologist, architect, and/or landscape architect.

Table 7-1. New Development and Re-development Projects Subject to the Permit BMP Tracking Program Requirements

	Project Area	New Development	Re-Development
Planning and Land Development Program	≥10,000 sq ft and ≥1 acre disturbed area	All Projects	--
	≥10,000 sq ft	Industrial Parks Commercial Malls Streets/Roads	Existing Single-Family Homes in hillside areas[a]
	≥5,000 sq ft	Retail Gas Outlets Restaurants Parking Lots* Automotive Facilities	Alter ≥50% impervious surface at site not subject to post-construction BMPs[a]
	≥2,500 sq ft	All projects located in, directly adjacent to, or discharging directly to the Ballona Creek Coastal Resource Area (CRA) [b]	--
	Single Family Homes in hillside areas	All Projects	New or replace ≥10,000 sq ft impervious surface area.

*Includes parking lots with ≥25 parking spaces.
(a) For projects with <50% impervious surfaces re-developed, only the altered area must be mitigated.
(b) The Permit applies to all projects located in, directly adjacent to, or discharging directly to a Significant Ecological Area (SEA). The County has given the term Coastal Resource Area (CRA) to SEAs located in the California Coastal Zone. The Ballona Creek CRA includes the salt marsh, Ballona Creek Channel, Ballona Lagoon, and Del Rey Lagoon (LADPW, 2014). This criterion would apply to projects directly adjacent to or discharging directly to, the Ballona Creek Wetlands (Area A), Fiji Ditch, and the Ballona Lagoon (i.e., projects along the Venice Canals).

7.1.1 Existing New Development/Re-Development Programs

In accordance with the Permit, the Permittees that have such land use authority over new developments or re-development projects or development construction sites are responsible for implementing a storm water management program to inspect and control pollutants from new development and re-development projects within their jurisdictional boundaries.

The LACFCD has no planning, zoning, development permitting, or other land use authority over new developments or re-development projects located in the incorporated or unincorporated areas of the MdR Watershed.

7.1.1.1 Existing New Development/Re-Development Program – County

In 2008, the County adopted Ordinance 22.52.2210 (Ord. No. 2008-0063 §3, 2008), which incorporates the Low Impact Development (LID) requirements outlined in the Permit into the County Code. This Ordinance is the Local Ordinance Equivalence of the Permit and applies to all of the development and re-development projects identified in Table 7-1. Prior to issuance of building permits and/or commencement of any construction activity, the LID BMPs in the project are reviewed by County staff using the *Standard Urban Stormwater Mitigation Plan Review Sheet* (LADPW, 2008b) and the *County of Los Angeles LID Standards Manual* (LADPW, 2009), which describe LID techniques. The County provided an update of the *LID Standards Manual* (LADPW, 2014) to comply with the LID requirements of the 2012 MS4 Permit.

7.1.1.2 Existing New Development/Re-Development Program – City of Los Angeles

In May 2012, the City of Los Angeles adopted Ordinance 181899 to amend the Los Angeles Municipal Code (LAMC) and expand the applicability of existing SUSMP requirements to include rainwater LID strategies on all projects requiring a building permit. The Ordinance is enforced through a LID Plan Check process, wherein City staff review project drawings and the associated storm water mitigation plan for LID measures prior to issuance of a building permit. The *Development Best Management Practices Handbook* (City of Los Angeles, 2011) describes LID techniques and provides examples and descriptions of how LID systems function.

7.1.1.3 Existing New Development/Re-Development Program – City of Culver City

In 2002, the City of Culver City adopted Ordinance 2002-014 to amend Chapter 5.05 of the Municipal Code to include LID mitigation as part of the SUSMP. The Ordinance is enforced through a LID Plan Check process, wherein City staff review project drawings and the associated storm water mitigation plan for LID measures prior to issuance of all applicable permits. Potential enforcement actions for identified seasonal and/or recurrent violations of SUSMP provisions include cease and desist orders, notice to clean orders, permit revocation (if applicable), and other potential civil and/or criminal remedies deemed appropriate. In December of 2014, a revised LID ordinance was adopted to achieve a local ordinance equivalent to the Permit.

7.1.2 Data Tracking, Inspection, and Enforcement Requirements for Post-Construction BMPs

Section VI.D.7.d.iv of the Permit requires each Permittee to implement an inspection and enforcement program for new development and redevelopment post-construction BMPs and to track data in an electronic database (preferably with a GIS-interface to the MS4 maps). Figure 7-1 presents an iterative approach to collection, tracking, and reporting and data associated with the New Development and Re-Development Program. Existing SUSMP programs may be standardized between MdR EWMP Agencies and shared using a common electronic tracking platform.

The overall data tracking process may be a linear or an iterative process, as needed, based on the findings of each year of implementation. Potential changes to the program and data collection systems will be considered during the annual reporting process, when all available data from the MdR Watershed is compiled by jurisdiction and reviewed in the context of the Permit and TMDLs. The Permittees will conduct a formal review of the overall data tracking program and make necessary programmatic revisions during Year 3 of the program.

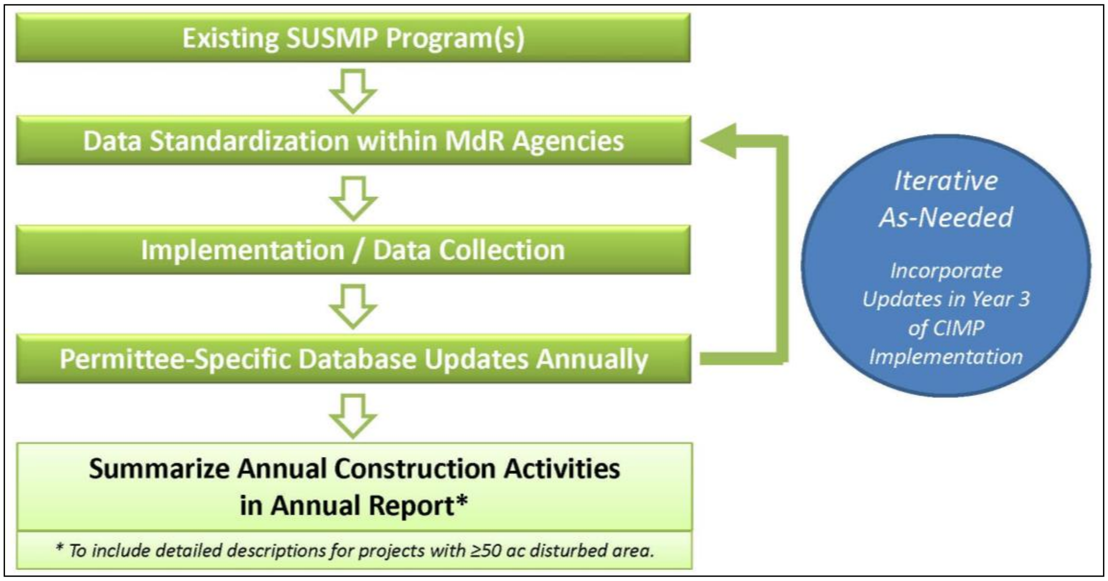

Figure 7-1. Iterative Approach – New Development/Re-Development Program Data Tracking

Existing data tracking protocols and databases, which have been summarized for each Permittee in Appendix E, are based on the SUSMP programs described above. The Permit allows each Permittee to establish Local Ordinance Equivalents to the Permit; therefore, slight variations currently exist for inspection thresholds and data tracking. Consequently, during Year 1 of the program, data review and standardization are necessary to ensure that information collected across the MdR Watershed is consistent and that collected data are tracked and annually shared using consistent methods for reporting purposes.

The Permit minimum data tracking requirements, identified in Table 7-2, establish the basis for data standardization. Key additional data fields, which may allow for more consistent, streamlined data reporting, are also identified in Table 7-2. The additional data fields reflect the following reporting requirements of the Permit:

- A summary of New Development/Re-development Projects are constructed during the reporting year, for each MdR Agency's jurisdictional area.
- A detailed description of control measures applied to projects disturbing more than 50 acres.

An essential factor in overall data standardization between Permittees is agreement on the type of fields to be exported from individual Permittee databases to the master database. This method of standardization may be enhanced through collaborative development of the design and implementation of common inspection forms. Section 7(d)(iv)(1)(c) of the Permit requires Permittees to use a Post-Construction BMP Maintenance Checklist to inspect all BMPs at least once every two years after new and re-development projects are completed in order to assess condition, functionality, and maintenance of the BMPs. Checklists, inspection forms, and training materials may be used to establish consistency between Permittees for naming conventions, reporting units, inspection evaluations (e.g., satisfactory/unsatisfactory), corrective actions, and other factors. Example forms are provided in Appendix E.

Table 7-2. Minimum Database Tracking Requirements

Category	2012 Permit Requirements for New Development/Re-Development Database	Minimum Method of Data Tracking By Section of the Permit
Development Project	Jurisdiction	--
	Project Name	MRP - X.A.1
	Municipal Project Identification No.	VI.D.7.d.iv.1.a.i
	State Waste Discharger Identification (WDID) No.	VI.D.7.d.iv.1.a.ii
	Developer Name / Contact Information	MRP - X.A.1
	Construction Start/Completion Dates	--
	Project Location and Site Map *(preferably linked to GIS storm drain map(s), especially for projects with off-site BMPs)*	--
	Location relative to a significant ecological area (SEA) feature	--
BMP Design	Project Area (acres)	VI.D.7.d.iv.1.a.iii
	Total Disturbed Area *(additional reporting requirements for projects ≥50 acres)*	--
	Type of Receiving Water [(1)]	--
	85^{th} Percentile Storm Event 95^{th} Percentile Storm Event (if "natural" Receiving Water) Other Hydromodification Design Criteria Project Design Storm (inches) Design Storm Volume (gallons/ MGD)	MRP - X.A.4, MRP - X.A.5, MRP - X.A.6, MRP - X.A.7 & 11 MRP - X.A.8 & 10
	Portion of Design Storm to be Retained on-site (%) Portion of Design Storm to be Retained or Treated off-site (%)	MRP - X.A.9 MRP - X.A.12 & 13
BMPs	BMP Type (Infiltration, Biofiltration, Groundwater Replenishment) and Description[(2)]	VI.D.7.d.iv.1.a.iv
	BMP Location (coordinates)	VI.D.7.d.iv.1.a.v
	BMP Location (on-site / off-site)	--
	Date of Maintenance Agreement	VI.D.7.d.iv.1.a.vii
	BMP Inspection Date and Summary of Findings[(3)]	VI.D.7.d.iv.1.a.ix
	BMP Corrective Action(s) based on Inspections	VI.D.7.d.iv.1.a.x
	BMP Replacement and/or Repair Date	VI.D.7.d.iv.1.a.xii
	BMP Maintenance Records	VI.D.7.d.iv.1.a.viii
	Date of BMP Acceptance	VI.D.7.d.iv.1.a.vi
	Date Certificate of Occupancy Issued (New Development)	VI.D.7.d.iv.1.a.xi MRP - X.A.3
	BMP Map *(preferably linked to GIS storm drain map(s), especially for off-site BMPs)*	MRP - X.A.2 MRP - X.A.14
	Documentation of Issuance of BMP Requirements to the Developer	MRP - X.A.15

(1) An improved drainage system is a system that has been channelized or armored. A natural drainage system is a system that has not been improved. The clearing or dredging of a natural drainage system does not cause the system to be classified as an improved drainage system.

(2) In order to identify and inspect for project-specific design specifications and criteria, it is recommended to integrate this description with electronic (PDF) files of Project Design Drawings and Calculations, which may be on record in a separate database, and with electronic copies of all maintenance records.

(3) Post-Construction BMP descriptions should integrate with the information in the Inspection check-lists. Basic information may be input to the database from design drawings and then field verified during the initial post-construction inspection.

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8.0 REGIONAL STUDIES

8.1 Bioassessment Program

The MRP identifies one regional study: the SMC Regional Watershed Monitoring Program. The SMC is a collaborative effort between the Southern California Coastal Water Research Project (SCCWRP), State Water Board's Surface Water Ambient Monitoring Program (SWAMP), three Southern California Regional Water Quality Control Boards, and several county storm water agencies. SCCWRP acts as a facilitator to organize the monitoring program, conducts the data analysis, and prepares monitoring results reports. The goal of the SMC is to develop a monitoring program on a regional level for Southern California's coastal streams and rivers.

Prior to the initiation of the SMC Regional Watershed Monitoring Program, in-stream monitoring in southern California was conducted by over a dozen different organizations, each of which had disparate monitoring programs that varied in design, frequency, and the indicators selected for measurement. Even where the monitoring designs were similar, the field techniques, laboratory methods, and quality assurance requirements were often not comparable, making region-wide assessments impossible. In addition, the lack of an integrated information management system precluded data sharing among programs. To address these problems, SCCWRP helped the SMC design and implement a coordinated and regional watershed monitoring program. The SMC works with local programs in the region to facilitate greater data collection and provide a regional context to address site- and watershed-specific questions.

The LACFCD and City of Los Angeles will continue to participate in the Bioassessment Program being managed by the SMC. The LACFCD will continue to coordinate and assist in implementing the bioassessment monitoring requirement of the MS4 Permit on behalf of all the Permittees in Los Angeles County during the current permit cycle. Initiated in 2008, the SMC's Bioassessment Program is designed to run over a five-year cycle. Monitoring under the first cycle concluded in 2013, with reporting of findings and additional special studies in 2014. The next five-year Bioassessment Program is scheduled to run from 2015 to 2019.

8.2 Southern California Bight Regional Marine Monitoring Program

The Southern California Bight Regional Marine Monitoring Program (Bight) is led and organized by SCCWRP and is considered to be independent of this CIMP. Data from the study, however, will be used to help evaluate long-term assessment of conditions in the MdRH. Historically, the MdRH was included in Bight 2003, Bight 2008, and Bight 2013. Currently, the MdR EWMP Agencies are participating in Bight 2018, which will include the SQO analysis required by the Toxics TMDL.

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9.0 SPECIAL STUDIES

9.1 Existing Special Studies

The MRP requires that each Permittee conduct the special studies required by an effective TMDL or an approved TMDL CMP. As such, in addition to ongoing monitoring efforts, the MdR EWMP Agencies have completed special studies outlined in the TMDL CMPs in accordance with the requirements of the Bacteria TMDL and Toxics TMDL to better understand conditions in the MdR Watershed. For each of the special studies, where applicable, Table 9-1 provides the location and description of monitoring station used for the study, media sampled, and the type of data collected based on monitoring history.

Table 9-1. Special Studies Completed From 2006-2014

Report	Year	TMDL CMP Monitoring Station IDs	Parameters	Outfalls/MS4 (Storm Water)	Harbor Water	Sediment	Sediment Cores
Storm Borne Sediment Collection Pilot Project (Brown and Caldwell, 2013)	2011-2014	MdR-4, MdR-5, MdRU-C-1	Organics	x			
			Metals	x			
			Conventional*	x			
Special Study - Low-Detection Level (Brown and Caldwell, 2011b)**	2011	MdRH-B-1, MdRH-B-2, MdRH-B-3, MdRH-B-4, MdR-3, MdR-4, MdR-5, MdRU-C-1, MdRU-C-2	Organics	x	x	x	
Special Study - Partitioning Coefficient (Brown and Caldwell, 2011a)	2011	MdRH-B-1, MdRH-B-2, MdRH-B-3, MdRH-B-4, MdRH-F-1, MdRH-F-2, MdRH-F-3, MdRH-F-4, MdRH-F-5, MdR-3, MdR-4, MdR-5, MdRU-C-1, MdRU-C-2	Metals	x	x	x	
			Conventional*	x	x	x	
MdRH Sediment Characterization Study (Weston, 2008b)	2008	Multiple locations in the Harbor Back Basins, Front Basins, and Main Channel	Organics			x	x
			Metals			x	x
			Conventional*		x	x	
			Benthic Community			x	
			Toxicity			x	
Nonpoint Source Bacteria Study (Weston, 2008a)	2006	MdR Watershed	Bacteria	x	x	x	

*Based on Table E-2 of the MRP, conventional pollutants are Oil and Grease, total Phenols, cyanide, pH, Temperature.
**The study included storm water, Harbor sediment, and Harbor receiving water characterization.

9.2 Special Studies Completed Under CIMP (2016-2018)

Special studies are a tool to be implemented on an as-needed basis for the adaptive management process throughout the EWMP implementation. The Toxics TMDL required a Stressor Identification Study to be performed as a special study. The Stressor Identification Study as described below was completed in December 2016.

- **Stressor Identification Study:** Biological testing is a useful tool for determining the presence of toxicity from sediment contamination; however, it does not indicate the cause of toxicity. If sediments fail to meet the SQOs during the Sediment Triad Assessment, the Toxics TMDL requires a Stressor Identification Study to be conducted in accordance with Section VII.F of the *Water Quality Control Plan for Enclosed Bays and Estuaries* (State Water Resources Control Board [SWRCB] and Cal EPA, 2009) and for the final report to be submitted to the Regional Board by December 15, 2016. The stressor identification investigations use a variety of tools to determine whether the reason for the narrative objective not being met is due to generic stressors other than toxic pollutants, such as physical alterations or other pollutant-related stressors. According to the SQO guidelines, "If there is compelling evidence that the SQO exceedances contributing to a receiving water limit exceedance are not due to toxic pollutants, then the assessment area shall be designated as having achieved the receiving water limit." Following a review of the investigation data, conclusions will be made based on the data available and/or recommendations will be developed for future studies to further characterize or identify the condition causing the narrative impairment. To determine whether a site is impacted from toxic pollutants, one or more of the following tools may be applied:

  - Evaluate the spatial extent of the area of concern in relation to anthropogenic sources.
  - Evaluate the body burden of the pollutants accumulated in the animals used for exposure testing.
  - Evaluate the chemical constituent results to mechanistic benchmarks.
  - Compare chemistry and biology data to determine whether correlations exist.
  - Alternative biological assessment such as bioaccumulation experiments, pore water toxicity, or pore water chemistry analyses may be conducted.
  - Phase I TIEs conducted in accordance with USEPA 2007 may also be conducted and are often useful for determining the causative agent or class of compounds causing toxicity.

10.0 NON-DIRECT MEASUREMENTS

Environmental data (water, sediment, and tissue data) collected through other monitoring programs in the MdR Watershed will be incorporated to the extent practicable. The extent practicable will be dictated by the cost of gathering and compiling information from outside programs. It is not the intent or purpose of this CIMP to compile and analyze all available data. Environmental data reported by other entities will be evaluated for suitability for inclusion in this CIMP database and will be accepted if it meets the following requirements:

- Conducted and documented in accordance with the sampling procedures outlined in this CIMP.
- Sampling collection is performed and documented by a competent party in accordance with applicable guidance and this CIMP.
- Sample analysis is conducted using approved analytical method by a certified analytical laboratory.

Non-direct measurements related to tidal measurements (e.g., measurements not physically recoded by field staff during field monitoring activities) will be obtained from the National Oceanic and Atmospheric Administration (NOAA). Additional rainfall information will be obtained from the County, as needed.

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11.0 ADAPTIVE MANAGEMENT

11.1 Integrated Monitoring and Assessment Program

One of the main objectives of the MdR Watershed CIMP is to leverage resources and create a regionally efficient and effective monitoring program. Adaptive management is a structured, iterative process designed to use resources both effectively and efficiently, resulting in a robust watershed program adapted to local conditions.

The integrated review of existing monitoring programs, TMDL implementation plans, the Regional Board-approved Bacteria TMDL CMP, Toxics TMDL CMPs, and the monitoring data that was used in the development of the 2014 MdR Watershed CIMP represent the "Initial Assessment" of existing conditions in the MdR Watershed. Lessons learned during planning and implementation of Year 1 of the MdR Watershed CIMP (i.e., monitoring station appropriateness and safety considerations for wet weather receiving water monitoring) will be tracked and integrated into the overall program assessment during the QA/QC review of monitoring data and annual reporting. Each annual report will present a summary of TMDL and Permit compliance and will provide an opportunity to identify, as appropriate, modifications to the MdR Watershed CIMP protocols based on lessons learned and monitoring data. A formal programmatic review will occur during Years 1 and 2 of the program and will be integrated into the Year 3 implementation. A more comprehensive review and update of the MdR Watershed CIMP monitoring protocols may also become necessary, especially when preparing for the Triad Sampling for SQO analysis (required once during the five-year Permit Order period per the SQO guidance).

11.2 CIMP Revision Process

Every two years, hence during Year 3 of the implementation of the Permit monitoring program, available monitoring information will be reviewed in the context of the receiving water monitoring program and outfall-based monitoring objectives.

At any stage of the CIMP implementation, where changes are needed, changes will be made to this CIMP, incorporated into monitoring practice, and described in the next Monitoring Annual Report. Identified changes will be discussed in the annual report and implemented starting no later than the first CIMP monitoring event of the next monitoring year. Such changes include, but are not limited to, adding/removing monitored constituents, modifying laboratories/analytical methods, or amending sampling protocol. Should major changes to the approach be required (e.g., moving or removing a storm water outfall or receiving water monitoring station location), the modifications will be proposed in the annual report and in a separate letter to the Regional Board requesting Executive Officer approval of the change.

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12.0 DATA MANAGEMENT AND REPORTING

Appendix F details the procedures for managing and reporting monitoring data collected under this CIMP. Data management procedures include data review, verification, and validation.

Annual reporting for Permit compliance is required to be submitted by December 15 of every year. Annual reporting will cover the monitoring period of July 1 through June 30. These reports shall clearly identify all data collected during the monitoring year, as well as strategies, control measures, and assessments implemented by each Permittee within its jurisdiction. Annual Reports will also present watershed scale efforts implemented by multiple Permittees. Discussion shall be provided in accordance with the requirements laid out in MRP Section XVIII. The annual monitoring reports will include the following:

- Watershed Summary Information
    - Watershed Management Area / Subwatershed (HUC-12) Description,
    - Description of MdR EWMP Agency Drainages Area within the MdR Watershed
- Annual Assessment and Reporting
    - Storm Water Control Measures
    - Effectiveness Assessment of Storm Water Control Measures
    - Non-storm Water Control Measures
    - Effectiveness Assessment of Non-Storm Water Control Measures
    - Integrated Monitoring Compliance Report
    - Adaptive Management Strategies
    - Supporting Data and Information.

MAL reports are required to be submitted annually and will compare monitoring data to applicable MALs identified in Attachment G of the Permit. Subwatersheds with a running average of greater than or equal to twenty percent exceedances of the MALs will be identified and beginning in the third year of CIMP implementation (Year 3), a MAL Action Plan will be required for these sub watersheds.

Additionally, semi-annual annual data reports will be submitted with the annual monitoring report, and six months prior to the annual report (June of each year). The June 15 data submittal will cover the monitoring period of July 1 through December 31, and the December 15 data submittal will cover January 1 through June 30. These semi-annual analytical data reports detail exceedances applicable to WQBELs, RWLs, action levels, or aquatic toxicity thresholds, with corresponding sample dates and monitoring locations.

Monthly monitoring reports are required for Bacteria TMDL compliance and annual monitoring reports are also required for Toxics TMDL compliance. These data reports will be submitted as an attachment to Permit annual reports.

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13.0 SCHEDULE FOR CIMP IMPLEMENTATION

The MdR Watershed is impacted by five TMDLs, including the Bacteria TMDL, Toxics TMDL, Trash TMDL, Debris TMDL and SMB DDT and PCB TMDL. The compliance schedules for these TMDLs are summarized in Table 13-1. Implementation of new monitoring programs and modifications to existing monitoring programs were implemented beginning 90 days after the approval of the CIMP. During the transition to the monitoring described in this CIMP, monitoring under the Toxics CMP was ceased and resources shifted to the new CIMP monitoring program. Bacteria monitoring continued to be conducted without a transition period.

Table 13-1. TMDL Compliance Schedules

TMDL	Matrix	Parameters	Goal	Compliance Date
Marina del Rey Harbor Toxic Pollutants TMDL	Harbor water	Dissolved Copper (from boats)	Meet LAs	3/22/2024
	Harbor sediments (Back Basins)	Copper, lead, zinc, chlordane, PCBs, DDTs, p'p-DDE	Interim Sediment Allocations	3/22/2016*
			Final Compliance	3/22/2018***
	Harbor sediments (Front Basins)		Interim Sediment Allocations	3/22/2019
			Final Compliance	3/22/2021***
Marina del Rey Mother's Beach and Back Basins Bacteria TMDL	Harbor water	Total coliform, fecal coliform, *Enterococcus*	Interim time frame for compliance with allowable exceedance days for summer and winter dry weather	12/28/2017**
			Original final and TSO final dates for compliance with allowable exceedance days for summer and winter dry weather	12/28/2017**
			Compliance with allowable exceedance days for wet weather and geometric mean targets	7/15/2021
Santa Monica Bay TMDLs for DDTs and PCBs	Water column	Total DDTs and Total PCBS	Numeric targets in Santa Monica Bay	3/26/2014 for DDTs 3/26/2014 for PCBs
	Fish tissue		Numeric targets in Santa Monica Bay	3/26/2023 for DDTs 3/26/2034 for PCBs
	Bay sediment		Numeric targets in Santa Monica Bay	3/26/2023 for DDTs 3/26/2034 for PCBs
Ballona Creek Trash TMDL$^{\Omega}$	Trash		0 discharge of trash or 0% of the baseline load	9/30/2015
Santa Monica Bay Nearshore and Offshore Debris TMDL*	Trash		20% reduction	3/20/2016
			40% reduction	3/20/2017
			60% reduction	3/20/2018
			80% reduction	3/20/2019
			100% reduction	3/20/2020

Table 13-1. Footnotes
PCB – polychlorinated biphenyls
p,p’-DDE – p,p’-dichlorodiphenyldichloroethylene
* Interim milestone occurs prior to EWMP approval.
**Deadline or time frame identified in Bacteria TDML Time Schedule Order No. R4-2014-0142
***TSO was submitted and is pending
$^{\Omega}$TMDL complied with through the Ballona Creek Trash TMDL

The schedule for MdR CIMP reporting is summarized in Table 13-2. For Bacteria TMDL compliance monitoring, monthly data reports will continue to be submitted to the Regional Board by the City of Los Angeles. For the Toxics TMDL and the Permit, the MdR EWMP Agencies will submit an Annual Monitoring Report to the Regional Board no later than December 15 of each year.

Table 13-2. MdR Watershed Reporting Schedule

Program	Report Type	Due Date(s)
Bacteria TMDL	Data Summary Report	Monthly (last day of month)
Toxics TMDL	Annual Monitoring Report	December 15, Annually
Permit	Annual Monitoring Report	December 15, Annually
	Municipal Action Level Action Plan *(If running storm event average concentrations are only 20% greater than MALs – only applies to MdR-3 for Permit compliance monitored storms)*	December 15, Annually

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APPENDIX A
Regulatory Drivers and Monitoring Requirements

A.0 REGULATORY DRIVERS AND MONITORING REQUIREMENTS

This appendix presents a discussion of the regulatory drivers and ensuing monitoring requirements integrated in the Coordination Implementation Monitoring Plan (CIMP) for the Marina del Rey (MdR) Watershed.

A.1 2014-2016 Section 303(d) List

The federal Clean Water Act (CWA), § 303(d), requires states to identify waters that do not meet applicable water quality standards despite the treatment of point sources by the minimum required levels of pollution control technology. States are required not only to identify these "water quality limited segments" but also to prioritize such waters for the purpose of developing Total Maximum Daily Loads (TMDLs). A TMDL is defined as the "sum of the individual Waste Load Allocations (WLAs) for point sources and load allocations (LAs) for non-point sources and natural background" (40 Code of Federal Regulations [CFR] 130.2), such that the capacity of the waterbody to assimilate constituent loads (the loading capacity) is not exceeded. A TMDL is also required to account for seasonal variations and include a margin of safety to address uncertainty in the analysis conducted by the United States Environmental Protection Agency (USEPA) (USEPA, 2000). The §303(d) list was last updated in 2014-16 and identifies a number of constituents for the MdR Back Basins and Marina Beach (referred to in the §303(d) listing by the former name Harbor Beach) (Table A-1).

Table A-1. Summary of 2014-16 Section 303(d) Listings

Water Body	Constituent	Final Listing Decision
Marina del Rey Harbor – Back Basins	Chlordane (tissue and sediment)	List on §303(d) list (being addressed by USEPA-approved TMDL)
	Copper (sediment)	Do not Delist on §303(d) list (being addressed by USEPA-approved TMDL)
	Dichlorodiphenyltrichloroethane (DDT)* (tissue)	Do Not Delist from §303(d) list (TMDL required list)
	Dieldrin* (tissue)	Do Not Delist from §303(d) list (TMDL required list)
	Dissolved Oxygen	List on §303(d) list (TMDL required list)
	Fish Consumption Advisory	List on §303(d) list (being addressed by USEPA-approved TMDL)
	Indicator Bacteria	List on §303(d) list (being addressed by USEPA-approved TMDL)
	Lead (sediment)	List on §303(d) list (being addressed by USEPA-approved TMDL)
	Polychlorinated biphenyls	List on §303(d) list

Table A-1. Summary of 2014-16 Section 303(d) Listings

Water Body	Constituent	Final Listing Decision
	(PCBs) (tissue and sediment)	(being addressed by USEPA-approved TMDL)
	Sediment toxicity	Do Not Delist from §303(d) list (being addressed with USEPA-approved TMDL)
	Zinc (sediment)	List on §303(d) list (being addressed by USEPA-approved TMDL)
Marina del Rey Harbor Beach	Indicator Bacteria	List on §303(d) list (being addressed by USEPA-approved TMDL)
*USEPA-approved TMDL has made a finding of non-impairment for this constituent.		

A.2 2012 MS4 Permit

The National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit Order No. R4-2012-0175 (Permit) was adopted on November 8, 2012, by the Los Angeles Regional Water Quality Control Board (LARWQCB or Regional Board) and became effective December 28, 2012. This Permit replaced the previous MS4 permit (Order No. 01-182). The purpose of the Permit is to ensure the MS4s in the Los Angeles County are not causing or contributing to exceedances of water quality objectives set to protect the beneficial uses in the receiving waters in the Los Angeles region. The agencies with jurisdiction in the MdR Watershed Management Area (WMA), including the unincorporated areas of the County of Los Angeles (County), the Los Angeles County Flood Control District (LACFCD), City of Los Angeles, and City of Culver City (collectively referred to as the MdR Agencies), have elected to pursue a CIMP and have provided justification in this document demonstrating fulfillment of monitoring requirements of the Permit and TMDLs. The Monitoring and Reporting Program (MRP) defines the monitoring requirements of the Permit and incorporates monitoring requirements defined in existing TMDLs and Regional Board-approved Coordinated Monitoring Plans (CMPs). Water quality data collected from the MdR receiving water for Permit compliance will be compared with all applicable receiving water limitations. Outfall-based stormwater Permit compliance monitoring data will be compared to all applicable water quality based effluent limitations (WQBELs).

A.3 Total Maximum Daily Loads

The Marina del Rey watershed is subject to five TMDLs; the Santa Monica Bay Nearshore Debris TMDL (Debris TMDL), the Ballona Creek Trash TMDL (Trash TMDL), the Marina del Rey Harbor Mother's Beach and Back Basin Bacteria TMDL (Bacteria TMDL), the Toxic Pollutants in Marina del Rey Harbor TMDL (Toxics TMDL), and the EPA-established Santa Monica Bay TMDL for DDTs and PCBs (SMB Toxics TMDL).

A.3.1 Santa Monica Bay Nearshore Debris TMDL & Ballona Creek Trash TMDL

The Santa Monica Bay Nearshore Debris TMDL was adopted by the LARWQCB on November 4, 2010 (Resolution No. R10-010) and became effective upon adoption by the USEPA on March 20, 2012. Responsible agencies identified for the Debris TMDL include, among others, the County, the City of Culver City, and the City of Los Angeles. The Debris TMDL established numeric targets and WLAs of zero discharge of trash and plastic pellets to waterbodies within the Santa Monica Bay WMA, which includes Marina del Rey Harbor (MdRH). The trash WLA applicable to the MS4 Permittees shall be complied with through the Ballona Creek Trash TMDL (Resolution No. R08-007).

The Ballona Creek Trash TMDL was adopted by the LARWQCB on September 19, 2001, and became effective on August 28, 2002. The TMDL was amended in 2004 and the amended TMDL became effective on August 11, 2005. On June 11, 2015 the LARWQCB adopted a second revision to the Trash TMDL but as of the writing of this MdR Enhanced Watershed Management Plan (EWMP), the revised TMDL has yet to be approved by the State Water Resources Control Board, the Office of Administrative Law (OAL), or by the USEPA. The TMDL established WLAs of zero discharge of trash and set a final compliance deadline of September 30, 2015. The MdR Watershed Management Group (WMG) Agencies have met the final compliance deadline in the TMDL, and corresponding schedule in the 2012 MS4 Permit, through installation of full capture devices. In the City of Los Angeles area of the MdR watershed, 293 catch basins have been retrofitted with trash screens (103 City-owned and 190 LACFCD-owned catch basins with trash screens). The City of Culver City has retrofitted four catch basins and the County has retrofitted 40 catch basins in the MdR with full-capture devices.

The Permit requires Permittees to develop a Trash Monitoring and Reporting Plan (TMRP) to describe the methodologies that will be used to assess and monitor trash from source areas in the Santa Monica Bay WMA and shoreline of the Santa Monica Bay. In 2012, the County submitted a TMRP to the Regional Board. The City of Los Angeles will not be developing a TMRP for MdR because the implementation program for the Ballona Creek (BC) Trash TMDL covers the City's area in MdR.The City of Culver City is in compliance with the TMRP for the Ballona Creek Trash TMDL and is considered in compliance with the Debris TMDL's trash component. These plans are considered to be independent of this CIMP.

Plastic Pellet Monitoring and Reporting Plans (PMRPs) quantifying potential plastic pellet discharges to Santa Monica Bay, along with supplemental Spill Response Plans (SRPs) to address containment of spilled plastic pellets, were submitted to the Regional Board by the City of Culver City (2012), County (2013), and LACFCD (2013). The City of Los Angeles does not have plastic pellet facilities in MdR and is therefore not subject to the pellet monitoring requirements of the PMRP; subsequently, the City will coordinate plastic pellets spill and response requirements in conjunction with SMB and BC watersheds.

The TMRPs/PMRPs for the County, City of Culver City, and LACFCD are provided in Appendix J. These plans are considered to be independent of this CIMP.

A.3.2 Marina del Rey Harbor Mother's Beach and Back Basin Bacteria TMDL

The Bacteria TMDL (LARWQCB, 2004, 2012) was adopted by the USEPA in accordance with LARWQCB Resolution No. 2003-012 and became effective on March 18, 2004. The Bacteria TMDL was revised by the LARWQCB on June 7, 2012 (Resolution No. R12-007) and a Time Schedule Order (TSO) was approved on July 10, 2014 (TSO No. R4-2014-0142). The Responsible Agencies identified for the Bacteria TMDL include the County, LACFCD, City of Los Angeles, City of Culver City, and Caltrans. The Responsible Agencies developed the *Marina Del Rey Harbor Mothers' Beach and Back Basins Bacterial TMDL CMP* (Bacteria TMDL CMP) (Los Angeles County Department of Public Works [LADPW], 2007), which was approved by the Regional Board on February 1, 2007. In addition to compliance monitoring, the Bacteria TMDL CMP included additional monitoring in the MdR Front Basins (non-§303(d) listed basins) to help characterize bacteria levels across the Harbor.

The Bacteria TMDL established numeric bacterial compliance targets for marine recreation of 19 illnesses per 1,000 persons based on the acceptable health risk described by the USEPA (USEPA, 1986). The numeric targets are expressed as both single sample limits and geometric mean limits (Table A-2). The Bacteria TMDL numeric targets apply throughout the year. The geometric mean targets may not be exceeded at any time. Resolution R12-007 also standardized the rolling geometric mean calculation to a weekly calculation, using five or more samples, for 6-week periods, starting all calculations on Sunday

Table A-2. Bacteria TMDL Numeric Targets

Indicator	Geometric Mean Limits**	Single Sample Limits
Total coliform	1,000 MPN/100 mL	10,000 MPN/100mL** or 1,000 MPN/100 mL (fecal-to-total coliform exceeds 0.1)
Fecal coliform	200 MPN/100 mL	400 MPN/100 mL
Enterococcus	35 MPN/100 mL	104 MPN/100 mL

* Geometric means shall be calculated weekly as a rolling geometric mean using five or more samples, for six week periods, starting all calculations on Sunday.
** Total coliform single sample limit of 10,000 most probable number (MPN) decreases to 1,000 when the fecal coliform value is greater than 10% of total coliform value.

Each monitoring station is also assigned an allowable number of exceedance days, or the number of days where sampling results can surpass the single sample numeric targets. The Bacteria TMDL WLAs are expressed as allowable exceedance days. Allowable exceedance days are specified by three defined seasons (summer dry, winter dry, and wet weather) and are based on the lesser of two criteria: (1) exceedances days in the designated reference system, and (2) exceedance days based on historical bacteriological data at the monitoring site. The TSO (TSO No. R4-2014-0142) implemented an interim compliance period for summer and winter dry sampling with increased allowable exceedance days for many of the stations. Table A-3 presents a summary of the Bacteria TMDL compliance dates, requirements, and limits by station and season and includes the interim compliance period established by the TSO.

Table A-3. Bacteria TMDL Seasons and Allowable Exceedance Days (Single Sample Targets)

Compliance Season	**Summer Dry Weather April 1 – October 31**		**Winter Dry November 1- March 31**		**Wet Weather Rain Event***	**Geometric Mean Year Round**
Deadline	**December 28, 2017****		**December 28, 2017****		**July 15, 2021**	
Compliance Monitoring Location	**Allowable Exceedance Days/Year**					
	TSO Interim Compliance	**Final Compliance**	**TSO Interim Compliance**	**Final Compliance**	**Final Compliance**	**Final Compliance**
Daily Sampling						
MdRH-1^Ω	22	0	60	9	17	0
Weekly Sampling						
MdRH-2	11	0	19	2	3	0
MdRH-3	12	0	12	2	3	0
MdRH-4 (S)	3	0	5	2	3	0
MdRH-4 (D)	2	0	3	2	3	0
MdRH-5	5	0	3	2	3	0
MdRH-6 (S)	3	0	5	2	3	0
MdRH-6 (D)	4	0	4	2	3	0
MdRH-7	4	0	5	2	3	0
MdRH-8 (S)	1	0	2	2	3	0
MdRH-8 (D)	2	0	2	2	3	0
MdRH-9 (S)	1	0	2	2	1	0
MdRH-9 (D)	0	0	2	2	1	0

*Rain event ≥ 0.1 inches at LAX rain gauge, and 3 days following the end of the rain event.
** Deadline identified in Bacteria TDML Time Schedule Order No. R4-2014-0142
^Ω MdRH-1 is sampled Monday-Saturday while MdRH-2 is sampled Monday and Saturday. All other locations are sampled weekly on Mondays. MDRH-1 exceedances days are based on daily sampling while the other monitoring stations exceedance days are based on weekly sampling.

A.3.3 Santa Monica Bay TMDL for DDTs and PCBs

The Santa Monica Bay TMDL for DDTs and PCBs was approved by the USEPA on March 26, 2012. The TMDL set numeric targets for the water column, sediment and fish tissue in the Bay (Table A-4).

Table A-4. Santa Monica Bay TMDL for DDTs and PCBs Numeric Targets

TMDL Target	**Total DDTs**	**Total PCBs**
Water Column	0.17 ng/L	0.019 ng/L
Fish Tissue	40 ng/g	7 ng/g
Sediment (normalized for organic carbon [OC])	2.3 µg/g OC	0.7 µg/g OC

The TMDL set stormwater WLAs at existing estimated pollutant levels (which were lower than the calculated total allowable loads needed to achieve sediment targets) and therefore this TMDL is referred to as an anti-degradation TMDL. The WLA for the Los Angeles County MS4 was set at 27.08 grams per year (g/year) of DDT and 140.25 g/year for PCBs (Table A-5). The reduction in stormwater volume that will occur through implementation of the best management practices (BMPs) proposed in this EWMP will reduce stormwater loading of DDTs and PCBs to Santa Monica Bay below current conditions and will therefore satisfy the requirements of this anti-degradation TMDL.

Table A-5. Los Angeles County MS4 Permit Stormwater Waste Load Allocations from the Santa Monica Bay DDTs and PCBs TMDL

Permit	Total DDTs	Total PCBs
Los Angeles County MS4 Permit	27.08 g/yr	140.25 g/yr

A.3.4 Toxic Pollutants in Marina del Rey Harbor TMDL

The Regional Board adopted the Toxics TMDL on October 6, 2005 (LARWQCB, 2005). The Toxics TMDL was approved by USEPA and became effective on March 22, 2006. The responsible agencies identified for the Toxics TMDL included the County, City of Los Angeles, City of Culver City, and Caltrans. The responsible agencies developed the Toxics TMDL CMP (LADPW, 2008), which was approved by the Regional Board on March 3, 2009, to address the monitoring requirements defined in the original Toxics TMDL. In 2013, the Toxics TMDL was revised, with final USEPA approval on October 15, 2015. The revised Toxics TMDL included the LACFCD as a responsible agency, extended the TMDL to the Front Basins of the Harbor, implemented the final numeric target for PCBs in the water column, reduced the PCB numeric targets for sediment and fish tissue, added total DDTs) and p, p'-dichlorodiphenyldichloro-ethylene (p p'-DDE) sediment targets, changed the metals WLAs, and modified the monitoring requirements. The final Toxics TMDL numeric targets, in-harbor load allocations, and storm water WLAs are discussed below.

A.3.4.1 Toxics TMDL Numeric Targets

The Toxics TMDL numeric targets for sediments in the Back Basins of the MdR and water column and fish tissue in the MdR are summarized in Table A-6. The sediment numeric targets were established using the effects range low (ER-L) (Long et al., 1995) guidelines for copper, lead, zinc, chlordane, total PCBs, total DDTs and p p'-DDE. The numeric target for total PCBs in sediments was established to protect human health from the consumption of contaminated fish based on the food web bioaccumulation model developed by Gobas and Arnot (2010). Water column numeric targets were established for total PCBs and copper. The numeric target for total PCBs is 0.00017 micrograms per Liter (µg/L). Acute and chronic numeric targets were established for dissolved copper, such that the acute numeric target represents the single sample maximum criterion and the chronic numeric target represents the four-day average criterion. Both the copper and PCB numeric targets were developed using the California Toxics Rule (CTR) criterion for the protection of human health from the consumption of aquatic organisms.

The fish tissue numeric target of 3.6 micrograms per kilogram (µg/kg) for total PCBs is the Office of Environmental Health Hazard Assessment (OEHHA) Fish Contaminant Goal (FCG).

Table A-6. Toxics TMDL Numeric Targets for Sediment, Water and Fish Tissue

Constituent Group	Constituent	Toxics TMDL Numeric Targets		
		MdR Back Basins	MdR	
		Sediment	Water Column	Fish Tissue
Organics	Chlordane	0.5 µg/kg	--	--
	Total PCBs	3.2 µg/kg	0.00017 µg/L	3.6 µg/kg
	Total DDTs	1.58 µg/kg	--	--
	p p'-DDE	2.2 µg/kg	--	--
Metals	Copper	34 mg/kg	--	--
	Dissolved copper	--	Acute – 4.8 µg/L Chronic – 3.1 µg/L	--
	Lead	46.7 mg/kg	--	--
	Zinc	150 mg/kg	--	--

A.3.4.2 Toxics TMDL Load Allocations

The Toxics TMDL established loading capacities and LAs for in-harbor sediments and the MdR water column.

The sediment loading capacity was estimated based on annual average total suspended solids (TSS) loads to the MdR (84,612 kilograms per year [kg/year]) based on the assumption that the finer sediments transport the majority of constituents. The Toxics TMDL for sediment was calculated based on the average annual TSS loading and the numeric sediment targets. The sediment in-harbor LAs are the same as the numeric targets. Non-point sources of sediment impairment include direct atmospheric deposition. The sediment LAs for in-harbor sediments and atmospheric deposition are presented in Table A-7.

Table A-7. Toxics TMDL Loading Capacities and Load Allocations for Sediment

Constituent Group	Constituent	Load Allocation		Sediment Loading Capacity*
		In-Harbor Sediment	Atmospheric Deposition	
--	--	µg/kg	g/year	g/year
Organics	Chlordane	0.5	0.005	0.04
	PCBs	3.2	0.225	1.92
	Total DDTs	1.58	0.016	0.13
	p p'-DDE	2.2	0.022	0.19
--	--	mg/kg	kg/year	kg/year
Metals	Copper	34	0.34	2.88
	Lead	46.7	0.46	3.95
	Zinc	150	1.49	12.69

The Toxics TMDL established the dissolved copper loading capacities for the water column of MdR as 557 kg/year (The water column LA for dissolved copper from boats is a reduction of 85% from the baseline load from boats (3,609 kg/year). The MS4 Permittees are not subject to this criterion.

A.3.4.3 Toxics TMDL Storm Water Waste Load Allocations

The Toxics TMDL established point source WLAs for storm water for each of the storm water Permittees. The WLAs for metals and organics are presented in Table A-8. The apportionment between the storm water Permittees has also been presented in Table A-8 based on an estimate of the percentage of land area covered by each storm water permit.

Table A-8. Toxics TMDL Storm Water Waste Load Allocations by Permittee

Storm Water Permittees	Toxics TMDL Storm Water Waste Load Allocations (WLAs)						
	Metals			Organics			
	Copper (kg/year)	Lead (kg/year)	Zinc (kg/year)	Chlordane (g/year)	Total PCBs (g/year)	Total DDTs (g/year)	p p'-DDE (g/year)
MS4 Permittees*	2.26	3.10	9.96	0.0332	1.51	0.10	0.15
Caltrans	0.036	0.05	0.16	0.0005	0.024	0.0017	0.0024
General Construction	0.23	0.32	1.02	0.0034	0.16	0.011	0.015
General Industrial	0.012	0.016	0.053	0.0002	0.0080	0.0006	0.0008
Total WLA	**2.54**	**3.49**	**11.20**	**0.04**	**1.70**	**0.12**	**0.16**

MS4-Municipal Separate Storm Sewer System.
*MS4 Permittees refer to the MdR Agencies subject to the 2012 MS4 Permit.

A.4 References

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APPENDIX B
Monitoring Station Selection Process

B.0 MONITORING STATION SELECTION PROCESS

This Appendix summarizes the receiving water and outfall monitoring stations selected under the Coordination Implementation Monitoring Plan (CIMP).

B.1 Receiving Water Stations

The selection of the Marina del Rey (MdR) CIMP receiving water stations included field reconnaissance and review of monitoring stations identified in the two Total Maximum Daily Load (TMDL) Coordinated Monitoring Plans (CMPs) for the MdR Watershed, the *Marina Del Rey Harbor Mothers' Beach and Back Basins Bacterial TMDL Coordinated Monitoring Plan* (Bacteria TMDL CMP) (Los Angeles County Department of Public Works [LADPW], 2007) and the *Marina Del Rey Harbor Toxic Pollutants TMDL Coordinated Monitoring Plan* (Toxics TMDL CMP) (LADPW, 2008).

Tables summarizing previous receiving water monitoring stations, monitoring programs, and CIMP station-specific monitoring modifications are presented below for the main channel and each basin of MdR Harbor. A discussion of the MS4 infrastructure and unique conditions of the Grand Canal (i.e., Venice Canals and Ballona Lagoon) has also been provided.

B.1.1 Front and Back Basin Bacteria and Toxics TMDL CMP Stations

Toxics TMDL CMP receiving water monitoring stations are provided in Table B-1 and Figure B-1. Changes that were made to monitoring under the CIMP are also included in Table B-1.

Bacteria TMDL CMP receiving water monitoring stations are identified in Table B-2 and Figure B-1. There were no changes made to these stations under the CIMP.

Table B-1. Toxics TMDL CMP Receiving Water Monitoring Stations

Harbor Area	Station ID	CIMP Change	
Front Basins			
Basin A	MdRH-F-1	Renamed to MdRH-A	**<u>Water Column:</u>** Monthly Sampling on an alternating schedule for dissolved copper and total polychlorinated biphenyls (PCBs) MdRH-A, MdRH-C, and MdRH-G will be sampled one month; the following month stations MdRH-B and MdRH-H will be sampled. **<u>Sediment:</u>** Annual sampling of copper, lead, zinc, chlordane, total PCBs, total dichlorodiphenyltrichloroethanes (DDTs), p p'-dichlorodiphenyldichloroethylene (p p'-DDE), total organic carbon, grain size and toxicity. Sediment quality objective (SQO) sampling once every five years.
Basin B	MdRH-F-2	Renamed to MdRH-B	
Basin C	MdRH-F-3	Renamed to MdRH-C	
Basin G	MdRH-F-4	Renamed to MdRH-G	
Basin H	MdRH-F-5	Renamed to MdRH-H	
Harbor Area	**Station ID**	**CIMP Change**	
Back Basins			
Basin D	MdRH-B-1	Renamed to MdRH-D	**Water Column:** Monthly Sampling on an alternating schedule for dissolved copper and total polychlorinated biphenyls (PCBs). MdRH-E will be sampled one month, MdRH-D and MdRH-F will be sampled the following month. **<u>Sediment:</u>** Annual sampling of copper, lead, zinc, chlordane, total, total PCBs, dichlorodiphenyltrichloroethanes (DDTs), p p'-dichlorodiphenyldichloroethylene (p p'-DDE), total organic carbon, grain size and toxicity. Sediment quality objective (SQO) sampling once every five years.
Basin E	MdRH-B-2	Renamed to MdRH-E	
Basin F	MdRH-B-3	Renamed to MdRH-F	

Table B-2. Receiving Water Monitoring Stations under the Bacteria TMDL CMP

Harbor Area	Station ID	CMP Monitoring Program – No Changes in CIMP
Basin D	MdRH-1	One bacteria grab sample is collected from ankle deep water daily (Monday-Saturday).
Basin D	MdRH-2	One bacteria grab sample is collected from ankle deep water 2x/weekly (Mondays and Saturdays).
Basin D	MdRH-3	One bacteria grab sample is collected weekly (Mondays).
Basin D	MdRH-4	Two bacteria grab samples are collected weekly (Mondays). One sample is collected at the water's surface. One sample is collected at depth. The water at this location is approximately 3 to 4 meters deep.
Basin E	MdRH-5	The tide gate outlet is often 2 to 3 meters below the water's surface. One bacteria grab sample is collected at depth weekly (Mondays). The tide height at which the sample is collected is recorded in field notes to denote surface conditions.
Basin E	MdRH-6	Two bacteria grab samples are collected weekly (Mondays). One sample is collected at the water's surface. One sample is collected at depth. The water at this location is approximately 4 meters deep.
Basin E	MdRH-7	MdRH-7 is located downstream of the tide gate where water from the Boone Olive Pump Station flows into the marina (CSTL-022A). The tide gate outlet is often 2 to 3 meters below the water's surface. One bacteria grab sample is collected at depth, and the tide height at which the sample is collected is recorded in field notes to denote surface conditions.
Basin F	MdRH-9	Two bacteria grab samples are collected weekly (Mondays). One sample is collected at the water's surface. One sample is collected at depth. The water at this location is approximately 4 meters deep.

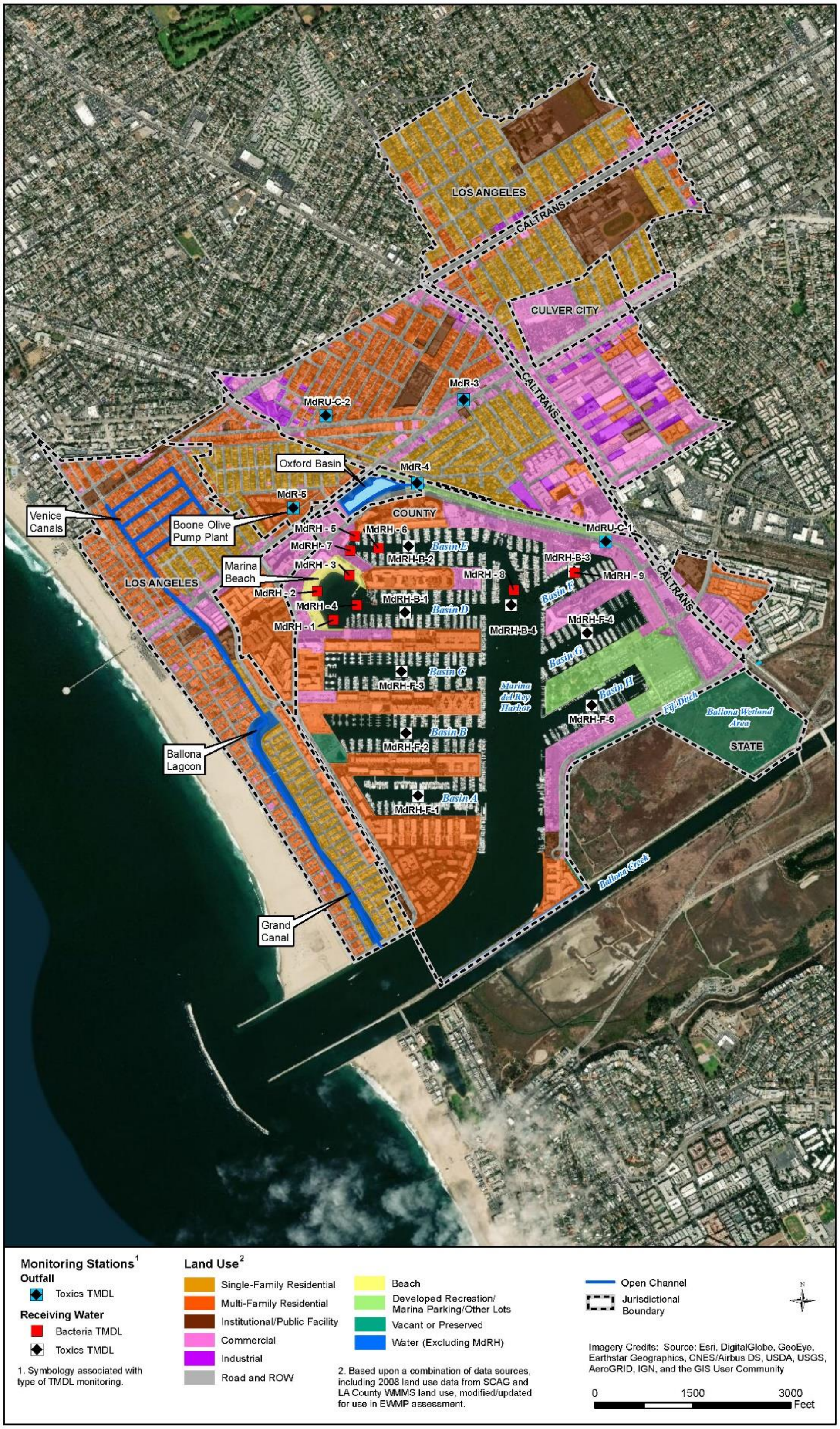


Figure B-1. CMP Monitoring Stations

B.1.2 Main Channel

Table B-3 summarizes the receiving water monitoring stations in the Main Channel under the Bacteria and Toxics TMDL CMPS as well as changes that were made in the CIMP.

Table B-3. Receiving Water Monitoring Stations in the Main Channel under the Bacteria and Toxics TMDL

Harbor Area	Station ID	Existing Monitoring Program	CIMP Change
Main Channel	MdRH-8	Bacteria TMDL monitoring station. Two bacteria grab samples are collected weekly (Mondays). One sample is collected at the water's surface and one e is collected at depth. The water at this location is approximately 4 meters deep.	No change recommended.
Main Channel	MdRH-B-4	This is a Toxics TMDL monitoring station located at the confluence of Basins E, D, and F and represents receiving water conditions downstream of three major outfalls, two 18-inch outfalls, and Marina Beach.	Re-named to MdRH-MC. Permit and Toxics TMDL compliance monitoring. **Water Column:** Monitor monthly for dissolved copper and total polychlorinated biphenyls (PCBs). **<u>Sediment:</u>** Annual sampling of copper, lead, zinc, chlordane, total PCBs, total dichlorodiphenyltrichloroethanes (DDTs), p p'-dichlorodiphenyldichloroethylene (p p'-DDE), total organic carbon, grain size and toxicity. Sediment quality objective (SQO) sampling once every five years

B.1.3 Grand Canal (Venice Canals and Ballona Lagoon)

The Grand Canal, consisting of Venice Canals and Ballona Lagoon (within Subwatershed 2), are under the jurisdiction of the City of Los Angeles. The four 36-inch outfalls, twenty-one 18-inch outfalls, and four 18-inch to 36-inch outfalls along the Grand Canal are separated from the MdR Harbor by a large tide gate that releases water to the main channel of MdR Harbor at a point west of the Front/Back Basins during outgoing tides (Figure B-2). The associated MS4 is partially inundated with water from the Grand Canal. According to the City of Los Angeles, the MS4 tributary to the Grand Canal is protected by best management practices (BMPs) (e.g., double screens – one at the catch basin and one at the outfall). The four major outfalls along the Grand Canal are fully submerged making the canal a low priority area for water quality monitoring.

Figure B-2. Tide Gate Separating the Grand Canal from MdR Harbor (Ebbing Tidal Conditions)

B.2 Outfall Stations

The watershed station assessment focused on the identification and prioritization of potential watershed monitoring stations associated with major outfalls. Monitoring stations were evaluated for watershed representativeness. Each monitoring station drainage area was evaluated using total acreage by jurisdiction and land use (Table B-4 and Table B-5, respectively).During Year 3 of the CIMP, changes were made to the outfall monitoring program. Additional information is provided in the following sections.

Table B-4. Existing Monitoring Stations and Watershed Representativeness by Jurisdiction

Jurisdiction	MdR-4ORB	MdR-5	MdRU-C-2	MdRU-C-1P11
County of Los Angeles	1.00%	0.00%	0.00%	100.00%
City of Los Angeles	89.00%	100.00%	100.00%	0.00%
City of Culver City	6.00%	0.00%	0.00%	0.00%
Other - CALTRANS	4.00%	0.00%	0.00%	0.00%

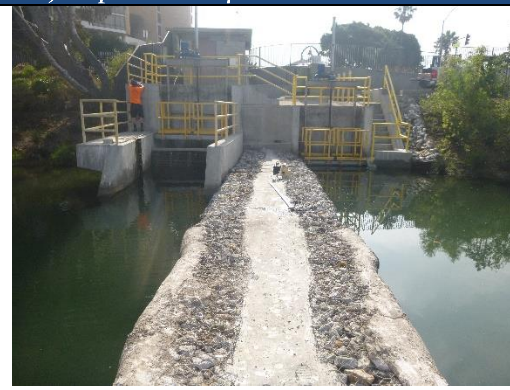
Table B-5. Existing Monitoring Stations and Watershed Representativeness by Land Use

Land Use	MdR-4ORB	MdR-5	MdRU-C-2	MdRU-C-1P11
Single Family Residential	23.43%	32.54%	-	-
Multi-Family Residential	14.90%	29.95%	63.18%	-
Roads and Right-of-Way	27.07%	31.17%	31.50%	-
Public Facilities	10.11%	3.69%	0.07%	-
Commercial and Services	20.03%	2.31%	5.26%	100.00%
Developed Parks and Recreation	0.40%	-	-	-
Industrial	4.07%	0.34%	-	-

B.2.1 Back Basins - Basin E

Basin E receives storm water discharge from three major outfalls, CSTL-022A, B, and C. Three low flow diversions (LFDs) have been installed in the MS4, immediately upstream of the tidally influenced zone, to redirect any potential non-storm water discharges from Basin E to the sanitary sewer. See CIMP Section 5.0 for detailed description of the CIMP non-storm water program.

For the first two years of the CIMP (2016-2018), storm water monitoring was conducted at four watershed stations tributary to Basin E (MdR-3, MdR-4, MdR-5, and MdRU-C-2). Beginning in September 2018, Stations MdR-3 and MdR-4 were replaced by a new outfall station, MdR-4ORB, located at the tide gates in Oxford Retention Basin (ORB). MdR-4ORB will represent the drainage areas previously represented by MdR-3 and MdR-4. As presented in Table B-5, storm water discharges assessed at MdR-4ORB and MdR-5 cover most land uses in the MdR Watershed. In addition, Station MdR-3 was designated as the watershed station for Permit compliance monitoring from 2016-2018. Because MdR-3 will be removed from storm water monitoring, MdR-5 was designated as the replacement Permit compliance monitoring station per approval by the Los Angeles Regional Water Quality Control Board (LARWQCB) (letter dated August 30, 2018). MdR-5 represents a mix of land uses representative of the MdR Watershed, as well as multiple jurisdictional areas. Additional details of the station screening and prioritization are summarized in the tables below.

MdR-4ORB *Located at the Oxford Retention Basin (near tide gates). Upstream of Basin E.*	
SCREENING PARAMETERS: • **Regulatory Compliance:** Meets criteria. • **Historic Data:** Current ORB monitoring station. • **Safety:** Area surrounded by fence. Site established adjacent to either side of the berm in front of tide gates. • **Quality Control:** Above tide gates. • **Land Use:** Mixed land use *(predominantly single family residential with commercial, industrial, and roads).* • **Jurisdiction:** City of Los Angeles.	 Tributary Area: 669.7 acres (44.6% MdR Watershed)
Watershed Monitoring Station – Storm Water Monitoring (Toxics TMDL)	

MdR-5 *Located at the Boone-Olive Pump Station control house. Upstream of Basin E.*	
SCREENING PARAMETERS: • **Regulatory Compliance:** Meets criteria. • **Historic Data:** Current Storm Water monitoring station (Toxics TMDL). Multiple years of data. • **Safety:** Requires key for access. Site established on concrete platform adjacent to control house. • **Quality Control:** Above tide gates. • **Land Use:** Predominantly residential *(mixed single family and multi-family and roads).* • **Jurisdiction:** City of Los Angeles. • **BMPs:** Co-located with LFD Project No. 3874.	 Material: Open channel upstream of four outfalls (inflow from 66-inch RCP) Tributary Area: 70.5 acres (3.8% total Watershed)
Watershed Monitoring Station – Storm Water Monitoring (Permit and Toxics TMDL)	

<table>
<tr><th colspan="2">MdRU-C-2
Located at 602 Woodlawn Avenue. Upstream of Basin E.</th></tr>
<tr><td><u>SCREENING PARAMETERS:</u>
• Regulatory Compliance: Meets criteria.
• Historic Data: Current Storm Water monitoring station for storm-borne Sediment special study (Toxics TMDL). Ongoing data collection.
• Safety: Access from sidewalk/catch basin. No traffic control required.
• Quality Control: Above tidal zone. The next accessible manhole in the main MS4 (682 Oxford Ave.) is tidally influenced; mussels in catch basins. Meets laminar flow criteria (RCP).
• Land Use: Predominantly residential (mixed single family and multi-family and roads).
• Jurisdiction: City of Los Angeles.
• BMPs: Trash screens installed at catch basin inlet.</td>
<td>
Material: 18-inch RCP run into main storm drain line (33-inch RCP)
Tributary Area: 6.5 acres (0.35% MdR Watershed)</td></tr>
<tr><td colspan="2">Watershed Monitoring Station – Storm Water Monitoring (Toxics TMDL)</td></tr>
</table>

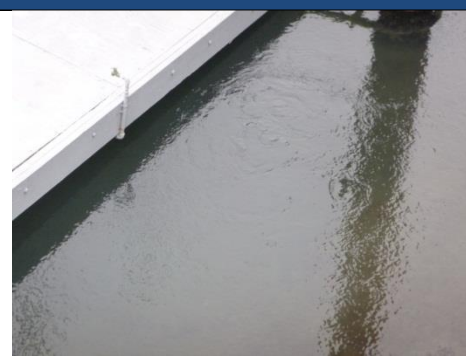
B.2.2 Front Basins - Basin C

Basin C receives discharge from the outfall associated with SD Line A. There is one watershed station, MdRU-C-1P11, associated with Basin C. The findings of the field reconnaissance are summarized below.

<table>
<tr><th colspan="2">MdRU-C-1P11
Located in Parking Lot 11. Upstream of Basin C.</th></tr>
<tr><td><u>SCREENING PARAMETERS:</u>
• Regulatory Compliance: Meets criteria.
• Historic Data: None
• Safety: Access from parking lot.
• Quality Control: Above tidal zone. Meets laminar flow criteria (RCP).
• Land Use: Predominantly commercial.
• Jurisdiction: County of Los Angeles.</td><td>
Material: 18-inch RCP
Tributary Area: 1.8 acres (0.12% total Watershed)</td></tr>
<tr><td colspan="2">Watershed Monitoring Station – Storm Water Monitoring (Toxics TMDL)</td></tr>
</table>

B.2.3 Front Basins - Basin G

There are no existing watershed stations in Basin G and there is no monitoring requirement under the Bacteria TMDL because it is a Front Basin. Paired upstream and downstream receiving water and MS4 monitoring, as described in the Permit is not feasible. Major Outfall CSTL-023B is fully submerged for the duration of the tidal cycle. Eddies from the outfall may be observed from the water's surface during ebbing tides. During the field reconnaissance of the MS4 located upstream of CSTL-023B, tidal intrusion was observed. The manhole cleanout access points along Lincoln Boulevard were observed to contain more than 1 foot of standing tidal water in the vault. No new monitoring stations characterizing Basin G are feasible or recommended.

<table>
<tr><td colspan="2">CSTL-023B (Major Outfall)
MS4 upstream of Basin G.</td></tr>
<tr><td><u>SCREENING PARAMETERS:</u>
• Regulatory Compliance: Meets criteria.
• Historic Data: None.
• Safety: Limited access to MS4, especially main storm drain lines.
• Quality Control: Tidal influence for the full length of MS4. Outfall fully submerged.
• Land Use: Predominantly roads.
• Jurisdiction: County.
• BMPs: None.</td><td>
CSTL-023B
Material: 54-inch RCP</td></tr>
<tr><td colspan="2">No Watershed Stations Recommended.</td></tr>
</table>

B.3 Regional Monitoring Stations

The Southern California Bight Regional Marine Monitoring Program (Bight Program) is led and organized by Southern California Coastal Water Research Project (SCCWRP) and is considered to be independent of this CIMP; however, data from the Bight Program (2013 and 2018) will be used to help evaluate long-term assessment of conditions and TMDL compliance. Participation in future Bight assessments will be determined by SCCWRP and the MdR CIMP Agencies during each five-year period of the program and may be coordinated with Toxics TMDL-required sediment quality objective (SQO) monitoring.

B.3.1 Bight 2013

The Bight 2013 survey was organized into five technical components: 1) Contaminant Impact Assessment, 2) Shoreline Microbiology, 3) Water Quality, 4) Marine Protected Areas, and 5) Trash and Debris. The MdR Watershed has been included in the 2013 Contaminant Impact Assessment, which focuses on sediment contaminants and associated impacts on benthic infauna and demersal fish. MdR Harbor monitoring stations included in Bight 2013 are presented in Table B-6.

Table B-6. Bight 2013 Monitoring Stations in the MdR Watershed

Bight 2013 Document	Bight 2013 Station ID	Latitude	Longitude	Sample Media	Location
Contaminant Impact Assessment Workplan	B13-8407	33.9643	-118.4535	Sediment, Tissue	Main Channel south, outside MdRH
	B13-8409	33.9703	-118.4482	Sediment, Tissue	Main Channel, south of Basin A
	B13-8413	33.9761	-118.4465	Sediment, Tissue	Between Basin G and Basin H
	B13-8417	33.9833	-118.4506	Sediment, Tissue	Basin E

B.3.2 Bight 2018

The Bight 2018 survey is organized into five technical components: 1) Sediment Quality (formerly Contaminant Impact Assessment/Coastal Ecology), 2) Microbiology, 3) Ocean Acidification, 4) Harmful Algal Blooms, and 5) Trash. The MdR Watershed has been included in the 2018 Sediment Quality, which focuses on sediment contaminants and associated impacts on benthic infauna and demersal fish. MdR Harbor monitoring stations included in Bight 2018 are presented in Table B-7.

Table B-7. Bight 2018 Monitoring Stations in the MdR Watershed

Bight 2018 Document	Bight 2018 Station ID	Latitude	Longitude	Sample Media	Location
Sediment Quality Assessment Workplan	B18-10047	33.98308	-118.45075	Sediment	Basin E
	B18-10048	33.98015	-118.45094	Sediment	Basin D
	B18-10049	33.97524	-118.45615	Sediment	Basin B
	B18-10050	33.97037	-118.44768	Sediment	Main Channel
	B18-10051	33.96470	-118.45352	Sediment	Main Channel south, outside MdRH

B.4 References

LADPW. 2008. *MdRH Toxic Pollutants Total Maximum Daily Load Coordinated Monitoring Plan*. March 2008.

LADPW (Los Angeles County Department of Public Works). 2007. *Marina Del Rey Harbor Mothers' Beach and Back Basins Bacterial TMDL Coordinated Monitoring Plan* (Bacteria TMDL CMP).

APPENDIX C
Sampling Procedures, Analytical Methods, and Data Quality Control

C.0 SAMPLING PROCEDURES, ANALYTICAL METHODS AND QUALITY CONTROL

C.1 SAMPLING PROCEDURES

This section of the appendix presents a discussion of applicable sampling procedures for water and sediment sample collection, fish and mussel tissue collection, and other monitoring programs during storm water (wet) and non-storm water (dry) weather conditions. These procedures include chain-of-custody protocols, safety considerations, storm characterization, wet weather and dry weather water quality sampling protocols, storm-borne and Harbor sediment sampling protocols, and fish and mussel sampling protocols.

C.1.1 Storm Event Forecasting and Precipitation Monitoring

Storm water monitoring during wet weather is required by the Permit. The Marina del Rey Enhanced Watershed Management Program (MdR EWMP) Agencies propose to conduct wet weather monitoring between October 1st and April 15th for schedule optimization and cost efficiencies. In order to identify qualifying storms for storm water monitoring, at least one National Weather Service (NWS) weather forecast tool will be monitored by members of the MdR EWMP Agencies daily during the wet weather season.

The automatic tipping bucket (intensity measuring) rain gauge located at Electric Avenue Pump Plant (at the intersection of Electric Avenue and Brooks Avenue, latitude: 33.993048, longitude: -188.472793) will be used to evaluate post-storm wet weather monitoring criteria for the MdR Watershed. Local rain gauge data may be used in storm water runoff calculations and to help develop runoff characteristics for the MdR Watershed. In the event that the Electric Avenue Pump Plant rain gauge is not operational, the rain gauge at Los Angeles International Airport (LAX) will be used.

For purposes of this Coordinated Integrated Monitoring Program (CIMP), mobilization for wet weather receiving water monitoring will occur when the following criteria are met:

1. 70% probability of at least 0.25-inch rainfall, at least 24 hours prior to the start of a rainfall event using NWS forecast tools. If the criteria cannot be met to fulfill the required number of wet weather events, then smaller storms may be sampled (i.e. 0.1 inch rainfall). Every attempt will be made to monitor acceptable storms; however, if a storm is not predicted at least 24 hours in advance, it may not be possible to monitor the event.
2. At least three days of dry conditions (e.g., less than 0.1 inch of rain each day) prior to the storm event.

C.1.2 Water Quality Sampling

Water quality sampling requirements are summarized by regulatory driver and monitoring station for storm water (Table C-1) and non-storm water (Table C-2) monitoring programs. Note that for the Toxics Total Maximum Daily Load (TMDL), non-storm water monitoring at receiving water stations will be conducted in the main channel of MdR monthly and on a rotating monthly schedule for the remaining stations such that MdRH-A, MdRH-C, MdRH-E, and MdRH-G will be sampled one month; whereas MdRH-B, MdRH-D, MdRH-F and MdRH-H will be sampled the following month. All stations will be sampled a minimum of six times per year.

Sample preservatives, holding time requirements, suggested analytical methods, target detection limits, and holding times for each parameter sampled and analyzed for each monitoring program are provided in Appendix D. The Method Detection Levels (MDLs) must be lower than or equal to the minimum level (ML) values defined in the Permit or per TMDL requirements.

Note that polychlorinated biphenyls (PCBs) were generally manufactured as a mixture of various PCB congeners and manufactured and sold under many names, the most common of which is the Aroclor series (United States Environmental Protection Agency [USEPA], 2014). The Toxics TMDL does not specify the type of analysis required for total PCBs, but historically, water quality samples underwent analysis for Aroclors. The screening parameters in MRP Table E-2 list total PCBs in the form of Aroclors. The sediment triad analysis used to determine Sediment Quality Objectives (SQOs) requires analysis for congeners in order to achieve the sediment quality guidelines. Considering that the regulatory drivers applicable to the MdR Watershed require different analytical and reporting methods of total PCBs, this CIMP proposes using a consistent method of analysis. Therefore, for the purposes of this CIMP, all water, sediment, and tissue samples will undergo analysis for congeners in place of Aroclors.

Table C-1. Monitoring Program by Monitoring Station – Water Quality – Storm Water (Wet Weather)

Sampling Media	*Station Type*	*Wet Weather Monitoring Program*	*Parameter(s)*	*Station ID*	*Latitude*	*Longitude*	*Sampling Frequency*	*Sample No. and Type @ Sample Location*	*No. Samples/ Year[e]*
Water	Harbor Receiving Water Station	Permit	Field Parameters Bacteria[a] Screening Parameters[b][c] Trash Survey *Flow not feasible in harbor.*	MdRH-MC	33.98054	-118.448191	3 storms/year	1 grab @ Water Surface	3
				Duplicate			1 storm/year	1 grab @ Water Surface	1
				Field Blank			1 storm/year	Laboratory Blank Water	1
			Toxicity	MdRH-MC			2 storms/year	1 grab @ Water Surface	2
				Duplicate			1 storm/year	1 grab @ Water Surface	1
	Outfall Stations	Permit	Flow, Field Parameters Bacteria,[a] Screening Parameters [b][c]	MdR-5	33.98567	-118.45297	3 storms/year	1 composite (flow-weighted) 1 grab 1 duplicate sample 1 field blank sample	3 + 2 QC
			Toxicity				As needed [d]	1 composite (flow-weighted)	Up to 3
		Toxics TMDL	Flow (all events of 0.1" or greater), Total Suspended Solids (TSS), Total Dissolved Solids (TDS), Settleable Solids Total Organic Carbon (TOC)	MdR-4ORB	33.98446	-118.45631	3 storms/year plus 3 pre-storm/year*	2 composite (pre-storm and storm) (multiple grab samples)	6
				MdR-5	33.98567	-118.45297	3 storms/year	1 composite (flow-weighted)	3
				MdRU-C-1P11	33.979445	-118.457047	3 storms/year	1 composite (time-weighted)	3
				MdRU-C-2	33.98849	-118.457609	3 storms/year	1 composite (flow-weighted)	3
				Duplicate	To be determined		1 storm/year	1 composite (dependent on station)	1
				Field Blank	Not applicable		1 storm/year	Laboratory Blank Water	1

*Additional 3 pre-storm sampling events will be conducted at MdR-4ORB only.

[a] City of Los Angeles' regional monitoring program uses *E. coli* in place of fecal coliform bacteria. Both indicator bacteria appear on Table E-2 in the MRP.

[b] Table E-2 in the MRP (Reporting Program No. CI-6948). The first significant storm of the first monitoring year (2016-17) was analyzed for the entire list of parameters on Table E-2 of the MRP at the receiving water station, MdRH-MC. For subsequent storms, only Category 1 constituents will be analyzed at the permit receiving water station and the permit outfall station, along with any parameters from Table E-2 that were above the lowest applicable water quality ojective during the first significant storm of 2016-17. See Table D-1 in Appendix D for permit receiving water station parameters and Table D-3 for permit outfall station parameters. Table D-3 also includes metals analyis which was added to the parameter list due to results of TIE findings in Year 2 of the permit term (2017-18) at the permit receiving water station in MdRH.

[c] Required for parameters with results at nearest downstream receiving water station that exceeds the lowest applicable WQO.

[d] Toxicity shall be conducted if the TIE conducted during the most recent sampling event at the downstream receiving water monitoring station was inconclusive.

Table C-2. Monitoring Program by Monitoring Station – Water Quality – Non-storm Water (Dry Weather)

Sampling Media	*Station Type*	*Dry Weather Monitoring Program*	*Parameter*	*Station ID*	*Latitude*	*Longitude*	*Sampling Frequency*	*Sample No. and Type @ Sample Location*	*No. Samples/ Year*
Water	Harbor Receiving Water Stations	Permit	Field Parameters Indicator Bacteria[a] Total suspended solids (TSS) Total Hardness Total Copper Dissolved Copper Total PCBs[b] *Flow not feasible in harbor.*	MdRH-MC	33.98054	-118.448191	2x/year including once in July*	1 grab @ Water Surface	2
				Duplicate			1x/year	1 grab @ Water Surface	1
				Field Blank	Not Applicable		1x/year	Laboratory Blank Water	1
			Toxicity	MdRH-MC	33.98054	-118.448191	1x/year in July	1 grab @ Water Surface	1
				Duplicate			1x/year	1 grab @ Water Surface	1
		Bacteria TMDL	<u>Indicator Bacteria:</u> Total Coliform, *E. coli,* [a] *Enterococcus*	MdRH-1	33.979886	-118.457175	6 days/week[c]	1 grab @ Ankle Deep	312
				MdRH-2	33.981105	-118.458012	2 days/week[c]	1 grab @ Ankle Deep	104
				MdRH-3	33.981785	-118.456382	1x/week[c]	1 grab @ Water Surface	52
				MdRH-4	33.980535	-118.455992	1x/week[c]	1 grab @ Water Surface, 1 grab @ At Depth	52x2
				MdRH-5	33.983435	-118.456112	1x/week[c]	1 grab @ At Depth[d]	52
				MdRH-6	33.982925	-118.454912	1x/week[c)]	1 grab @ Water Surface, 1 grab @ At Depth	52x2
				MdRH-7	33.982805	-118.456332	1x/week[c]	1 grab @ At Depth[d]	52
				MdRH-8	33.981185	-118.448062	1x/week[c]	1 grab @ Water Surface	52
				MdRH-9	33.981935	-118.444992	1x/week[c)]	1 grab @ Water Surface	52
		Toxics TMDL	Copper (total/dissolved) and Hardness	MdRH-MC	33.98054	-118.448191	1x/month	1 grab @ Water Surface	12
				MdRH-A	33.97251	-118.45284	1x/every other month (rotational schedule[e])	1 grab @ Water Surface	6[e]
				MdRH-B	33.97514	-118.453465	1x/ every other month h (rotational schedule[e])	1 grab @ Water Surface	6[e]
				MdRH-C	33.97773	-118.453722	1x/ every other month (rotational schedule[e])	1 grab @ Water Surface	6[e]
				MdRH-D	33.98022	-118.453555	1x/ every other month (rotational schedule[e])	1 grab @ Water Surface	6[e]
				MdRH-E	33.98301	-118.453383	1x/ every other month (rotational schedule[e])	1 grab @ Water Surface	6[e]
				MdRH-F	33.98198	-118.445015	1x/ every other month (rotational schedule[e])	1 grab @ Water Surface	6[e]
				MdRH-G	33.97939	-118.444347	1x/ every other month (rotational schedule[(e])	1 grab @ Water Surface	6[e]
				MdRH-H	33.97635	-118.444087	1x/ every other month (rotational schedule[e])	1 grab @ Water Surface	6[e]
				Duplicate	To be Determined		3x/year	1 grab @ Water Surface	3
				Field Blank	Not Applicable		3x/year	Laboratory Blank Water	3
			Total PCBs	MdRH-MC	33.98054	-118.448191	1x/month	1 grab @ Water Surface	12
				MdRH-A	33.97251	-118.45284	1x/every other month (rotational schedule[e])	1 grab @ Water Surface	6[e]

Table C-2. Monitoring Program by Monitoring Station – Water Quality – Non-storm Water (Dry Weather)

Sampling Media	*Station Type*	*Dry Weather Monitoring Program*	*Parameter*	*Station ID*	*Latitude*	*Longitude*	*Sampling Frequency*	*Sample No. and Type @ Sample Location*	*No. Samples/ Year*
				MdRH-B	33.97514	-118.453465	1x/every other month (rotational schedule[e])	1 grab @ Water Surface	6[e]
				MdRH-C	33.97773	-118.453722	1x/every other month (rotational schedule[e])	1 grab @ Water Surface	6[e]
				MdRH-D	33.98022	-118.453555	1x/ every other month (rotational schedule[e])	1 grab @ Water Surface	6[e]
				MdRH-E	33.98301	-118.453383	1x/ every other month (rotational schedule[e])	1 grab @ Water Surface	6[e]
				MdRH-F	33.98198	-118.445015	1x/month (rotational schedule[e])	1 grab @ Water Surface	6[e]
				MdRH-G	33.97939	-118.444347	1x/ every other month (rotational schedule[e])	1 grab @ Water Surface	6[e]
				MdRH-H	33.97635	-118.444087	1x/ every other month (rotational schedule[e])	1 grab @ Water Surface	6[e]
				Duplicate	To be Determined		3x/year	1 grab @ Water Surface	3
				Field Blank	Not Applicable		3x/year	Laboratory Blank Water	3
Water	Outfall	Toxics TMDL	Flow TSS TDS Settleable Solids TOC	MdR-4ORB	33.98446	-118.45631	1x/year	1 composite (multiple grabs)	1

[*] One of the two required dry weather monitoring events will be conducted during the historically driest month of the year, July.
[(a)] City of Los Angeles' regional monitoring program uses *E. coli* in place of fecal coliform bacteria. Both indicator bacteria appear on Table E-2 in the MRP.
[(b)] All the parameters listed in Table E-2 of the MRP were monitored during the July monitoring event in the first monitoring year (2016-17). Only constituents detected above the lowest applicable water quality objective in 2016-17, or those listed separately in the MS4 Permit will continue to be monitored during dry weather events (2x/year) for the remainder of the permit term (see Table D-2 in Appendix D).
[(c)] Monitoring is scheduled. Samples collected 6 days/week (Monday-Saturday) at MdRH-1 and twice per week (Monday and Saturday) at MdRH-2, designated shoreline stations at Marina Beach. Samples collected weekly are sampled on Mondays. Season classifications (Wet versus Dry) are assigned post-monitoring, based on prevailing weather conditions during a scheduled sampling event. "Dry Weather" is assigned to samples collected at least 72 hours post a rainfall event.
[(d)] The outfall tide gate is typically 2 to 3 meters below the water's surface. The tide height at which the sample is collected is recorded in field notes to denote surface conditions.
[(e)] Sampling will be rotated on a monthly schedule (MdRH-A, MdRH-C, MdRH-E, and MdRH-G will be sampled one month; the following month stations MdRH-B, MdRH-D, MdRH-F and MdRH-H will be sampled,

C.1.2.1 Water Quality Sampling – Composite versus Grab Sampling

There are two main types of samples which are used in water quality monitoring, grab samples and composite samples. The type of sample taken in a given instance will depend on the monitoring station, the type of test to be performed, frequency of testing, and regulatory requirements. A grab sample consists of a single sample taken at a specific time. A composite sample is a mixed or combined sample created by combining a series of discrete samples (aliquots) of specific volume. The protocols and use of these sampling methods under the CIMP are described below.

C.1.2.1.1 Water Quality Sampling – Grab Sampling

Grab samples will be collected at outfall and receiving water stations to characterize water quality conditions in accordance with regulatory requirements and protocols outlined in this CIMP, as summarized in Table C-3. Grab samples will be collected at the receiving water station, MdRH-MC, during both storm water and non-storm water (dry weather) sampling. During wet weather sampling, samples will be used to characterize storm water flows for Permit compliance monitoring and will be collected between one and three hours after monitoring is initiated at the upstream outfall station, MdR-5. Grab samples will also be collected at outfall stations during storm water monitoring events, to help characterize parameters not amenable to composite sampling (Table C-4). These grab samples will be collected during the rising limb of the hydrograph. For safety, grab samples collected during non-storm water monitoring events will be collected during day-light, normal business hours, to the maximum extent practicable.

Table C-3. Primary Method of Grab Sampling for each Monitoring Program

Station Type	Permit	Toxics TMDL	Bacteria TMDL
Outfall	Grab: Center of flow at the peak of storm	Grab: Center of flow at the peak of storm	Grab: Incoming wave, surface water, and/or at depth
Receiving Water	Grab: Surface water, 1-3 hours after start of monitoring at MdR-5 during storm water sampling.	Grab: Surface water	Grab: Incoming wave, surface water, and/or at depth

Table C-4. Water Quality Parameters Requiring Grab Sample Collection

Constituents Requiring Grab Samples	
Field Parameters	**Indicator Bacteria**
▪ Temperature ▪ Hydrogen ion concentration (pH) ▪ Specific conductance ▪ Dissolved Oxygen (DO) ▪ Turbidity	▪ Total coliforms ▪ Fecal coliforms ▪ Fecal enterococci ▪ *Escherichia coli*

All grab samples will be collected from the horizontal and vertical center of flow, whenever possible. Grab samples will be kept clear from uncharacteristic floating debris. Additionally, parameter-specific grab sampling techniques include the following:

- **Bacteria:** Bacteria samples will be collected in a sterile sample bottle and then placed in a clean Ziploc® bag and put on ice container at about 0-4ºC for transport to the laboratory for analysis within the laboratory holding time (e.g., 8 hours).
- **Field Parameters:** A YSI meter, or equivalent, will be used for collection of pH, dissolved oxygen (DO), specific conductance, turbidity, and temperature data. Meters will be allowed to stabilize for one minute prior to recording readings. Operation of meters will be conducted in accordance with manufacturer instructions, and meters will be calibrated in accordance with manufacturer specifications on the same day field measurements will be taken to ensure accurate functionality. Calibration logs will be available upon request. Field parameters, such as DO and temperature, degrade with exposure. Field parameter measurements will be collected and recorded after a sample has been collected. In the event of equipment malfunction and repair, a field parameter grab sample will be re-collected and tested.

C.1.2.1.2 Water Quality Sampling – Composite Sampling

Composite samples will be collected at outfall stations during storm water monitoring for Permit and Toxics TMDL programs (Table C-5) on a flow- or time-weighted basis except at the outfall station MdR-4ORB, where the composite sample will be comprised of multiple grab samples. All flow- or time-weighted composite samples will consist of a minimum of three sample aliquots, separated by a minimum of 15 minutes within each hour of monitoring/discharge.

Table C-5. Primary Method of Composite Sampling for each Monitoring Program

Station Type	Permit	Toxics TMDL	Bacteria TMDL
Outfall	Flow-weighted	Flow-weighted, time-weighted, or multiple grabs	N/A
Receiving Water	N/A	N/A	N/A
N/A – Not applicable. Flow or time-weighted composite samples will be collected using automated sampling equipment installed on-site prior to an event. In the event of equipment malfunction, composite sampling will be collected manually, if feasible.			

Flow or time-weighted composite samples will be collected using automated sampling equipment installed on-site prior to an event. Sampling equipment will consist of a configuration and design as historically used in the MdR Watershed at outfall stations. All water quality instruments will be calibrated according to the manufacturer specifications during their installation. Equipment quality checks of the calibration may be performed regularly to ensure ongoing equipment performance.

Figure C-1. ISCO Type Automated Flow and Sampling Equipment Installed at Existing Monitoring Stations

At a minimum, sampling equipment used for time-weighted composite sampling at outfall stations will include: a water level sensor to continuously measure water stage (level or height), level data logger, peristaltic pump, sample bottles, and lockable housing to secure all monitoring equipment (Figure C-1, or equivalent). Level sensors will be installed in the middle of the municipal separate storm sewer system (MS4) at the system invert. Level sensors will log vault/pipe water stage and will be used in conjunction with rain local gauge data for post-event catchment area runoff calculations for sites at which flow-weighed composite samples cannot be collected.

For sites that are conducive to flow-weighted composite sampling, monitoring equipment will include: a water level and/or velocity sensor to measure and log flow, peristaltic sample pump and refrigerated housing, sample bottles, and lockable housing to secure all monitoring equipment (Figure C-1, or equivalent). Flow sensors will be installed in the middle of the MS4 at the system invert. Flow sensors will be used to relay water stage data to the flow meter. The flow meter will be programmed to continually calculate flow rates by inserting the stage information into the pre-programmed discharge equation (e.g., Manning's Equation) or site-specific rating table.

Prior to a monitored storm event, automated samplers will be programmed to start automatically when the water level exceeds a site-specific, minimum predetermined level. Time weighted sample aliquots will be collected at an evenly spaced time intervals based on the forecast rainfall intensity and duration, such that sufficient sample volume is obtained for all required chemistry analytes. Flow-weighted sample aliquots will be collected based on a storm specific pacing interval (cubic feet) to obtain a flow-weighted composite sample representative of the storm hydrograph. Samples will be stored in glass containers within the sampler. As samples are collected, monitoring data, including discrete sample times and runoff data, are logged and stored for transfer. The automated sampler will be deactivated by field personnel within 48 hours after the end of each storm event. In the event of equipment malfunction, manual grab samples will be collected. The time of each manual grab sample will be recorded and used to create the time-weighted composite sample, which will be submitted to the laboratory for analysis. Time-weighted sample aliquots will be collected by sampling discretely at established time intervals, as follows:

- **Event Duration >24 hours:** Hourly aliquots for the first 24 hours.
- **Storm Event Duration ≤24 hours and >3 hours:** Hourly aliquots for the duration of the event.
- **Storm Event Duration ≤ 3 hours:** Aliquots separated by a minimum of 15 minutes within each hour of discharge. The MRP requires a minimum of three aliquots total. For the purposes of this CIMP, sample aliquots will be collected at 15 minute intervals for a total of three hours.

In the event of equipment malfunction at an outfall station, flow data necessary for storm water load estimates will be modeled. Rainfall data from the MdR Watershed precipitation station and other regional precipitation stations may be used to populate the model. Data from storm events either before or after the missing data may also be used for model calibration. Additionally, field observations of flow conditions may be used to calibrate models. Field flow measurement and estimation techniques, listed in order of priority, include the following:

- **Float Method:** Measure of average velocity (average of three measurements representing a known distance traveled and measured interval, multiplied by a correction factor of 0.85) and average cross-sectional flow area (width and depth measurements, at a minimum),
- **Direct Volumetric Measurement:** Measure of the time required to fill a container of known volume (only applicable to small flows), and
- **Visual Approximation:** If storm water discharge is not safely measurable using either of these direct measurement techniques, visual approximation of water depth and velocity may be used to estimate flow. Visual approximation is based on best professional judgment and would only be used to confirm the relative changes in magnitude of storm water discharge for modeled flow.

The composite sample at MdR-4ORB for both wet and dry weather monitoring will be comprised of multiple grab samples collected at the two tide gates in Oxford Retention Basin (ORB). Prior to sampling, salinity measurements will be taken near the tide gates using a YSI 6920 water quality sonde to verify that stormwater has entered ORB and reached the tide gates (i.e. verify presence of a freshwater lens). Once it has been verified that stormwater has entered ORB, sampling will be conducted during closed tide gate conditions prior to the next predicted ebb tide when water would drain from ORB. Utilizing a peristaltic pump deployed from the berm that is located between the two tidal gates in the middle of ORB, grab samples will be collected approximately 10 feet in front of each tide gate in 4-liter increments alternating between tide gates so the number of grab samples will be split evenly. The distance from the tide gates may vary from 10-20 feet based on the amount of trash/organic debris present in front of the tide gates during a storm event. Samples will be collected from mid-channel and mid-depth of the water column. The mid-depth of the water column will be determined using an 8-foot stadia rod. Tubing from the peristaltic pump will then be attached to the stadia rod at the measured mid-depth point. In between tide gates, a 5-minute waiting period will be implemented before collecting the next sample in order to prevent the peristaltic pump motor from receiving undue stress by running constantly over an extended period of time.

C.1.2.1.3 Equipment Maintenance

All sampling equipment will be cleaned and calibrated according to manufacturer manuals prior to sampling. Field meters will be visually inspected after use at each location and all snails, mud, algae, and debris will be removed. The meters will then be thoroughly rinsed on-site with deionized water followed by site water before taking measurements. Visual inspection of the field meters will be completed prior to departure from the station and before use at the next monitoring location.

C.1.2.2 Water Quality Sampling – Receiving Water Stations – Storm Water

Storm water grab samples will be collected at the Marina del Rey Harbor (MdRH) receiving water station for Permit compliance (MdRH-MC) three times annually. Note that flow monitoring and, therefore, flow-weighted composite sampling is not feasible in the MdR Harbor. Grab samples will be collected from the water’s surface with the assistance of a sampling pole or bucket. Sampling at the receiving water station will be coordinated to begin after sampling begins at the upstream outfall station (MdR-5) in order to monitor the potential effect of the MS4 on the receiving water. Field personnel will take all precautions necessary to ensure safe sampling techniques are used in the field.

Toxicity monitoring shall be conducted at MdRH receiving water station MdRH-MC to evaluate a sublethal effect (e.g., reduced growth, reproduction) to experimental test organisms in accordance with MRP requirements. Toxicity sampling shall consist of a grab sample collected utilizing a pre-cleaned pitcher or bucket. The total sample volume shall be determined both by the specific toxicity test method used and the additional volume necessary for toxicity identification evaluation (TIE) studies. Sufficient sample volume shall be collected to perform both the required toxicity tests and TIE studies. All toxicity tests shall be conducted as soon as possible following sample collection. A 36-hour sample holding time is preferred for test initiation, with no more than 72 hours elapsed before the conclusion of sample collection and test initiation.

A field duplicate and field blank sample will be collected at the MdRH-MC Harbor receiving water station for Permit compliance.

All samples shall be delivered under chain-of-custody to the appropriate analytical laboratory for analyses as specified in Appendix D. Year 1 CIMP results for Permit compliance storm water monitoring shaped monitoring requirements and parameter lists for subsequent storm events and monitoring years. Appendix D monitoring lists were revised accordingly.

C.1.2.3 Water Quality Sampling – Receiving Water Stations – Trash Monitoring

Trash monitoring will be conducted to assess the quantities of trash in the Harbor receiving water associated with storm events. Visual observations of trash will be made and photographs will be taken at the MdRH-MC prior to the start of storm event monitoring and again at the end of the storm water monitoring. One photograph will be taken across the Main Channel of MdRH, perpendicular to direction of flow along the channel. The photograph will show as much as possible of both sides of the Main Channel when feasible. The post storm photograph must be taken from the same vantage point. Ideally the two photographs will display relative volumes of trash that were deposited by storm flows, if trash is present.

C.1.2.4 Water Quality Sampling – Receiving Water Stations – Non-Storm Water

C.1.2.4.1 Water Quality Sampling – Receiving Water Stations – Non-Storm Water Monitoring for Permit Compliance

Non-storm water monitoring will be conducted at MdRH-MC twice annually. One of these monitoring events will occur in the month of July, which is historically the driest month in the region (Los Angeles County Department of Public Works [LADPW], 2014a). Monitoring will be conducted in accordance with MRP Section VI.D.1.b.i, on days with less than 0.1 inch of rain and not less than three days after a rain event of 0.1 inch or greater within the watershed (as measured at the rain gauge located at Electric Avenue Pump Plant). During the first dry weather event of the first CIMP monitoring year (2016-17) all of the parameters in Table E-2 of the MRP were monitored in addition to those required in MRP Section D.1.c. This included aquatic toxicity monitoring. If a parameter in Table E-2 was detected exceeding the lowest applicable WQO in samples from this first dry weather event, then the parameter will continue to be analyzed for the remainder of the Permit term during dry weather at MdRH-MC. Aquatic toxicity will continue to be monitored during the July dry weather monitoring event.

C.1.2.4.2 Water Quality Sampling – Receiving Water Stations – Bacteria TMDL Compliance

Water quality grab samples will be collected from Harbor receiving water stations MdRH-1 through MdRH-9 for Bacteria TMDL compliance. Samples collected for Bacteria TMDL compliance are collected on a scheduled basis (weekly, bi-weekly or six times per week depending upon the station). Bacteria grab samples collected at Harbor receiving water stations MdRH-1 through MdRH-3, which are located along the Marina Beach, will be collected from ankle depth during an incoming wave. Bacteria grab samples collected from Harbor receiving water stations MdRH-4 through MdRH-9 will be collected from a skiff. Samples collected from the skiff will be collected from the water's surface and/or at depth, depending on the sampling schedule in Table C-2. Skiff operations will be subject to all existing field safety protocols and sampling standard operating procedures.

Bacteria samples collected within three days of a storm event are classified as wet weather samples and the sampling location from major outfalls (receiving water stations MdRH-5 and MdRH-7) are subject to TMDL observation requirements. In accordance with the Bacteria TMDL, wet weather bacteria grab samples shall represent flow from the outfall into the surf zone/receiving water at the point of mixing of storm water and marine water. Grab samples shall be taken as close as possible to the initial point of mixing with the receiving water. As a safety consideration, this monitoring location may be shifted no further away than 10 meters (m) down current of the MS4 outfall/point of mixing. The Global Positioning System (GPS) coordinates of this event-specific monitoring location will be recorded in field notes. Care will be taken not to collect a sample from the incoming tidal swash. The tide may push the freshwater discharge back into the MS4 during high tide conditions. Tide observations and potential impacts on water quality conditions will be recorded in field notes.

All bacteria grab samples shall be delivered under chain-of-custody to the appropriate analytical laboratory for all TMDL required bacterial analyses identified in Appendix D, within the designated 8-hour holding time.

C.1.2.4.3 Water Quality Sampling – Receiving Water Stations – Non-Storm Water Monitoring for Toxics TMDL

Water quality grab samples of dissolved copper and total PCBs (e.g., congeners) will be collected from Harbor receiving water stations for Toxics TMDL compliance. Samples will be collected from a skiff. Skiff operations will be subject to all existing field safety protocols and sampling standard operating procedures. As a safety consideration, samples are not collected from the skiff during rainfall. All toxicity samples shall be delivered under chain-of-custody to the appropriate analytical laboratory for all TMDL required analyses (Appendix D).

C.1.2.5 Water Quality Sampling – Outfall Stations – Storm Water

Storm water samples will be collected at four outfall stations for Toxics TMDL compliance three times annually and at MdR-5 for Permit compliance three times annually. Grab and composite sampling methods for collection of storm water at the outfall stations is described in Sections C.1.2.1.1 and C.1.2.1.2. Water quality sampling at the outfall stations will be conducted in conjunction with the collection of suspended sediment as described in Section C.1.3.1.

Toxicity monitoring shall be conducted at the Permit outfall station (MdR-5) in accordance with the MRP and the August 7, 2015 LARWQCB Toxicity Memo. Toxicity sampling will only occur at MdR-5 if it is triggered by the steps outlined in the MRP and clarified in the Toxicity Memo (see Section C.2.1.2).

One field duplicate and field blank sample will be collected annually at MdR-5 for Permit and Toxics TMDL compliance.

All samples shall be delivered under chain-of-custody to the appropriate analytical laboratory for all analyses summarized in Appendix D. Year 1 CIMP results for Permit compliance storm water monitoring at the receiving water station MdRH-MC shaped monitoring requirements and parameter lists for subsequent storm events and monitoring years at the Permit outfall station MdR-5. Appendix D monitoring lists were revised accordingly.

C.1.2.6 Water Quality Sampling – Outfall Stations – Non-Storm Water

One Toxics TMDL outfall monitoring location MdR-4ORB, located at the tide gates in ORB, was selected for non-storm water monitoring (dry weather) each year beginning in September 2018 by the Regional Board per the approval letter dated August 30, 2018. During one non-storm water event per year when the ORB tide gates automated system is set to a dry weather tide gate logic, non-storm water sampling will occur during one ebb tide. The collection method for the composite water sample at MdR-4ORB is described in Section C.1.2.1.2. All samples shall be delivered under chain-of-custody to the appropriate analytical laboratory for the analyses summarized in Appendix D. Water quality sampling during this non-storm event will be conducted in conjunction with the collection of suspended sediment as described in Section C.1.3.2.

C.1.3 Sediment Sampling

Multiple sediment monitoring programs are required by the Toxics TMDL. These programs are briefly described below and explained further in the following sections.

The first program required by the Toxics TMDL is the analysis of storm-borne suspended sediment collected from the MdR Watershed. Storm-borne suspended sediment collection at outfall stations will be conducted during three storm events per year. Monitoring will be conducted during the wet weather monitoring season of October 1st through April 15th. The Watershed Management Group (WMG) Agencies will attempt to capture storms occurring in September and early May, if feasible, based upon readiness and other constraints (such as sample holding times).

Storm-borne and non-storm water (dry weather) suspended sediment samples will be analyzed for Toxics TMDL pollutants and used to evaluate the potential sediment and pollutant load entering MdR Harbor from the Watershed. Table C-6 and Table C-7 lists the monitoring stations applicable to the two types of monitoring.

Sediment monitoring has been conducted in the MdR Harbor for more than 25 years, as part of an annual monitoring program conducted by the Los Angeles County Department of Beaches and Harbors, the Toxics TMDL CMP, a special study conducted by the County in 2008, and the regional Bight program (2003, 2008, and 2013). Sediment monitoring results for the Toxics TMDL constituents have remained relatively consistent over time. Sediment chemistry and toxicity will be conducted annually. Additionally, sediment triad sampling (SQO sampling) will be conducted once every five years. For the first five-year term, SQO monitoring was fulfilled by a Stressor Identification study conducted in 2016 and participation in the Bight program in 2018. For the next five-year term, SQO monitoring will occur once at the annual Toxics TMDL sediment monitoring locations (Table C-8).

Sample preservatives, holding time requirements, target detection limits, and holding times for each parameter are provided for each monitoring program in Appendix D.

Table C-6. Monitoring Programs by Monitoring Station – Storm-Borne Suspended Sediment – Storm Water (Wet Weather)

Sampling Media	Station Type	*Wet Weather Monitoring Program*	Parameter(s)	Station ID	Latitude	Longitude	Sampling Frequency	Sample No. and Type @ Sample Location	No. Samples/ Year
Storm-Borne Suspended Sediment [a][b]	Outfall Stations	Toxics TMDL	Copper, Lead, Zinc, Percent Solids, Total PCBs (congeners), total DDTs, p,p'-DDE, Chlordane**	MdR-4ORB	33.98446	-118.45631	3 storms/year plus 3 pre-storms/year*[a]	2 composite samples (pre-storm and storm)	6
				MdR-5	33.98567	-118.45297	3 storms/year[a]	1 composite sample	3
				MdRU-C-1P11	33.979445	-118.457047	3 storms/year[a]	1 composite sample	3
				MdRU-C-2	33.98849	-118.457609	3 storms/year[a]	1 composite sample	3
				Duplicate	To be determined		1 storm/year	1 composite sample	1
				Field Blank	Not Applicable		1 storm/year	Laboratory Blank Water	1

[a] Sediment collected during storm water monitoring events at outfalls.
[b] Total organic carbon (TOC) will be analyzed in storm water instead of in sediment per Regional Board approval letter dated June 27, 2018.
* Additional three pre-storm sampling events will be conducted at MdR-4ORB only.
** Chlordane will be calculated by summing cis and trans chlordane; cis and trans nonachlor; and oxychlordane

Table C-7. Monitoring Program by Monitoring Station – Suspended Sediment (Dry Weather)

Sampling Media	*Station Type*	*Dry Weather Monitoring Program*	*Parameter*	*Station ID*	*Latitude*	*Longitude*	*Sampling Frequency*	*Sample No. and Type @ Sample Location*	*No. Samples/Year*
Suspended Sediment	Outfall Station	Toxics TMDL	Copper, Lead, Zinc, Total PCBs (congeners), Total DDTs, p,p'-DDE, Chlordane*	MdR-4ORB	33.98446	-118.45631	1 x/year	1 composite sample	1

*Chlordane will be calculated by summing cis and trans chlordane; cis and trans nonachlor; and oxychlordane

Table C-8. Monitoring Programs by Monitoring Station – (Benthic) Sediment (Dry Weather)

Sampling Media	*Station Type*	*Dry Weather Monitoring Program*	*Parameter(s)*	*Station ID*	*Latitude*	*Longitude*	*Sampling Frequency*	*Sample No. and Type @ Sample Location*	*No. Samples/ 5 Years*
(Benthic) Sediment	Harbor Receiving Water Stations	Toxics TMDL	**Sediment Chemistry & Toxicity** Copper, Lead, Zinc, Chlordane*, Total PCBs (congeners), Total DDTs, p,p'-DDE, Total organic carbon, Grain size, Toxicity	MdRH-MC	33.98054	-118.448191	1x/year	Multiple grabs of surficial sediment	5
				MdRH-A	33.97251	-118.45284	1x/year	Multiple grabs of surficial sediment	5
				MdRH-B	33.97514	-118.453465	1x/year	Multiple grabs of surficial sediment	5
				MdRH-C	33.97773	-118.453722	1x/year	Multiple grabs of surficial sediment	5
				MdRH-D	33.98022	-118.453555	1x/year	Multiple grabs of surficial sediment	5
				MdRH-E	33.98301	-118.453383	1x/year	Multiple grabs of surficial sediment	5
				MdRH-F	33.98198	-118.445015	1x/year	Multiple grabs of surficial sediment	5
				MdRH-G	33.97939	-118.444347	1x/year	Multiple grabs of surficial sediment	5
				MdRH-H	33.97635	-118.444087	1x/year	Multiple grabs of surficial sediment	5
				Duplicate	To be determined		1x/year	Multiple grabs of surficial sediment	5
				Equipment Rinse Blank	Not Applicable		1x/year	Laboratory Blank Water	5
			SQO Monitoring [(a)]: Grain Size, Percent Solids, Total Organic Carbon (TOC), Benthic Infauna Analysis, Cadmium, Copper, Lead, Mercury, Zinc, PAHS – lower and higher molecular weights, Total PCBs (congeners), DDTs, p,p'-DDE, Chlordane, Dieldrin, Sediment Toxicity	MdRH-MC	33.98054	-118.448191	SQO: 1x/5 years	Multiple grabs of Surficial Sediment	1
				MdRH-A	33.97251	-118.45284	SQO: 1x/5 years	Multiple grabs of Surficial Sediment	1
				MdRH-B	33.97514	-118.453465	SQO: 1x/5 years	Multiple grabs of Surficial Sediment	1
				MdRH-C	33.97773	-118.453722	SQO: 1x/5 years	Multiple grabs of Surficial Sediment	1
				MdRH-D	33.98022	-118.453555	SQO: 1x/5 years	Multiple grabs of Surficial Sediment	1
				MdRH-E	33.98301	-118.453383	SQO: 1x/5 years	Multiple grabs of Surficial Sediment	1
				MdRH-F	33.98198	-118.445015	SQO: 1x/5 years	Multiple grabs of Surficial Sediment	1
				MdRH-G	33.97939	-118.444347	SQO: 1x/5 years	Multiple grabs of Surficial Sediment	1
				MdRH-H	33.97635	-118.444087	SQO: 1x/5 years	Multiple grabs of Surficial Sediment	1
				Duplicate	To be determined		SQO: 1x/5 years	Multiple grabs of Surficial Sediment	1
				Equipment Rinse Blank	Not Applicable		SQO: 1x/5 years	Laboratory Blank Water	1

[(a)] For the first five years of the CIMP, SQO monitoring was fulfilled by conducting a Stressor Identification study conducted in 2016 and by participation with the Bight program in 2018. For the next five year term, SQO monitoring will be conducted once at the annual Toxic TMDL sediment monitoring stations.
* Chlordane will be calculated by summing cis and trans chlordane; cis and trans nonachlor; and oxychlordane

C.1.3.1 Sediment Sampling – Storm-borne Suspended Sediments (Wet Weather)

The Toxics TMDL requires analysis of the settleable and suspended solids of storm water quality samples collected from outfall discharges. Storm-borne suspended sediment sampling will take place during the wet weather monitoring period of October 1st through April 15th, in alignment with the other wet weather monitoring programs. A storm water composite sample will be collected at each outfall station during three monitored storm events per year. The suspended sediment will be filtered from the storm water composite sample by the analytical laboratory and analyzed for the constituents listed in Table C-6. Refer to Section C.1.2.1.2 for composite sampling methods. Suspended sediment sampling at outfall stations will be conducted in conjunction with the collection of water quality samples as described in Section C.1.2.5.

Storm-borne suspended sediment collected during a wet weather event at MdR-5 (located at the Boone Olive Pump Plant [See Figure 4-4 of the CIMP]) is only included in load calculations when storm water flows exceed the capacity of the low flow diversion (LFD). If the LFD capacity is not exceeded during a particular wet weather event, then there is no storm flow discharging from this station into Basin E and the storm-borne suspended sediment collected would not be used in the load calculation.

C.1.3.2 Sediment Sampling – Non-Storm Water Suspended Sediments (Dry Weather)

The Regional Board requested additional non-storm water monitoring be conducted at MdR-4ORB beginning in September 2018 (per approval letter dated August 30, 2018). During one non-storm water event per year when the ORB tide gates automated system is set to a dry weather tide gate logic, non-storm water sampling will occur during one ebb tide to characterize the pollutant load from ORB to Marina del Rey Harbor. One non-storm water composite sample will be collected for laboratory analyses of the suspended sediment for all constituents listed in Table C-7. Refer to Section C.1.2.1.2 for composite sampling methods at MdR-4ORB. Suspended sediment sampling during this non-storm event will be conducted in conjunction with the collection of water quality samples as described in Section C.1.2.6.

C.1.3.3 Sediment Sampling – MdR Harbor Sediments (Dry Weather)

The Toxics TMDL requires collection of benthic sediment samples annually for chemistry and toxicity (Table C-8) as well as a complete SQO analysis once every five years. For the first five year term, SQO monitoring was fulfilled by a Stressor Identification study conducted in 2016 and participation in the Bight program in 2018. For the next five year term, SQO monitoring will occur once at the annual Toxics TMDL sediment monitoring locations identified in Table C-8. Samples will undergo the suite of analyses required for SQO analysis, including sediment chemistry, toxicity, and benthic infaunal analysis. Samples will also be analyzed for grain size, percent solids, and total organic carbon (TOC).

Sediment samples will be collected from MdRH using a stainless-steel, 0.1-square meter (m^2) Van Veen grab sampler or equivalent. An equivalent sediment sampling device will have the following characteristics:

- Constructed of a material that does not introduce contaminants.
- Samples with minimal surface sediment disturbance.
- Does not leak during sample retrieval.

- Has a design that enables safe/easy sample verification that samples meet all applicable sampling criteria (e.g., access doors that allow visual inspection and removal of the undisturbed surface sediment).
- Grab samplers with smaller sampling surface areas may be acceptable depending on the study needs provided the sediment sample obtained is similar or equivalent to the quality of a Van Veen grab.

A sediment sample will be considered acceptable if the surface of the grab is even with minimal surface disturbance and a penetration depth of at least five centimeters (cm). Sediment samples that do not meet these criteria will be discarded and additional grab samples will be collected as needed. Good faith efforts will be made to collect representative sediment samples. If samples cannot be obtained from the exact sample point, a reasonable attempt will be made to collect a sample from the vicinity of the sample point (e.g., within 100 m, as per Bight protocols). If this proves unsuccessful, no sample will be collected from the given sample point. This effort will be fully documented in all field notes. If samples cannot be collected during two consecutive sampling events, alterative sampling point(s) will be proposed to the Regional Board and this CIMP will be updated. Sediment samples will be collected from the top 5 cm of the grab sampler, avoiding sediment within one cm of the sides of the grab sampler. Sediment samples will be processed as follows:

1. **Grain Size:** Sediments for grain size analysis will be placed in either a quart size Ziploc® bag or a clean glass jar and placed on ice in coolers. These samples will be delivered unfrozen to the laboratory within two days of collection for analyses.
2. **Sediment Chemistry:** Sediments for chemical analyses will be placed into certified clean glass jars with Teflon® lined lids, kept on ice in coolers, and frozen at -20°C within 24 hours. These samples will be delivered frozen to the laboratory within two days of collection for analyses.
3. **Sediment Toxicity:** Sediments for toxicity analysis will be placed in a clean food-grade polyethylene bag or multiple 1-Liter (L) certified clean glass jars, and placed on ice in coolers. These samples will be delivered unfrozen to the laboratory within two days of collection for analyses.
4. **Benthic Infauna:** Sediment collected for benthic infaunal analysis will be rinsed through a 1.0-millimeter (mm) mesh screen. The material retained on the screen will be transferred to a labeled glass or plastic quart jar. A 7% magnesium sulfate ($MgSO_4$) seawater solution will be added for approximately 30 minutes to relax the collected specimens. The samples will then be then fixed in a 10% buffered formalin solution. These samples will be delivered to the laboratory within two days of collection. The benthic infaunal sample will be stored in a formalin solution for a minimum of three days and no longer than five days.

Final sediment sample volumes necessary for grain size, chemistry, benthic infauna, and toxicity analysis will be determined during discussion with the contacted laboratory and to achieve targeted MDLs (Appendix D).

C.1.3.4 Sediment Sampling – Oxford Basin Sediment Monitoring

The Toxics TMDL specifies that the Los Angeles County Flood Control District (LACFCD) shall monitor discharges of sediment from ORB to MdRH after completion of the ORB Multiuse

Enhancement Project (ORB MEP). Additionally, the TMDL states that effectiveness monitoring developed as part of the Proposition 84 grant agreement for the ORB MEP may be used to meet the TMDL monitoring requirement; however, the monitoring must continue beyond the term of the Proposition 84 agreement.

The ORB MEP Monitoring Plan (LACFCD, 2014) proposed a tiered approach to monitoring sediments being discharged from ORB to Basin E of MdRH. During the first year of post-construction monitoring (2016-17), a Sediment and Water Exchange Study (LADPW, 2017) was conducted which focused on understanding whether there was a significant exchange of suspended sediments in and out of ORB. Because the results of this study indicated that sediment discharge to Basin E was significant, during the second year of post-construction monitoring (2017-18) a Sediment Discharge Study (LADPW, 2018) was conducted to collect and analyze suspended sediments being discharged from ORB to Basin E. The suspended sediments were analyzed for the constituents listed in the Toxics TMDL including total PCBs, total DDTs, p,p'-DDE, chlordane, copper, lead, and zinc during three wet weather events. The results of both studies are discussed below.

Sediment and Water Exchange Study – Year 1 Post Construction Monitoring:
ORB detains and filters runoff from a portion of the Marina del Rey watershed before discharging to MdRH. Two tide gates in ORB (7-foot pipe and 6-foot box culvert) are strategically operated for flood protection and to maximize the detention of runoff resulting from storm events. The Sediment and Water Exchange Study (LADPW, 2017) conducted during the first year of post-construction monitoring in ORB evaluated the sediment exchange between ORB and MdRH. The sediment exchange was based on 1) a volumetric assessment, and 2) a sediment assessment.

The volumetric assessment was based on recorded tide gate operations in ORB from June 2016 through May 2017. MdRH water elevation data from existing water level transducers located downstream of the ORB tidal gates along with storm water inflow data from LACFCD Project Numbers 5243 and 3872 were used to calculate the volume entering or leaving ORB. Flow rates in the conduits connecting ORB and MdRH were simulated using the United States Environmental Protection Agency's Stormwater Management Model (SWMM) software (5.10v)

For the sediment assessment, two YSI water quality sondes were installed near the two tide gates in ORB beginning in September 2016. Water quality was continuously monitored by the sondes during the first year of post-construction monitoring. TSS data were collected during four dry weather events and three wet weather events in 2016-17. TSS data were collected from both ebb and flood tides. A regression model was developed using TSS data and turbidity results as a predictor. Observed TSS concentrations obtained from the samples were correlated to the continuously-monitored turbidity data to estimate TSS concentrations in ORB and MdRH.

Sediment exchange between Oxford Basin and MdRH was calculated by applying the predicted TSS concentrations to the SWMM flowrate results to calculate TSS in kilograms in 15-minute time increments. Based on the analysis, the total net annual TSS discharge from ORB was 28,848 kilograms. The linear relationships between turbidity and TSS used in the study were based on limited TSS samples, therefore, it was recommended to collect additional TSS and turbidity data in future monitoring years to create a more robust correlation.

Sediment Discharge Study – Year 2 Post-Construction Monitoring and Beyond:
Based on the results of the Sediment and Water Exchange Study (LADPW, 2017), a Sediment Discharge Study (LADPW, 2018) was conducted in the second year of ORB post-construction monitoring. Suspended sediments in effluent from ORB were collected and analyzed during three storm events. A pilot study was conducted for the first monitored storm event of the season in order to determine the optimum sampling design at the two ORB tide gates for the collection of suspended sediments during a wet weather event. The final sampling design was then utilized during the following two wet weather events. During each storm event, suspended sediments were collected and analyzed for the Toxics TMDL constituents. Analytical chemistry results were used to calculate an annual load of the Toxic TMDL constituents from ORB to Basin E of MdRH for the 2017-18 monitoring year. In addition, the TSS exchange analysis was repeated using additional TSS data collected in 2017-18. The sampling design developed for this study will continue to be used for sampling the Toxics TMDL constituents for all future outfall monitoring at the new station MdR-4ORB located at the tide gates in ORB.

C.1.4 Bioaccumulation – Fish and Mussel Sampling

Fish and mussel tissue monitoring is required by the Toxics TMDL to determine the integrated accumulation of bioavailable contaminants from various sources. Fish and mussel tissue sampling will be conducted annually, and the timing of sampling will be kept consistent between monitoring years to allow for more reliable long-term data analysis. In 2010 to 2012, fish and mussel sampling were conducted during the month of October. For consistency, this schedule is recommended to continue. The bioaccumulation monitoring program for fish and mussel tissue will be conducted for total PCBs (congeners), chlordane, and total dichlorodiphenyl-trichloroethanes (DDTs) as summarized in Table C-9. Sample preservatives, holding time requirements, suggested analytical methods, target detection limits, and holding times for each parameter are presented in Appendix D.

Table C-9. Parameters by Monitoring Program – Fish and Mussel Tissue

<table>
<tr><th rowspan="2">Sampling Media</th><th rowspan="2">Station ID</th><th colspan="4">Harbor Receiving Water</th></tr>
<tr><th>Sample No. and Type</th><th>Sampling Frequency</th><th>Samples per Year</th><th>Parameters</th></tr>
<tr><td>Fish Tissue</td><td>MdRH-MC
MdRH-A
MdRH-B
MdRH-C
MdRH-D
MdRH-E
MdRH-F
MdRH-G
MdRH-H</td><td>Individuals and/or composites.</td><td>1x/year (October)</td><td>18</td><td>Chlordane, DDTs, PCBs(a)</td></tr>
<tr><td rowspan="2">Mussel Tissue</td><td>MdRH-A
MdRH-B
MdRH-C
MdRH-G
MdRH-H</td><td>One composite representing transplanted mussels in the Front Basins.</td><td rowspan="2">1x/year (October)</td><td>1</td><td rowspan="2">Chlordane, DDTs, PCBs(a)</td></tr>
<tr><td>MdRH-MC
MdRH-D
MdRH-E
MdRH-F</td><td>One composite representing transplanted mussels in the Back Basins.</td><td>1</td></tr>
</table>

(a). 54 PCB congeners: 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. These include all 41 congeners analyzed in the SCCWRP Bight Program and dominant congeners used to identify the Aroclors.

C.1.4.1 Fish Sampling

In the Toxics TMDL CMP, six “bottom dwelling fish species” were considered potential candidates for bioaccumulation sampling, including white croaker, California halibut, barred sand bass, queenfish, bat ray, and shiner perch. Considering the nature of fish and the fact that fish do not always cooperate with monitoring activities, the Toxics TMDL CMP allowed sampling to be limited to two bottom-dwelling fish species. During surveys conducted in October 2010, 2011, and 2012, up to five individual fish per targeted species were caught in three of the Back Basins. A total of 30 individual fish from each survey underwent bioaccumulation analysis.

For the purposes of this CIMP, at least two fish species will be targeted during each survey. In order to evaluate the potential impact to the food chain and associated human health impacts, this CIMP has further refined the species targeted for analysis, such that at a minimum a sport fish will be targeted during each survey. Table C-10 presents the species of fish recommended to be targeted by dietary category. White croaker was selected because the species has a “do not consume” fish advisory from the Office of Environmental Health Hazard Assessment (OEHHA, 2009). It was caught during 34 of the 44 historical fish surveys conducted in MdR Harbor (1985 to 2008) and during surveys in 2011 and 2013 (nine individuals analyzed). California halibut was selected because it is a piscivore and demersal fish (i.e., in direct contact with the sediments). California halibut was caught in MdR Harbor during 42 of the 44 historical fish surveys and all three of the most recent compliance surveys (26 individuals analyzed). Queenfish was selected as a third optional sampling species because it is under a current OEHHA fish consumption advisory and represents a dietary guild that consumes both benthic and pelagic species. It was caught in 31 of the 44 historical surveys. If two of the three targeted species are not caught during monitoring, bottom-dwelling species (e.g., barred sand bass, bat ray, and shiner perch) will be targeted.

Table C-10. Target Fish Species

Fish Species	Dietary Guild	Description of Dietary Guild	Target Size Range (total length in mm)
White Croaker (*Genyonemus lineatus*)	Benthic diet without piscivory	Diet largely composed of small benthic invertebrates, such as amphipods and other crustaceans, bivalve mollusks, and polychaete worms.	160-300
California Halibut (*Paralichthys californicus*)	Piscivore	The majority of the diet is fish. Large predatory invertebrates (e.g., cephalopods, decapod crustaceans, and echinoderms) are also consumed to some degree.	560-820
Queenfish (*Seriphus politus*)	Benthic and pelagic diet with piscivory	Diet includes a combination of benthic invertebrates, pelagic invertebrates (e.g., zooplankton, shrimp, and mysidae), and forage fish.	120-260

Note that inclusion of a prey fish, such as topsmelt (*Atherinops affinis*)[1], may also be appropriate to help evaluate conditions throughout the food chain as part of a potential future SQO Part II (indirect effects) analysis. The SQO Part II analysis is not required by the Toxics TMDL and this information has been included for reference purposes only.

C.1.4.1.1 Number of Fish Samples

A total of 18 fish tissue samples (nine each of two species) will undergo analysis per annual survey for Toxics TMDL compliance. Each sample will consist of muscle tissue with skin removed along the length of the body. Belly flaps will be removed and not included in the tissue samples.

Fish will be analyzed as individuals, unless the fish caught are of insufficient size for individual sample analysis, then fish must be analyzed as composites. If fish are analyzed as composite samples, each composite sample shall include a minimum of three fish, with up to five fish per sample preferred, especially if smaller fish are caught (OEHHA, 2005). All fish composite samples must follow OEHHA's "75 percent rule," where the length of the smallest fish should be at least 75% of the length of the largest fish of a species in a composite sample.

[1] Topsmelt is one of the three test species required for Toxicity analysis under the Permit. If Topsmelt is identified as the "most sensitive" species and selected for ongoing toxicity analysis under the Permit receiving water monitoring requirements, it would also be the preferred prey fish for tissue sampling and analysis.

C.1.4.1.2 Fish Sampling Protocols

Fish swim throughout MdR Harbor; therefore, for the purposes of this CIMP, the entire Harbor is considered to be a single representative area for fish sampling. Trawl transects will be run throughout the Harbor to collect targeted fish species. Fish will be collected during a single day of trawling. At the end of a trawl day, the entire catch will be evaluated for sampling. Fish sampling protocols shall be conducted in accordance with OEHHA's *General Protocol for Sport Fish Sampling and Analysis*[2] (OEHHA, 2005). Fish used for samples shall be of either legal size and/or edible size. The Department of Fish and Wildlife (DFW) Sport Fishing Regulations define legal size requirements using total length. All size measurements are in terms of total length.

In order to have 18 fish tissue samples (e.g., nine samples representing two targeted species), reasonable attempts will be made to collect nine to 16 fish of each targeted species during each survey. This will allow for up to nine individual tissue samples or six individual and three composite tissue samples to undergo sample analysis. If more than 10 trawls are conducted and none the three targeted species are caught (see Table C-10), bottom-dwelling species identified in the Toxics TMDL CMP may be sampled. Listed in order of preference, targeted fish will include: barred sand bass, shiner perch and bat ray.

Fish will be collected using up to three different gear types, if necessary, due to the variation in gear capture efficiency and strata of the various target species. These include otter trawl, lampara net, and gill net. Prior to deployment of the sampling gear, a survey of the sampling area using a fathometer and direct visual observations will be performed to determine whether possible obstructions exist that could prevent proper deployment or damage gear and whether sensitive submerged aquatic vegetation (in shallow water habitat areas) is present that should be avoided. Based on the findings of this survey, the gear will be deployed in order of priority:

1. The first gear type to be employed will be a standard otter trawl with a 7.6-m headrope, 2.5-cm mesh, and 1.3-cm mesh cod end liner. The otter trawl is effective for collecting bottom dwelling demersal fish species. This is the preferred trawl method.
2. The lampara is a semi-pursing, round-haul net, having a cork line of approximately 273 m and a depth of 36 m. The net consists of two full-cut wings (100-m length each; 15-cm stretch mesh), a throat or apron with 5-cm mesh, and a sack or bag of 0.9-cm mesh. The net is set in a circle or ellipse and drawn closed at the bottom during retrieval onto the boat. The lampara net is highly effective for collecting two of the three target species (white croaker and queenfish).
3. Obstructive debris on the Harbor bottom may be problematic for the otter trawl and lampara net, in which case a gill net may be used. The gill net is a 50-m flat panel monofilament net with varying mesh sizes. The net has a float line and lead line so it will sit vertically in the water column, either weighted to capture demersal species or floated to capture pelagic species.
4. Collection of prey fish may require hand-fishing.

[2] Although OEHHA protocols are established for freshwater fish, they may be translated to fish within small and medium sized marine and/or estuarine waterbodies such as MdR Harbor.

Trawling will be conducted at a speed-over-ground of approximately two knots (one meter per second [m/s]), ranging between 1.5 and 2.5 knots (0.75 and 1.25 m/s). For collecting targeted species, the time and length of the trawl may vary, depending on site conditions. In general, the objective will be to limit trawl time to the five-minute period identified in the original Toxics TMDL CMP. Using a standard otter trawl, this will result in linear trawl coverage of 450 m to 600 m. The lampara and purse seine are both deployed in a circle (or oval if space-limited) and "pursed" or drawn closed toward the center as they are retrieved onto the deck.

Once on deck, the contents of the net will be transferred to tubs and processed. Sample processing for fish tissue samples includes evaluation of the length, weight, and sex of each fish. Once data is collected, fish will be filleted removing the edible portion from the carcass (i.e. muscle tissue with skin removed along the length of the body). Belly flaps will be removed during this process and will not be included in the tissue samples.

Fish will be submitted to the laboratory on ice, unfrozen, within two days of sample collection.

C.1.4.2 Mussel Sampling

In the Toxics TMDL CMP, mussels resident to the MdR Back Basin were collected for bioaccumulation sampling and analysis. Transplanted mussel sampling is recommended in place of resident mussel sampling in order to better control for mussel age and, therefore, assessment of tissue bioaccumulation. Studies have found that analysis of transplanted mussels yield results nearly identical to analysis of resident mussels (State Water Resources Control Board [SWRCB], 2013). Vexar cages, each containing approximately 30-35 California mussels per cage, will be installed at designated monitoring locations in the MdR Harbor. Vexar cages will remain on-site for approximately 6-8 weeks before transplanted mussels will be retrieved for tissue analysis.

In the Toxics TMDL CMP, tissue from mussels resident to the MdR Back Basins was composited into two replicate samples of eight individuals (55 to 65 mm in length, if available). This composite method will be used in this CIMP.

Mussels will be submitted to the laboratory on ice, unfrozen, within two days of sample collection.

C.1.5 Chain of Custody Procedures

In accordance with USEPA sampling protocols, all samples collected will be stored in the appropriate container type for the analytical method to be performed. Additionally, all samples will be stored and chilled in ice chests for transfer to the laboratory and between laboratories.

Chain-of-custody procedures (Woodward-Clyde, 1996) are used for all samples throughout the collection, transport, and analytical process. Samples are considered to be in custody if they are: (1) in the custodian's possession or view, (2) retained in a secured place (under lock) with restricted access, or (3) placed in a container and secured with an official seal to prevent the sample from being reached without breaking the seal. Chain-of-custody records, field logbooks, and field tracking forms are the principal documents used to identify samples and to document possession. The chain-of-custody procedures will be initiated during sample collection. A chain-of-custody record will be provided with each sample or group of samples. Each person with sample custody will sign the form and ensure the samples are not left unattended unless properly secured. Documentation of sample handling and custody includes the following:

- Bottle label information (i.e., station [site] number, station [site] name, laboratory analysis requested, and date [written at time of sampling]).
- Time (written at time of sampling).
- Number of bottles.
- Temperature of sample.
- Sampler(s), laboratory and sampler/courier signatures, and time(s) sample(s) changed possession (completed upon sample transfer[s]).

Each sample collected shall be associated with a recorded observation of site conditions, which should include (at a minimum) a unique sample identifier, collection date and time, weather conditions, sample characteristics, sampler’s name, and field observations that may be relevant to the monitoring being conducted (e.g., types of field investigations conducted, presence/absence of flow and estimated flow volume, connectivity with the receiving water, potential pollutant sources). Field forms and lists of field sampling equipment are provided in Attachment C1.

C.1.6 Field and Laboratory Safety

It is the policy of all participating agencies that all employees have a safe working environment and that all field and laboratory work be performed in a manner that provides the highest level of safety for the protection of every employee.

Sampling should only occur when conditions can be assessed as safe. The safety of the sample collector is the top priority and may preclude scheduled sampling, especially during storm water monitoring. Standard Operating Protocols for the MdR Watershed CIMP are summarized below and or may be referenced from the TMDL CMPs.

In addition, in an effort to improve employee safety and health awareness and prevent occupational related injury and illness, all participating laboratories must develop a safety program with the intention of satisfying the applicable federal, state, and local regulations.

C.2 Analytical Procedures

This section of the appendix presents a discussion of analytical methods to be used for sample analysis.

C.2.1 Analytical Procedures for Water Quality

A complete list of chemical and biological parameters with corresponding suggested analytical methods and target detection limits for water samples required by the Permit, Bacteria TMDL and Toxics TMDL is provided in Appendix D. All analytical methods used to obtain contaminant concentrations will follow USEPA or Standard Methods (SM) 21st Edition (American Public Health Association [APHA] et al., 2005).

C.2.1.1 Analytical Procedures for Aquatic Toxicity Testing for Permit Compliance Monitoring

Toxicity testing at receiving water station MdRH-MC shall be conducted during two storm events including the first storm event of the year.

Toxicity testing will also be conducted at receiving water station MdRH-MC once during dry weather each year (during the month of July, the historically driest month of the year).

As described in the MRP (page E-31), if samples are collected in receiving waters with salinity equal to or greater than 1 part per thousand (ppt) or from outfalls discharging to receiving waters with salinity that is equal to or greater than 1 ppt, then toxicity tests should be conducted on the most sensitive test species in accordance with species and short-term test methods in *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms* (EPA/600/R-95/136, 1995). The marine and estuarine test species identified in the MRP are listed in Table C-11.

Table C-11. Aquatic Toxicity Monitoring Methods

Media	Species	Taxon	Type of Test	Method
Receiving Water with Salinity ≥1 ppt Outfall discharge to Receiving Water with Salinity ≥1 ppt	Topsmelt	*Atherinops affinis*	Static Renewal Toxicity Test: Larval Survival and Growth	Method 1006.01 [a]
	Purple Sea Urchin	*Strongylocentrotus purpuratus*	Static Non-Renewal Toxicity Test: Fertilization	Method 1008.0 [a]
	Giant Kelp	*Macrocystis pyrifera*	Static Non-Renewal Toxicity Test: Growth	Method 1009.0 [a]

[a] Methods from *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms* (USEPA/600/R-95/136, 1995).

Toxicity test screening was conducted during two wet weather events (2016-17 monitoring year) and two dry weather events (July 2016 and July 2017) using all three test species listed in Table C-11 to determine the most sensitive test species to use for future toxicity testing. Based on the screening results, it was determined that *S. purpuratus* was the most sensitive test species. After the screening period, all subsequent monitoring has been using *S. purpuratus* for toxicity testing and will continue to do so until the fourth year of the permit term when rescreening is required again.

The method for *M. pyrifera* is a 48-hour chronic toxicity test that measures the percent zoospore germination and the length of the gametophyte germ tube. Although the test may be sensitive to herbicides, fungicides, and treatment plant effluent, the use of *M. pyrifera* as a test species for stormwater monitoring may not be ideal. Obtaining sporophylls for stormwater testing could also be a limiting factor for selecting this test. Collection of *M. pyrifera* sporophylls from the field is necessary prior to initiating the test and the target holding time for any receiving water or stormwater sample is 36 hrs; however, 72 hrs is the maximum time a sample may be held prior to test initiation. During the dry season, meeting the 36-72 hr holding time will be achievable; however, field collection during wet weather may be delayed beyond the maximum holding time due to heavy seas and inaccessible collection sites. In addition, collection of *M. pyrifera* sporophylls during the storm season may include increased safety risks that can be avoided by selection of a different species.

The *A. affinis* test measures the survival and growth test of a larval fish over seven days. At the end of seven days of exposure to a potential toxicant, the number of surviving fish are recorded, along with their weights, and compared to those exposed to non-contaminated seawater. Positive characteristics of the *A. affinis* chronic test include the ability to purchase test organisms from commercial suppliers as well as being one of the few indigenous test species that may be used to test undiluted stormwater by the addition of artificial sea salts to within the range of marine receiving waters. Unfortunately, the tolerance of *A. affinis* to chemicals in artificial sea salts may also explain their lack of sensitivity to changes in water quality compared to other test organisms such as the sea urchin or red abalone. In addition, there are concerns with the comparability of conducting a seven-day exposure test when most rain events do not occur over a seven-day period.

The *S. purpuratus* fertilization test measures the ability of sea urchin sperm to fertilize an egg when exposed to a potential toxicant. The *S. purpuratus* fertilization has been selected as a chronic toxicity test organism in previous MS4 permits and has been used to assess ambient receiving water toxicity and sediment pore water toxicity, as well as stormwater toxicity. The *S. purpuratus* fertilization test is also among the most sensitive test species to metals. The adult test organisms may be purchased and held in the lab prior to fertilization, and the sample volume necessary to conduct the test is small with respect to the other suggested tests. The minimal exposure period (20 min) allows for a large number of tests to be conducted over a short period of time and permits the testing of toxicants that may lose their potency over long periods of time.

Chronic toxicity test biological endpoint data shall be analyzed using the Test of Significant Toxicity (TST) t-test approach specified in *National Pollutant Discharge Elimination System Test of Significant Toxicity Implementation Document* (USEPA, Office of Wastewater Management, Washington, D.C. EPA 833-R-10-003, 2010). The critical chronic in stream waste concentration (IWC) established in the Permit for the MRP is set at 100% receiving water for receiving water samples and 100% effluent for wet and dry weather outfall samples. A 100% receiving water/outfall effluent sample and a control shall be tested.

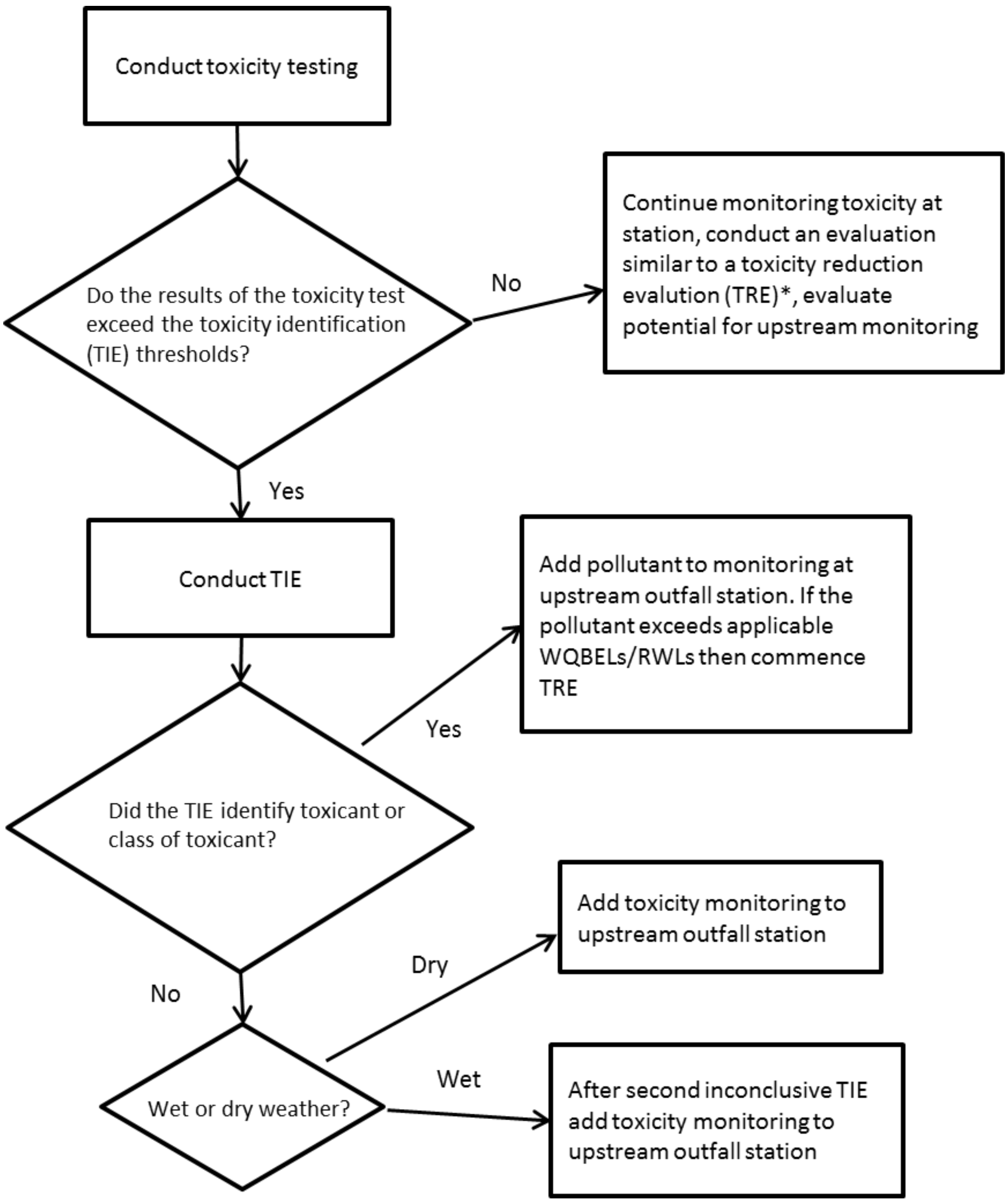
C.2.1.2 Toxicity Endpoint Assessment and Toxicity Identification Evaluation Triggers

A toxicity test sample is immediately subject to TIE procedures to identify the toxic chemical(s), if either the survival or sublethal endpoint demonstrates a percent effect value equal to or greater than 50% at the IWC. Percent effect is defined as the effect value—denoted as the difference between the mean control response and the mean IWC response, divided by the mean control response—multiplied by 100. A TIE shall be performed to identify the causes of toxicity using the same species and test method. The TIE should be conducted on the test species demonstrating the most sensitive toxicity response at a sampling station. TIEs shall be performed in accordance with guidelines for characterizing chronically toxic effluents including USEPA, 1991; USEPA, 1992; USEPA, 1993a; USEPA, 1993b; and USEPA, 1996.

TIE procedures will be initiated as soon as possible after the toxicity trigger threshold is observed to reduce the potential for loss of toxicity due to extended sample storage. If the cause of toxicity is readily apparent or is caused by pathogen related mortality (PRM) or epibiont interference with the test, the result will be rejected, if necessary, a modified testing procedure will be developed for future testing.

In cases where significant endpoint toxicity effects greater than 50% are observed in the original sample, but the follow-up TIE positive control “signal” is not statistically significant, the cause of toxicity will be considered non-persistent. No immediate follow-up testing is required on the sample. However, future test results should be evaluated to determine if parallel TIE treatments are necessary to provide an opportunity to identify the cause of toxicity

The general approach to conducting aquatic toxicity monitoring is presented in Figure C-2, which describes a general evaluation process for each aquatic toxicity sample collected as part of routine Permit compliance sampling conducted. Toxicity assessments will follow the guidelines set forth in the MRP and clarified in the Regional Board’s August 7, 2015 Toxicity Clarification Memo (Toxicity Memo) (LARWQCB, 2015).



*TRE like evaluation as described in the Los Angeles Regional Water Quality Control Board's August 17, 2015 Toxicity Clarification Memo.

Figure C-2. Aquatic Toxicity Assessment Process – Overview Flow Chart

If a TIE conducted at the receiving water station (MdRH-MC) identified the pollutant or class of pollutants causing the toxicity then the following actions will be taken at the upstream outfall location (MdR-5):

1. The toxicant(s) shall be monitored at the outfall station (MdR-5) during the next scheduled sampling event (at least 45 days following the toxicity sample collection date),
2. Monitoring shall continue until the deactivation criteria are met at the outfall station (two consecutive samples do not exceed receiving waters limitations [RWLs] or water quality based effluent limitations [WQBELs]).
3. If the toxicant is present in the discharge from the outfall at levels above the applicable RWL or WQBEL, a toxicity reduction evaluation (TRE) will be performed for that toxicant at the outfall location. The TRE shall include all reasonable steps to identify the source(s) of toxicity and discuss the appropriate best management practice (BMP[s]) to eliminate the cause(s) of toxicity. TREs shall be performed in accordance with guidelines presented in USEPA, 1999. No later than 30 days after the source of toxicity and appropriate BMPs are identified, the Permittee(s) shall submit a TRE Corrective Action Plan to the Regional Water Board Executive Officer for approval. The requirements of the Corrective Action Plan are outlined in the MRP.

If a TIE conducted at the receiving water station was inconclusive, then the following actions shall be taken at the outfall station:

1. If the sample was collected during dry weather, toxicity monitoring shall be conducted at the outfall monitoring station during the next scheduled monitoring event.
2. If the sample was collected during wet weather, then toxicity monitoring need not commence at the outfall until a second TIE at the receiving water station is inconclusive.

If toxicity samples have been collected at the outfall station for Permit compliance monitoring, toxicity results will be compared to appropriate laboratory controls. If there is no toxicity identified, toxicity monitoring will continue until the deactivation criteria are met (two consecutive samples pass the TST t-test during the same condition [wet or dry]) at the outfall station, or a TIE at the receiving water site identifies the constitute causing toxicity.

If toxicity is present at the outfall station but at levels below the trigger for a TIE, toxicity testing will continue until either the deactivation criteria are met, a TIE conducted at the receiving waster site identifies the pollutant causing toxicity, or the discharged is eliminated. An evaluation similar to the TRE shall also be conducted.

If toxicity is present at the outfall station and meets the trigger for a TIE:

1. If the TIE identifies the pollutant contributing to the toxicity then the pollutant will be added to the monitoring list for this station (until the deactivation criteria are met – two consecutive samples to not exceed RWLs or WQBELs) and a TRE will be conducted.
2. If the TIE is inconclusive, a TRE-like investigation will be conducted as described in the Toxicity Memo and toxicity testing will continue at the outfall until two consecutive

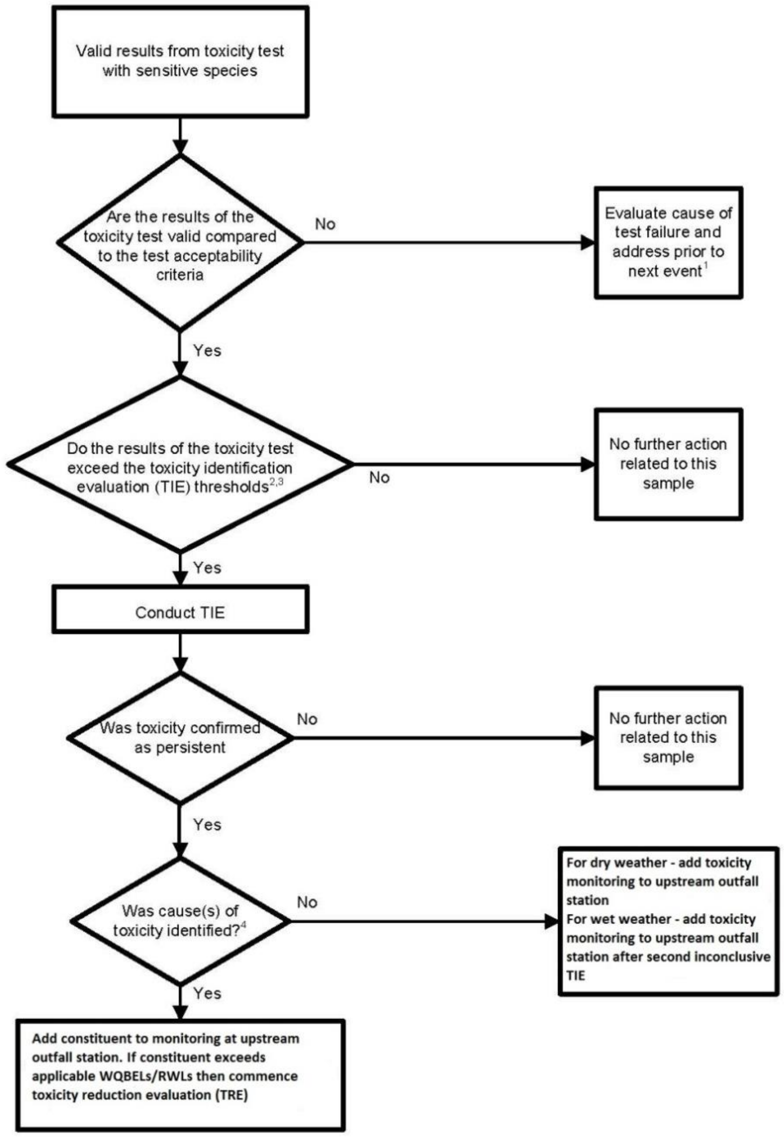
samples pass the TST t-test, a TIE identifies the pollutant causing the toxicity, or the discharge is eliminated.

As discussed above, the results of toxicity testing will be used to trigger further investigations to determine the cause of observed laboratory toxicity. As described in USEPA's 1991 *Methods for Aquatic Toxicity Identification*, a Phase I TIE utilizes methods to characterize the physical/chemical nature of the constituents which may cause or contribute to toxicity. Such characteristics as solubility, volatility, and filterability are determined without specifically identifying the toxicants. Phase I results are intended as a first step in specifically identifying the toxicants but the data generated can also be used to develop treatment methods to remove toxicity without specific identification of the toxicants. For Permit compliance monitoring, Phase I TIEs will be conducted on samples that exceed a TIE trigger. Water quality monitoring data will be reviewed to further support evaluation of potential toxicants. TIE methods will generally adhere to USEPA procedures documented in conducting TIEs (USEPA, 1991, 1992, 1993a-b). TIEs will perform the manipulations described in Table C-12. Given the wealth of historical data for the MdR Watershed, TIE sample manipulations have been prioritized based on TMDL targeted constituents such as organics and metals. The WMG will identify the cause(s) of toxicity using the treatments in Table C-12 and, if possible, using the results of water column chemistry analyses. Phase I TIEs are anticipated to identify causes of toxicity in the MdR Watershed and more rigorous Phase II and Phase III TIEs are generally not necessary.

Table C-12. Toxicity Identification Evaluation Sample Manipulations

Primary TIE Sample Manipulation	Expected Response
No Manipulation	Baseline test for comparing the relative effectiveness of other manipulations
pH Adjustment (pH 7 and 8.5)	Alters toxicity in pH sensitive compounds (i.e., ammonia and some trace metals)
Filtration or centrifugation	Removes particulates and associated toxicants
Ethylenedinrilo-Tetraacetic Acid (EDTA)	Chelates trace metals, particularly divalent cationic metals
Sodium thiosulfate (STS) addition	Reduces toxicants attributable to oxidants (i.e., chlorine) and some trace metals
Solid Phase Extraction (SPE) with C18 column	Removes non-polar organics (including pesticides) and some relatively non-polar metal chelates
Sequential Solvent Extraction of C18 column	Further resolution of SPE-extracted compounds for chemical analyses
Secondary TIE Sample Manipulation	**Expected Response**
Carboxylesterase addition[(1)]	Hydrolyzes pyrethroids
Piperonyl Butoxide (PBO)	Reduces toxicity from organophosphate pesticides such as diazinon, chlorpyrifos and malathion, and enhances pyrethroid toxicity
(1) Carboxylesterase addition has been used in recent studies to help identify pyrethroid-associated toxicity (Wheelock et al., 2004; Weston and Amweg, 2007). However, this treatment is experimental in nature and should be used along with other pyrethroid-targeted TIE treatments (e.g., PBO addition).	

A more detailed approach to conducting aquatic toxicity monitoring using the methodologies described in this appendix has been summarized in detail in Figure C-3.



Footnotes

1. Test failure includes pathogen or epibiont interference, which should be addressed prior to the next toxicity sampling event.
2. For freshwater, the TIE threshold is >50% mortality in an acute (wet weather) or chronic (dry weather) sample. If a >50% effect in a sub-lethal endpoint for chronic test is observed, a follow up sample will be collected within two weeks of the completion of the initial sample collection. If the follow up sample exhibits a greater than 50% effect, a TIE will be initiated.
3. For marine and estuarine waters, the TIE threshold is a percent effect value of equal to or greater than 50 percent. Follow up samples will be collected within two weeks of the completion of the initial sample collection and a TIE initiated.
4. The goal of conducting the Phase I TIE is to identify the cause of toxicity so that outfall monitoring can incorporate the toxicant(s) into the list of constituents monitored during outfall monitoring. Thus if the specific toxicant(s) or the analytical class of toxicants (i.e., metals that are analyzed via EPA Method 200.8) are identified sufficient information is available to inform the addition of pollutants to the list of pollutants monitored during outfall monitoring.

Figure C-3. Detailed Aquatic Toxicity Assessment Process – Overview Flow Chart

C.2.2 Analytical Procedures for Sediment Quality

Physical and chemical measurements of sediment were selected to provide data on chemicals of potential concern in MdR. All analytical methods follow USEPA or SM 21st Edition (APHA et al., 2005). A complete list of chemical analytes with corresponding suggested analytical methods and target detection limits for sediment is provided in Appendix D.

Physical analyses of sediment include grain size and percent solids. Grain size is analyzed to determine the general size classes that make up the sediment (e.g., gravel, sand, silt, and clay). Grain size analysis will be in accordance with the methods given in ASTM D4464M (or similar method). Percent solids are measured to convert concentrations of the chemical parameters from a wet-weight to a dry-weight basis and will be conducted using SM2540B.

The Triad Assessment requires all results to be presented on a dry-weight basis. Laboratories provide MDLs and reporting limits on a wet-weight basis. The final contracted laboratory will be contacted to ensure that reporting limits for SQO analysis (Appendix D) are low enough to meet the dry-weight levels.

C.2.3 Analytical Procedures for Sediment Toxicity

Sediment toxicity shall be conducted on an annual basis and once every five years as part of a SQO evaluation as detailed in the *Water Quality Control Plan for Enclosed Bays and Estuaries* (SWRCB and Cal EPA, 2009). Sediment bioassay tests will be used to quantify species-specific responses to exposure to surficial sediments under controlled laboratory conditions. In accordance with SQO guidance, at least one short-term survival test and one sublethal test will be conducted (Table C-13). In accordance with the Toxics TMDL, the acute survival test will be a 10-day test using the marine amphipod *Leptocheirus plumulosus*. The selection of this test is a result of findings of toxicity to this species during previous investigations in MdR, which was not observed for other amphipods (e.g., *Eohaustorius estuaries*). The sublethal test will be a 48-hour sediment-water interface test using the marine mussel *Mytilus galloprovincialis* because this species has been used during previous tests. Alternatively, a 28-day *Neanthes arenaceodentata* growth test may be used as the sublethal test in accordance with ASTM E1611-07 and USEPA protocols.

Table C-13. Toxicity Testing Proposed to Evaluate Benthic Sediment Condition

Media	Organism	Taxon	Type of Test	Method
Solid Phase	Amphipod	*Leptocheirus plumulosus*	10-day Acute Survival Test	ASTM E1367-03 and USEPA 1995
Sediment-Water Interface	Mussel	*Mytilus galloprovincialis*	48-Sediment Water Interface Sublethal Development Test	Anderson et al. 1996 and USEPA 1995

False positive sediment toxicity may be determined if naturally high concentrations of ammonia are present in tested sediment samples. The contract laboratory will test ammonia levels in all sediment samples prior to the start of toxicity testing. Toxicity tests will be run as static non-renewal if ammonia concentrations are below test specific criteria, where applicable. If ammonia concentrations are above test-specific criteria, tests may be run as static renewal with no more than two water changes per day; these tests will be initiated after the ammonia concentrations are brought down to levels appropriate for the test species.

Note that MdR Watershed sediment samples collected under the Toxics TMDL CMP in 2013 had ammonia porewater concentrations that did not require ammonia reduction protocols to be initiated.

C.2.4 Analytical Procedures for Sediment Benthic Infaunal Analysis

The benthic infaunal samples will be transported from the field to the laboratory and stored in a formalin solution for a minimum of five days. The samples will then be transferred from formalin to 70% ethanol for laboratory processing. The organisms will initially be sorted using a dissecting microscope into five major phyletic groups (i.e., polychaetes, crustaceans, molluscs, echinoderms, and miscellaneous minor phyla). While sorting, technicians will keep a count for quality control (QC) purposes. After initial sorting, samples will be distributed to qualified taxonomists who will identify each organism to species or to the lowest possible taxon (e.g., use of the Southern California Association of Marine Invertebrate Taxonomists [SCAMIT] Edition 7 for nomenclature and orthography [SCAMIT, 2008], or equivalent).

A quality assurance/quality control (QA/QC) procedure will be performed on each of the sorted samples to ensure a 95% sorting efficiency. A 10% aliquot of a sample will be re-sorted by a senior technician trained in the QA/QC procedure. The number of organisms found in the aliquot will be divided by 10% and added to the total number found in the sample. The original total will be divided by the new total to calculate the percent sorting efficiency. When the sorting efficiency of the sample is below 95%, the remainder of the sample (90%) will be re-sorted.

C.3 Quality Assurance and Quality Control

This section presents a discussion of QA and QC measures for the MdR Watershed CIMP. Field and laboratory QA data will be assessed for accuracy and precision. In addition, the appropriateness of the analytical methods and the achievement of MDLs and MLs by the laboratory will be verified.

C.3.1 Field Measurements

QA/QC for sampling processes begins with proper collection of the samples to minimize the possibility of contamination. Water samples will be collected in laboratory-certified, contaminant-free bottles. Temperature and pH will be measured and recorded using the appropriate calibrated equipment and reviewed immediately using best professional judgment to ensure accurate measurement of parameters. Collected samples will be put on ice and appropriately transported to the processing laboratory.

Field measurements for temperature, DO, specific conductance, turbidity, and pH will be made using an YSI meter, or equivalent, according to manufacturer specifications. Operation of field equipment will be conducted according to manufacturer instructions. Calibrations will be performed and recorded to ensure accurate functionality. Proper storage and maintenance procedures will be followed.

A field log will be completed at each station for each monitoring event. The field data log sheets will include empirical observations of the site and water quality characteristics.

C.3.2 Collection of Quality Control Samples

Samples will be collected in appropriate containers, kept on ice during the sampling event, and placed into coolers along with completed chain-of-custody for transfer to the laboratory. Field crews will ensure that sampling containers are being filled properly and the requirement to avoid contamination of samples at all times is met.

The purpose of a field duplicate sample is to evaluate the precision of samples collected in the field. During reporting, the relative percent difference will be calculated and used to determine precision. The purpose of the field blank sample is to show that no contamination of sample equipment occurred during sample collection. The purpose of a field equipment rinse blank is to demonstrate that targeted parameters are not associated with sampling equipment and that there is no cross-contamination associated with sample processing activities.

QC samples will be collected in accordance with general Surface Water Ambient Monitoring Program (SWAMP) guidelines (see SWAMP Standard Operating Procedures [SOPs] in Attachment C2), which will generally represent 5% of the total samples of the program.

For Permit compliance monitoring, this translates to one field blank and one duplicate sample per year of monitoring during both dry and wet weather monitoring (two sets of field QC samples each year).

For Toxics TMDL compliance monitoring, the following field QC sample sets (one field blank and one duplicate sample) are recommended for water quality sampling:

- **Harbor Receiving Water – Monthly:** Three (3) sets of field QC sample sets per year.
- **Outfalls – Storm Water:** One (1) set of field QC sample sets per year.

For Toxics TMDL compliance monitoring, the following QC sample sets (one duplicate and one equipment rinse blank or field blank) are recommended for sediment sampling:

- **Suspended Sediment:** One (1) QC sample set per year.
- **Sediment Chemistry and Toxicity:** One (1) QC sample set per survey (once per year).
- **Triad Assessment:** One (1) QC sample set per survey (once every five years).

Field QC samples will not be collected in association with tissue sampling.

Bacteria TMDL compliance monitoring is conducted as part of the City of Los Angeles's Regional program. No unique field QC samples will be collected during MdR Watershed compliance monitoring for the Bacteria TMDL.

C.3.3 Laboratory Quality Control

The chemistry, bacteriological, and toxicity analysis of samples will be performed under the guidelines of the QA/QC programs established by the analytical laboratories and their respective quality assurance project plans (QAPPs). These QAPPs vary by laboratory. Objectives for accuracy and precision involve all aspects of the testing process, and may include, but are not limited to the following:

- Methods and SOPs.
- Calibration methods and frequency.
- Data analysis, validation, and reporting.
- Internal QC.
- Preventive maintenance.
- Procedures to ensure data accuracy and completeness.

Results of all laboratory QC analyses will be reported with the final data. Any QC samples that fail to meet the specified QC criteria in the methodology or QAPP will be identified, and the corresponding data will be appropriately qualified in the final report. All QA/QC records for the various testing programs will be kept on file for review by regulatory agency personnel.

C.4 References

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Appendix C1
Field Equipment Lists and Field Forms

The following field equipment lists identify the general types of equipment necessary to complete the CIMP monitoring program. This list is not comprehensive but is intended to provide guidance for planning and preparation for monitoring events.

The following equipment are appropriate for general sample collection activities:

1. Personal protective equipment:
    i. Safety vest (ANSI 107 Class 2 compliant, high visibility)
    ii. Slip-resistant shoes/boots
    iii. Protective eyewear: UV protection; impact resistant
    iv. Life vest (if entering flood channel or operating skiff).
    v. First Aid Kit and portable eyewash bottle with saline solution
    vi. Foaming disinfectant hand cleanser, or equivalent
    vii. Light (when necessary)
    viii. Foul weather gear (when necessary)
    ix. Rain boots (when necessary)

2. Sterile gloves (latex, nitrile, etc.)

3. Site Map and Street Map (GPS-based or Thomas Guide)

4. Chain-of-Custody

5. Field Forms (multiple copies of all forms that apply, or electronic interface)
    i. Chain-of-Custody
    ii. Bacteria TMDL Field Forms
    iii. MdR Watershed CIMP Field Form
    iii. Flow Assessment Form(s) (when necessary)

6. Water-safe pen and Lab marker (black or blue)

7. Waterproof labels

8. Ice chest with ice (for samples)

9. Bottle Kits (provided by contract laboratory, based on monitoring program)
    i. Sample Bottle Kits (sufficient for sampling plus 1-2 extra sets in case of error)
    ii. Quality Control Sample Bottle Kits – Field Blanks and Duplicates

10. Wash bottle filled with de-ionized water

11. Paper towels

12. Trash bag

13. Cell phones (1 per person)

14. GPS (with differential correction capability, preferred)

15. Camera (water proof, recommended)

Additional sampling equipment necessary for water quality sampling:

H20-1. Sampling pole with weighted bottle holder, bucket, or equivalent

H20-2. Skiff with motor or oars (when necessary)

H20-3. Multiparameter Sonde with sensors capable of reading field paramters (pH, Dissolved Oxygen, temperature, specific conductivity)

Additional sampling equipment necessary for sediment sampling:

SED-1. Boat

SED-2. Van-veen or equivalent (1-m^2 or larger recommended)

SED-3. Benthic sampling equipment (Triad Monitoring for SQOs)

Additional sampling equipment necessary for fish tissue sampling (trawls):

FISH-1. Boat

FISH-2. Trawl equipment (in order of priority)

1) Otter trawl with a 7.6-m headrope, 2.5-cm mesh, and 1.3-cm mesh cod end liner. (preferred trawl method).
2) Lampara - a semi-pursing, round-haul net, having a cork line of approximately 273 m and a depth of 36 m. The net consists of two full-cut wings (100-m length each; 15-cm stretch mesh), a throat or apron with 5-cm mesh, and a sack or bag of 0.9-cm mesh. The net is set in a circle or ellipse and drawn closed at the bottom during retrieval onto the boat. The lampara net is highly effective for collecting two of the three target species (White Croaker and Queenfish).
3) Gill net - 50-m flat panel monofilament net with varying mesh sizes. The net has a float line and lead line so it will sit vertically in the water column, either weighted to capture demersal species or floated to capture pelagic species.

Additional sampling equipment necessary for mussel tissue sampling (transplanted mussels):

MUSSEL-1. Vexar Cages or Equivalent – 1 per station

MUSSEL-2. Live mussels from an uncontaminated source (35-50 per cage)

MUSSEL-3. Anchoring equipment (site-specific)

This appendix contains the following field forms:

Chain-of-Custody Form(s)
A chain-of-custody form is to be completed for each sampling event. The form should be prepared prior to leaving to the field. At each sampling station, the sampler enters his/her initials, along with time of collection. The original chain-of-custody form is to follow the samples at all times. The sampler must sign and date the chain-of-custody form when relinquishing the sample to the Laboratory who in turn, signs the form to indicate receipt of the sample. A copy of the chain-of-custody form is given to the sampling staff, and the laboratory retains the original, along with the samples to be analyzed. An example of a chain-of-custody form has been provided. An equivalent form may be used.

Field Log Sheets
Field Log forms are for recording details about each sampling event (including Date, time, locations, method of sampling (automated or manual), comments), and is retained by the sampling staff. The form is to be prepared before leaving to the field, and the appropriate information is filled out after each sample is collected. Field Forms include:

- MdR Watershed CIMP Field Form
- Manual Flow Assessment – Float Method Form
- Manual Flow Assessment – Direct Measurement Form
- Bacteria TMDL Field Forms (from Bacteria TMDL CMP)

FOR REFERENCE ONLY

Date:

Department of Public Works
Bureau of Sanitation
Environmental Monitoring Division

Sample Chain of Custody

EMD
LIMS #: ______

EMD Sample ID: ______
Project Name: ______

Sampling Information:
Sampling Agency: ______ Sampling Program: ______
Agency Sample ID#: ______
Phone Number: ______
Fax Number: ______ Purpose of program: ______
Contact Person: ______
email address: ______
Report Time Frame: ______
Sampler's Name: ______
Sampler's Title ______

Sampler's Signature: ______

Witness: Name ______ Sample Date: ______
Title ______
Sampling Time: ______
Name ______
Title ______

Sample Location: ______ Sampling Address: ______

Requested Analysis: Metals: ☐ Micro Biological: ☐
Organics: ☐ Toxicity: ☐
Conventional Chemistry: ☐ Air Testing: ☐
See back of page for specifics analyses

Sample Notification:

Toxicity: ______ Date: ______
PC: ______ Date: ______
Metals: ______ Date: ______
Wet: ______ Date: ______
Semi-Vol: ______ Date: ______
Micro: ______ Date: ______
Volatile: ______ Date: ______

Current Holder Name	Signature	Title	Received Date	Received Time	Released Date

Analysis to be performed on the Sample(s):

EMD
LIMS #: ____________________

	Locator:	Collection Time:		Locator:	Collection Time:
-1	______	______	-6	______	______
-2	______	______	-7	______	______
-3	______	______	-8	______	______
-4	______	______	-9	______	______
-5	______	______	-10	______	______

Sample Information: Liquid: ☐ Solid: ☐ Other: ☐ Temperature ______
Grab ☐ Composite: ☐
Start time: ______ Finish time: ______ pH ______
Container: Glass Size: ______ Color: ______ Number: ______
Plastic Size: ______ Color: ______ Number: ______ Residual Cl2 ______
Preservative ☐ Number of samples: ☐

Metals:

☐ Ag ☐ Cu ☐ Pb ☐ Other: ______
☐ Al ☐ Fe ☐ Sb
☐ As ☐ Hg ☐ Se
☐ Ba ☐ K ☐ Sn
☐ Be ☐ Mg ☐ Sr ☐ Total
85 ☐ Ca ☐ Mn ☐ Tl ☐ Dissolved
☐ Cd ☐ Mo ☐ V
☐ Co ☐ Na ☐ Zn
☐ Cr ☐ Ni

Organics:

☐ VOC ☐ Pesticides/PCB ☐ Clopyralid ☐ Air VOC
☐ BNA ☐ Dioxin - screen ☐ Dioxin - low resolution ☐ Fixed Gases
☐ TOX ☐ Other: ______ ☐ Dioxin - high resolution ☐ GC Sulfur
☐ Herbicides ☐ Tributyltin ☐ Siloxanes

Conventional Chemical:

☐ Alkalinity ☐ MBAS ☐ Solids:
☐ BOD ☐ Nitrogen: ☐ Total Solids
☐ Boron ☐ Ammonia Nitrogen ☐ Total Dissolved Solids
☐ Chloride ☐ Nitrate-N ☐ Total Suspended Solids
☐ COD ☐ Nitrite-N ☐ Settleable Solids
☐ Conductivity ☐ Organic-N ☐ Volatile Suspended Solids
☐ Cyanide (Free) ☐ Kjeldahl Nitrogen ☐ Volatile Total Solids
☐ Cyanide (Total) ☐ Oil & Grease ☐ Sulfates
☐ Flashpoint ☐ pH ☐ Sulfides, Total
☐ Fluoride ☐ Phenols ☐ Sulfides, Dissolved
☐ Grain Size ☐ Phosphate, Total ☐ Thiosulfate
☐ Hardness ☐ Phosphate, Dissolved ☐ TOC
☐ Hexavalent Chromium ☐ Radioactivity ☐ Turbidity
☐ H_2S ☐ Salinity ☐ Other:

Biological:

☐ Total Coliform ☐ Salmonella ☐ Other: ______
☐ Fecal Coliform ☐ Acute Toxicity (Fresh water) ______
☐ E. coli ☐ Chronic Toxicity (Sea water)
☐ Enterococcus ☐ Chronic Toxicity (Fresh water)

Remarks: ____________________

MANUAL SAMPLING - FLOW ESTIMATES (DIRECT VOLUME MEAUSREMENT)

Station I.D.:

Date:

Sample I.D:

Sample □	Time of Measurement	Volume Container Filled[1]	Time to Fill Botle (seconds)	Estimated Q (cfs)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

[1] Please don't forget to record units.

Conversion Factors

1 US gallon = 0.133 cubic feet

1 Liter = 0.035 cubic feet

SAMPLE VOLUME PROPORTIONS - MANUAL SAMPLING

Bottle No.	Flow (CFS)	Proportion	Rounded	Volume (Gal.)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
			Total Volume:	

Highest Flow:

Each bottle is _____________ gallons

*Proportion % to be calculated after last sample is taken so that peak flow value can be identified and used in the calculations

Proportion = Q from Bottle X / max Q of all samples collected

MdR Watershed
FIELD OBSERVATIONS AND TESTING LOG SHEET

PROJECT/SURVEY NAME	**STATION ID**	**STATION NAME**
DATE	**TIME**	**TYPE OF SAMPLING** □ WATER - STORMWATER □ SEDIMENT □ FISH TISSUE
FIELD TEAM	**RECORDER**	□ SQO □ WATER - NON-STORMWATER □ STORMBORNE SEDIMENT □ MUSSEL TISSUE

MONITORING PERIOD ☐ SUMMER DRY ☐ WINTER DRY ☐ WET WEATHER		**RAINFALL AMOUNT (POST-STORM)**
TIDE (MLLW, FEET)	**WATER DEPTH (FT)**	**TIDE (MLLW, FEET) = WATER DEPTH - TIDE**
WEATHER CONDITIONS ☐ CLEAR ☐ CLOUDY ☐ FOGGY ☐ DRIZZLING ☐ RAINY		

SURFACE WATER APPEARANCE	**ODOR**	☐ SEWAGE ☐ OIL ☐ CHEMICAL ☐ MARINE ☐ OTHER
	COLOR	☐ COLORLESS ☐ BROWN ☐ YELLOW ☐ GREEN ☐ RED ☐ OTHER
	FLOATING MATERIALS (ALL THAT APPLY)	☐ NONE ☐ SUDS/FOAM (SOME) ☐ SUDS/FOAM (HEAVY) ☐ SCUM ☐ ALGAE ☐ OILY SHEEN ☐ ORGANIC MATERIAL ☐ OTHER (DESCRIBE)
	TRASH	☐ NONE ☐ PLASTIC (CUPS, BOTTLES, BAGS) ☐ PAPER ☐ WRAPPERS ☐ OTHER (DESCRIBE)
	TRASH OBSERVATIONS:	
	TURBIDITY	☐ CLEAR ☐ CLOUDY ☐ HEAVY CLOUDINESS, OPAQUE
FLOW	☐ FLOW METER PRESENT ☐ MANUAL ☐ FLOW NOT APPLICABLE	**NOTES**

QA/QC SAMPLES: ☐ FIELD DUPLICATE ☐ FIELD BLANK ☐ EQUIPMENT RINSE BLANK ☐ NO QC SAMPLES COLLECTED

TYPE OF GRAB □ WATER □ SEDIMENT □ STORM-BORNE SEDIMENT	**GRAB COLLECTION TIME:**	**SAMPLE DEPTH (from surface)**	**NOTES:**
TYPE OF GRAB □ WATER □ SEDIMENT □ STORM-BORNE SEDIMENT	**GRAB COLLECTION TIME:**	**SAMPLE DEPTH (from surface)**	**NOTES:**

FIELD MEASUREMENTS (Take measurements in duplicate)	pH	TEMP (degree C)	CONDUCTIVITY (uS/cm)	DISSOLVED OXYGEN	TURBIDITY
	pH	TEMP (degree C)	CONDUCTIVITY (uS/cm)	DISSOLVED OXYGEN	TURBIDITY

SAMPLING ACTIVITIES (DESCRIBE ALL ACTIONS TAKEN AT EACH SITE VISIT AND PROVIDE ADDITIONAL COMMENTS AS NECESSARY)

IF WATER SAMPLE USING AUTOMATED SAMPLING EQUIPMENT, RECORD LAST SAMPLE TIME FOR EACH BOTTLE

BOTTLE 1 ______________ BOTTLE 2 ______________ BOTTLE 3 ______________ BOTTLE 4 ______________

PRE/POST STORM TRASH PHOSTOS TAKEN: ☐ YES ☐ NO ☐ NOT APPLICABLE

PHOTOS TAKEN: ☐ YES ☐ NO

PHOTO NUMBERS AND NOTES: ______________________________

TEAM LEADER'S SIGNATURE ______________________________

FLOW ESTIMATES - MANUAL SAMPLING

Velocity Calculations worksheet (Float Method)

Use only 3 of the 4 recorded times when calculating, discard one outlier.

Velocity Calculations			record avg. width and depth below		Velocity Calculations			record avg. width and depth below	
Site I.D:		Bottle #: **1**			Site I.D:		Bottle #: **1**		
	Dist(ft)	Time (sec)	Width(ft)	depth(in.)		Dist(ft)	Time (sec)	Width(ft)	depth(in.)
1st Run					1st Run				
2nd Run					2nd Run				
3rd Run					3rd Run				
4th Run					4th Run				
V= Dist(ft)/Time(sec):					V= Dist(ft)/Time(sec):				

Velocity Calculations			record avg. width and depth below		Velocity Calculations			record avg. width and depth below	
Site I.D:		Bottle #: **1**			Site I.D:		Bottle #: **1**		
	Dist(ft)	Time (sec)	Width(ft)	depth(in.)		Dist(ft)	Time (sec)	Width(ft)	depth(in.)
1st Run					1st Run				
2nd Run					2nd Run				
3rd Run					3rd Run				
4th Run					4th Run				
V= Dist(ft)/Time(sec):					V= Dist(ft)/Time(sec):				

Velocity Calculations			record avg. width and depth below		Velocity Calculations			record avg. width and depth below	
Site I.D:		Bottle #: **1**			Site I.D:		Bottle #: **1**		
	Dist(ft)	Time (sec)	Width(ft)	depth(in.)		Dist(ft)	Time (sec)	Width(ft)	depth(in.)
1st Run					1st Run				
2nd Run					2nd Run				
3rd Run					3rd Run				
4th Run					4th Run				
V= Dist(ft)/Time(sec):					V= Dist(ft)/Time(sec):				

Velocity Calculations			record avg. width and depth below		Velocity Calculations			record avg. width and depth below	
Site I.D:		Bottle #: **1**			Site I.D:		Bottle #: **1**		
	Dist(ft)	Time (sec)	Width(ft)	depth(in.)		Dist(ft)	Time (sec)	Width(ft)	depth(in.)
1st Run					1st Run				
2nd Run					2nd Run				
3rd Run					3rd Run				
4th Run					4th Run				
V= Dist(ft)/Time(sec):					V= Dist(ft)/Time(sec):				

Velocity Calculations			record avg. width and depth below		Velocity Calculations			record avg. width and depth below	
Site I.D:		Bottle #: **1**			Site I.D:		Bottle #: **1**		
	Dist(ft)	Time (sec)	Width(ft)	depth(in.)		Dist(ft)	Time (sec)	Width(ft)	depth(in.)
1st Run					1st Run				
2nd Run					2nd Run				
3rd Run					3rd Run				
4th Run					4th Run				
V= Dist(ft)/Time(sec):					V= Dist(ft)/Time(sec):				

MANUAL SAMPLING - FLOW ESTIMATES (FLOAT METHOD)

Station I.D.:

Date:

Sample I.D:

		See Page 1				
Sample □	**Time**	**Avg Width (ft)**	**Avg Depth (in)[1]**	**Estimated Velocity (fps)**	**Float Factor**	**Estimated Q (cfs)**
1					0.85	
2					0.85	
3					0.85	
4					0.85	
5					0.85	
6					0.85	
7					0.85	
8					0.85	
9					0.85	
10					0.85	

[1] Please don't forget to convert avg depth to ft by dividing by 12

Q=0.85xWx(D/12)xVEL

SAMPLE VOLUME PROPORTIONS - MANUAL SAMPLING

Bottle No.	**Flow (CFS)**	**Proportion□**	**Rounded**	**Volume (Gal.)**
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
			Total Volume:	

Highest Flow:

Each bottle is _____________ gallons

*Proportion % to be calculated after last sample is taken so that peak flow value can be identified and used in the calculations

Proportion = Q from Bottle X / max Q of all samples collected

DATE (Day/Month/Year): SAMPLER NAME AND INITIAL: HTP LOGIN #:

STATION ID	POINT ZERO SITES																				STATION ID	OPEN BEACH/BASINS				
SAMPLE TIME																					SAMPLE TIME					
Beach Refuse																					Beach Refuse					
Ocean Debris																					Ocean Debris					
Seaweed																					Seaweed					
Tar																					Tar					
Rubber / Plastic Goods																					Rubber / Plastic Goods					
Plankton Color																					Plankton Color					
Dead Marine																					Dead Marine					
Sewage Grease																					Sewage Grease					
Sewage Susp. Solids																					Sewage Susp. Solids					
Odor																					Odor					
Oil																					Oil					
Foam																					Foam					
Bathers																					Bathers					
Animals / Birds																					Animals / Birds					
Storm Drain Flow																					Storm Drain Flow					
Storm Drain Position																					Storm Drain Position					
Tide Height□																					Tide Height□					
Reached Surf																					Reached Surf					
Reverse Flow																					Reverse Flow					
Conductivity (Reverse Flow only)																					Conductivity (Reverse Flow only)					

CODE	0	1	2	3	4	5	6	7
Reverse Flow	NO	YES						
Reached Surf	NO	YES						
Storm Drain Position	Buried in Sand	Submerged (Not Sampled)						
Storm Drain Flow	Dry	Ponded	Low Flow (garden Hose)	Medium flow (between 2 and 4)	Heavy flow (Fire Hose)			
Plankton Color		Brown	Green	Red	Yellow	Blue-Green		
Dead Marine		Fish	Jellyfish	Seal	Dolphin	Bird	Whale	Crab
Odor		Sewage	Oil	Chemical	Marine			
Foam		Some	Heavy					
Animals / Birds or Bathers (50 yards each direction)		1 to 5	5 to 10	10 to 20	20 to 50	50 to 100	> 100	

NOTE: DO NOT PUT YOURSELF AT RISK IN ORDER TO COMPLETE THIS FORM

□BASED ON TIDE CHART

COMMENTS:

Example of Accelerated Field Observation Sheets

WEDNESDAY (accelerated)

DATE:____

SAMPLER NAME AND INITIAL:________________________________

HTP LOGIN #:____

STATION ID								
SAMPLE TIME								
Beach Refuse								
Ocean Debris								
Seaweed								
Tar								
Rubber / Plastic								
Plankton Color								
Dead Marine								
Sewage Grease								
Sewage Susp. Solids								
Odor								
Oil								
Foam								
Bathers								
Animals / Birds								
Storm Drain Flow								
Storm Drain Position								
Tide Height□								
Reached Surf								
Reverse Flow								
Conductivity (Reverse Flow only)								

FRIDAY (accelerated)

DATE:____

SAMPLER NAME AND INITIAL:________________________________

HTP LOGIN #:____

STATION ID								
SAMPLE TIME								
Beach Refuse								
Ocean Debris								
Seaweed								
Tar								
Rubber / Plastic								
Plankton Color								
Dead Marine								
Sewage Grease								
Sewage Susp. Solids								
Odor								
Oil								
Foam								
Bathers								
Animals / Birds								
Storm Drain Flow								
Storm Drain Position								
Tide Height□								
Reached Surf								
Reverse Flow								
Conductivity (Reverse Flow only)								

	WEATHER - MdRH BEACH		
	MON	WED	FRI
DATE			
SAMPLER			
Weather			
Wind Direction			
Wind Speed			
Sea Conditions			
Air Temp			
Surf Temp			
Wave Height			

CODE	1	2	3	4	5	6	7	8
WEATHER	Fair	Cloudy	Fog	Rain	P-Cldy	Hazy	Overcast	
SEA	Calm	Chop	Waves					
WIND DIRECTION	N	NE	E	SE	S	SW	W	NW

□BASED FROM THE TIDE CHART

COMMENTS:

APPENDIX C-2
SWAMP SOP

Conventional Parameters in Fresh and Marine Water

A list of parameters included in this category may be found in the associated QAPrPTableReference.

Terms appearing in the tables are defined in the *Surface Water Ambient Monitoring Program Quality Assurance Program Plan*, which contains a glossary (Appendix E), as well as a list of abbreviations and acronyms (Appendix F).

Table 1: Quality Control: Conventional Parameters in Fresh and Marine Water

Laboratory Quality Control	Frequency of Analysis	Measurement Quality Objective
Calibration Standard	Per analytical method or manufacturer's specifications	Per analytical method or manufacturer's specifications
Calibration Verification	Per 10 analytical runs	80-120% recovery
Laboratory Blank	Per 20 samples or per analytical batch, whichever is more frequent	<RL for target analyte
Reference Material	Per 20 samples or per analytical batch, whichever is more frequent	80-120% recovery
Matrix Spike	Per 20 samples or per analytical batch, whichever is more frequent (n/a for chlorophyll a and pheophytin a)	80-120% recovery
Matrix Spike Duplicate	Per 20 samples or per analytical batch, whichever is more frequent (n/a for chlorophyll a and pheophytin a)	80-120% recovery; RPD<25% for duplicates
Laboratory Duplicate	Per 20 samples or per analytical batch, whichever is more frequent (chlorophyll a/pheophytin a: per method)	RPD<25% (n/a if native concentration of either sample<RL)
Internal Standard	Accompanying every analytical run as method appropriate	Per method
Field Quality Control	**Frequency of Analysis**	**Measurement Quality Objective**
Field Duplicate[2]	5% of total project sample count	RPD<25% (n/a if native concentration of either sample<RL)
Field Blank, Travel Blank, Equipment Blank	Per method	<RL for target analyte

[1] Unless method specifies more stringent requirements

[2] Field duplicate relative percent differences are not calculated for chlorophyll a analyses for bioassessment

Table 2: Sample Handling: Conventional Parameters in Fresh and Marine Water

Analyte	Recommended Container[1]	Recommended Preservation[2,3]	Required Holding Time[4]
Alkalinity (as $CaCO_3$)[5]	P	Cool to ≤6 ˚C	14 days
Biochemical Oxygen Demand	P	Cool to ≤6 ˚C; add 1 g FAS crystals per liter if residual chlorine is present	48 hours
Chemical Oxygen Demand (Titrametric)	G	Cool to ≤6 ˚C; H_2SO_4 to pH<2	28 days; biologically active samples should be tested as soon as possible
Chloride	P	None required	28 days
Chlorophyll a Pheophytin a	Per method	Centrifuge or filter as soon as possible after collection; if processing must be delayed, keep samples on ice or at ≤6 ˚C; store in the dark	Samples must be frozen or analyzed within 4 hours of collection; filters can be stored frozen for 28 days
Cyanide (Total)	P	Cool to ≤6 ˚C; NaOH to pH>10; add 0.6 g $C_6H_8O_6$ if residual chlorine is present	14 days
Fluoride	P	None required	28 days
Hardness (as $CaCO_3$)	P	Cool to ≤6 ˚C; HNO_3 or H_2SO_4 to pH<2	6 months
Oil and Grease	G	Cool to ≤6 ˚C; HNO_3 or H_2SO_4 to pH<2	28 days
Organic Carbon (Dissolved)	G	Filter and preserve to pH<2 within 48 hours of collection; cool to ≤6 ˚C	28 days
Organic Carbon (Total)	G	Cool to ≤6 ◦C; acidify to pH<2 with HCl, H_3PO_4, or H_2SO_4 within 2 hrs	28 days
Perchlorate	P, G	Protect from temperature extremes	28 days
Phenols[6]	G	Cool to ≤6 ˚C; H_2SO_4 to pH<2	28 days
Silica	P	Cool to ≤6 ˚C; HNO_3 to pH<2	28 days; 6 months if acidified
Specific Conductance	P	Cool to ≤6 ˚C; if analysis is not completed within 24 hours of sample collection, sample should be filtered through a 0.45 micron filter and stored at ≤6 °C	28 days
Sulfate	P	Cool to ≤6 ˚C	28 days
Turbidity	P	Cool to ≤6 ˚C	48 hours

[1] "P" is polyethylene; "G" is glass

[2] Per the draft *National Coastal Assessment Quality Assurance Project Plan* (August 2009), marine waters in plastic containers may be ultra-frozen to ≤-50 ˚C for a maximum of six months.

[3] Per 40 CFR 136.3, aqueous samples must be preserved at ≤6 °C, and should not be frozen unless data demonstrating that sample freezing does not adversely impact sample integrity is maintained on file and accepted as valid by the regulatory authority. The preservation temperature does not apply to samples that are analyzed immediately (less than 15 minutes).

[4] Each "Required Holding Time" is based on the assumption that the "Recommended Preservation" (or a method-mandated alternative) has been employed. If a "Required Holding Time" for filtration, preservation, preparation, or analysis is not met, the project manager and SWAMP Quality Assurance Officer must be notified. Regardless of preservation technique, data not meeting the "Required Holding Time" will be appropriately flagged in the SWAMP database.

[5] Marine samples for alkalinity (as $CaCO_3$) may be cooled to ≤6 ˚C for a maximum of 24 hours.

[6] This table applies to phenols analysis using colorimetry. Guidelines for the chromatographic analysis of phenols are located in *Synthetic Organic Compounds in Water* Table 4*: Sample Handling.*

Table 3: Recommended Corrective Action: Conventional Parameters in Fresh and Marine Water

Laboratory Quality Control	Recommended Corrective Action
Calibration Standard	Recalibrate the instrument. Affected samples and associated quality control must be reanalyzed following successful instrument recalibration.
Calibration Verification	Reanalyze the calibration verification to confirm the result. If the problem continues, halt analysis and investigate the source of the instrument drift. The analyst should determine if the instrument must be recalibrated before the analysis can continue. All of the samples not bracketed by acceptable calibration verification must be reanalyzed.
Laboratory Blank	Reanalyze the blank to confirm the result. Investigate the source of contamination. If the source of the contamination is isolated to the sample preparation, the entire batch of samples, along with the new laboratory blanks and associated QC samples, should be prepared and/or re-extracted and analyzed. If the source of contamination is isolated to the analysis procedures, reanalyze the entire batch of samples. If reanalysis is not possible, the associated sample results must be flagged to indicate the potential presence of contamination.
Reference Material	Reanalyze the reference material to confirm the result. Compare this to the matrix spike/matrix spike duplicate recovery data. If adverse trends are noted, reprocess all of the samples associated with the batch.
Matrix Spike	The spiking level should be near the midrange of the calibration curve or at a level that does not require sample dilution. Reanalyze the matrix spike to confirm the result. Review the recovery obtained for the matrix spike duplicate. Review the results of the other QC samples (such as reference materials) to determine if other analytical problems are a potential source of the poor spike recovery.
Matrix Spike Duplicate	The spiking level should be near the midrange of the calibration curve or at a level that does not require sample dilution. Reanalyze the matrix spike duplicate to confirm the result. Review the recovery obtained for the matrix spike. Review the results of the other QC samples (such as reference materials) to determine if other analytical problems are a potential source of the poor spike recovery.
Laboratory Duplicate	Reanalyze the duplicate samples to confirm the results. Visually inspect the samples to determine if a high RPD between the results could be attributed to sample heterogeneity. For duplicate results due to matrix heterogeneity, or where ambient concentrations are below the reporting limit, qualify the results and document the heterogeneity.
Internal Standard	Check the response of the internal standards. If the instrument continues to generate poor results, terminate the analytical run and investigate the cause of the instrument drift.
Field Quality Control	**Recommended Corrective Action**
Field Duplicate	Visually inspect the samples to determine if a high RPD between results could be attributed to sample heterogeneity. For duplicate results due to matrix heterogeneity, or where ambient concentrations are below the reporting limit, qualify the results and document the heterogeneity. All failures should be communicated to the project coordinator, who in turn will follow the process detailed in the method.
Field Blank, Travel Blank, Equipment Blank	Investigate the source of contamination. Potential sources of contamination include sampling equipment, protocols, and handling. The laboratory should report evidence of field contamination as soon as possible so corrective actions can be implemented. Samples collected in the presence of field contamination should be flagged.

Inorganic Analytes in Fresh and Marine Water

A list of analytes included in this category may be found in the associated QAPrPTableReference.

Terms appearing in the tables are defined in the *Surface Water Ambient Monitoring Program Quality Assurance Program Plan*, which contains a glossary (Appendix E), as well as a list of abbreviations and acronyms (Appendix F).

Table 1: Quality Control[1]: Inorganic Analytes in Fresh and Marine Water

Laboratory Quality Control	Frequency of Analysis	Measurement Quality Objective
Calibration Standard	Per analytical method or manufacturer's specifications	Per analytical method or manufacturer's specifications
Calibration Verification	Per 10 analytical runs	80-120% recovery
Laboratory Blank	Per 20 samples or per analytical batch, whichever is more frequent	<RL for target analyte
Reference Material[2]	Per 20 samples or per analytical batch, whichever is more frequent	75-125% recovery (70-130% for MMHg)
Matrix Spike	Per 20 samples or per analytical batch, whichever is more frequent	75-125% recovery (70-130% for MMHg)
Matrix Spike Duplicate	Per 20 samples or per analytical batch, whichever is more frequent	75-125% recovery (70-130% for MMHg); RPD<25%
Laboratory Duplicate	Per 20 samples or per analytical batch, whichever is more frequent	RPD<25% (n/a if native concentration of either sample<RL)
Internal Standard	Accompanying every analytical run when method appropriate	60-125% recovery
Field Quality Control	**Frequency of Analysis**	**Measurement Quality Objective**
Field Duplicate	5% of total project sample count	RPD<25% (n/a if native concentration of either sample<RL), unless otherwise specified by method
Field Blank, Equipment Blank	Per method	Blanks<RL for target analyte

[1] Unless method specifies more stringent requirements

[2] Not applicable to selenium speciation

Table 2: Sample Handling: Inorganic Analytes in Fresh and Marine Water

Analyte	Recommended Container[1]	Recommended Preservation[2,3]	Required Holding Time[4]
Hexavalent Chromium (Filtered)	P, G	Cool to ≤6 ˚C, pH 9.3 – 9.7 within 24 hours	28 days at ≤6 ˚C[5]
Mercury (Dissolved)	G, PA	Filter and preserve with 0.5% v:v pre-tested 5% BrCl or 12N HCl within 48 hours	90 days at room temperature following acidiciaftion
Mercury (Total)	G, PA	Preserve with 0.5% v:v pre-tested 5% BrCl or 12N HCl within 48 hours	90 days at room temperature following acidification
Methylmercury (Dissolved)[6]	G, PA	Immediately after collection, cool to ≤6 ˚C in the dark; filter and acidify to 0.5% with pre-tested HCl within 48 hours; if salinity is >0.5 ppt, acidify with H_2SO_4	6 months at to ≤6 ˚C in the dark following acidification
Methylmercury (Total)[6]	G, PA	Immediately after collection, cool to ≤6 ˚C in the dark; acidify to 0.5% with pre-tested HCl within 48 hours; if salinity is >0.5 ppt, acidify with H_2SO_4	6 months at to ≤6 ˚C in the dark following acidification
Selenium Speciation[7]	P	Filter and preserve with 0.4% HCl within 15 minutes of collection; maintain collection temperature as best as possible	6 months
Trace Metals[8] (Dissolved)	P	Filter within 15 minutes of collection; HNO_3 to pH<2 within 48 hours and at least 24 hours prior to analysis	6 months at room temperature following acidification
Trace Metals[8] (Total)	P	HNO_3 to pH<2 within 48 hours and at least 24 hours prior to analysis	6 months at room temperature following acidification

[1] "P" is polyethylene; "G" is glass; "PA" is any plastic that is made of a sterilizable material (polypropylene or other autoclavable plastic)

[2] Per 40 CFR 136.3, aqueous samples must be preserved at ≤6 °C, and should not be frozen unless data demonstrating that sample freezing does not adversely impact sample integrity is maintained on file and accepted as valid by the regulatory authority. The preservation temperature does not apply to samples that are analyzed immediately (within 15 minutes).

[3] Per 40 CFR 136.3, an aqueous sample may be collected and shipped without acid preservation. However, acid must be added at least 24 hours before analysis to dissolve any metals that adsorb to the container walls. If the sample must be analyzed within 24 hours of collection, add the acid immediately.

[4] Each "Required Holding Time" is based on the assumption that the "Recommended Preservation" (or a method-mandated alternative) has been employed. If a "Required Holding Time" for filtration, preservation, preparation, or analysis is not met, the project manager and SWAMP Quality Assurance Officer must be notified. Regardless of preservation technique, data not meeting the "Required Holding Time" will be appropriately flagged in the SWAMP database.

[5] If the analytical method doesn't include preservation, analysis must occur within 24 hours.

[6] Methylmercury samples may be shipped to the laboratory unpreserved if they are collected in fluoropolymer bottles, filled to the top with no head space, capped tightly, and maintained at ≤6 °C from the time of collection until preservation. The samples must be acid-preserved within 48 hours of sampling.

[7] Including the species selenite, selenate, and selenocyanate

[8] With the exception of mercury, methylmercury, hexavalent chromium, and selenium speciation

Table 3: Recommended Corrective Action: Inorganic Analytes in Fresh and Marine Water

Laboratory Quality Control	Recommended Corrective Action
Calibration Standard	Recalibrate the instrument. Affected samples and associated quality control must be reanalyzed following successful instrument recalibration.
Calibration Verification	Reanalyze the calibration verification to confirm the result. If the problem continues, halt analysis and investigate the source of the instrument drift. The analyst should determine if the instrument must be recalibrated before the analysis can continue. All of the samples not bracketed by acceptable calibration verification must be reanalyzed.
Laboratory Blank	Reanalyze the blank to confirm the result. Investigate the source of contamination. If the source of the contamination is isolated to the sample preparation, the entire batch of samples, along with the new laboratory blanks and associated QC samples, should be prepared and/or re-extracted and analyzed. If the source of contamination is isolated to the analysis procedures, reanalyze the entire batch of samples. If reanalysis is not possible, the associated sample results must be flagged to indicate the potential presence of the contamination.
Reference Material	Reanalyze the reference material to confirm the result. Compare this to the matrix spike/matrix spike duplicate recovery data. If adverse trends are noted, reprocess all of the samples associated with the batch.
Matrix Spike	The spiking level should be near the midrange of the calibration curve or at a level that does not require sample dilution. Reanalyze the matrix spike to confirm the result. Review the recovery obtained for the matrix spike duplicate. Review the results of the other QC samples (such as reference materials) to determine if other analytical problems are a potential source of the poor spike recovery.
Matrix Spike Duplicate	The spiking level should be near the midrange of the calibration curve or at a level that does not require sample dilution. Reanalyze the matrix spike duplicate to confirm the result. Review the recovery obtained for the matrix spike. Review the results of the other QC samples (such as reference materials) to determine if other analytical problems are a potential source of the poor spike recovery.
Laboratory Duplicate	Reanalyze the duplicate samples to confirm the results. Visually inspect the samples to determine if a high RPD between the results could be attributed to sample heterogeneity. For duplicate results due to matrix heterogeneity, or where ambient concentrations are below the reporting limit, qualify the results and document the heterogeneity.
Internal Standard	Check the response of the internal standards. If the instrument continues to generate poor results, terminate the analytical run and investigate the cause of the instrument drift.
Field Quality Control	**Recommended Corrective Action**
Field Duplicate	Visually inspect the samples to determine if a high RPD between results could be attributed to sample heterogeneity. For duplicate results due to matrix heterogeneity, or where ambient concentrations are below the reporting limit, qualify the results and document the heterogeneity. All failures should be communicated to the project coordinator, who in turn will follow the process detailed in the method.
Field Blank, Equipment Blank	Investigate the source of contamination. Potential sources of contamination include sampling equipment, protocols, and handling. The laboratory should report evidence of field contamination as soon as possible so corrective actions can be implemented. Samples collected in the presence of field contamination should be flagged.

Nutrients in Fresh and Marine Water

A list of analytes included in this category may be found in the associated QAPrPTableReference.

Terms appearing in the tables are defined in the *Surface Water Ambient Monitoring Program Quality Assurance Program Plan*, which contains a glossary (Appendix E), as well as a list of abbreviations and acronyms (Appendix F).

Table 1: Quality Control[1]: Nutrients in Fresh and Marine Water

Laboratory Quality Control	Frequency of Analysis	Measurement Quality Objective
Calibration Standard	Per analytical method or manufacturer's specifications	Per analytical method or manufacturer's specifications
Calibration Verification	Per 10 analytical runs	90-110% recovery
Laboratory Blank	Per 20 samples or per analytical batch, whichever is more frequent	<RL for target analyte
Reference Material	Per 20 samples or per analytical batch, whichever is more frequent	90-110% recovery
Matrix Spike	Per 20 samples or per analytical batch, whichever is more frequent	80-120% recovery
Matrix Spike Duplicate	Per 20 samples or per analytical batch, whichever is more frequent	80-120% recovery RPD<25% for duplicates
Laboratory Duplicate	Per 20 samples or per analytical batch, whichever is more frequent	RPD<25% (n/a if native concentration of either sample<RL)
Field Quality Control	**Frequency of Analysis**	**Measurement Quality Objective**
Field Duplicate	5% of total project sample count	RPD<25% (n/a if native concentration of either sample<RL)
Field Blank, Travel Blank, Equipment Blank	Per method	<RL for target analyte

[1] Unless method specifies more stringent requirements

Table 2: Sample Handling: Nutrients in Fresh and Marine Water

Analyte	Recommended Container[1]	Recommended Preservation[2]	Required Holding Time[3]
Ammonia **(as N)**	P	Cool to ≤6 ˚C; samples may be preserved with 2 mL of H_2SO_4 per L	48 hours; 28 days if acidified
Kjeldahl Nitrogen **(Total)**	P	Cool to ≤6 ˚C; H_2SO_4 to pH<2	7 days; 28 days if acidified
Nitrate **(as N)**	P	Cool to ≤6 ˚C	48 hours (unless calculated from nitrate + nitrite (as N) and nitrite (as N) analyses)
Nitrate + Nitrite **(as N)**	P	Cool to ≤6 ˚C; H_2SO_4 to pH<2	48 hours; 28 days if acidified
Nitrite **(as N)**	P	Cool to ≤6 ˚C	48 hours
Nitrogen **(Total)**	P	Cool to ≤6 ˚C; H_2SO_4 to pH <2	28 days
Orthophosphate **(Dissolved, as P; *Soluble Reactive Phosphorus*)**	P	Filter within 15 minutes of collection[4]; cool to ≤6 ˚C	48 hours
Orthophosphate **(Total, as P)**	P	Cool to ≤6 ˚C	48 hours
Phosphorus **(Dissolved, as P)**	P	Filter within 15 minutes of collection; cool to ≤6 ˚C; H_2SO_4 to pH <2	28 days
Phosphorus **(Elemental)**	G	Cool to ≤6 ˚C	48 hours
Phosphorus **(Total, as P)**	P	Cool to ≤6 ˚C; H_2SO_4 to pH <2	28 days

[1] "P" is polyethylene; "G" is glass

[2] Per 40 CFR 136.3, aqueous samples must be preserved at ≤6 °C, and should not be frozen unless data demonstrating that sample freezing does not adversely impact sample integrity is maintained on file and accepted as valid by the regulatory authority. The preservation temperature does not apply to samples that are analyzed immediately (less than 15 minutes).

[3] Each "Required Holding Time" is based on the assumption that the "Recommended Preservation" (or a method-mandated alternative) has been employed. If a "Required Holding Time" for filtration, preservation, preparation, or analysis is not met, the project manager and SWAMP Quality Assurance Officer must be notified. Regardless of preservation technique, data not meeting the "Required Holding Time" will be appropriately flagged in the SWAMP database.

[4] Per 40 CFR 136.3, the immediate filtration requirement in orthophosphate measurement is to assess the dissolved or bio-available form of orthophosphorus (i.e., that which passes through a 0.45-micron filter), hence the requirement to filter the sample immediately upon collection (i.e., within 15 minutes of collection).

Table 3: Recommended Corrective Action: Nutrients in Fresh and Marine Water

Laboratory Quality Control	Recommended Corrective Action
Calibration Standard	Recalibrate the instrument. Affected samples and associated quality control must be reanalyzed following successful instrument recalibration.
Calibration Verification	Reanalyze the calibration verification to confirm the result. If the problem continues, halt analysis and investigate the source of the instrument drift. The analyst should determine if the instrument must be recalibrated before the analysis can continue. All of the samples not bracketed by acceptable calibration verification must be reanalyzed.
Laboratory Blank	Reanalyze the blank to confirm the result. Investigate the source of contamination. If the source of the contamination is isolated to the sample preparation, the entire batch of samples, along with the new laboratory blanks and associated QC samples, should be prepared and/or re-extracted and analyzed. If the source of contamination is isolated to the analysis procedures, reanalyze the entire batch of samples. If reanalysis is not possible, the associated sample results must be flagged to indicate the potential presence of the contamination.
Reference Material	Reanalyze the reference material to confirm the result. Compare this to the matrix spike/matrix spike duplicate recovery data. If adverse trends are noted, reprocess all of the samples associated with the batch.
Matrix Spike	The spiking level should be near the midrange of the calibration curve or at a level that does not require sample dilution. Reanalyze the matrix spike to confirm the result. Review the recovery obtained for the matrix spike duplicate. Review the results of the other QC samples (such as reference materials) to determine if other analytical problems are a potential source of the poor spike recovery.
Matrix Spike Duplicate	The spiking level should be near the midrange of the calibration curve or at a level that does not require sample dilution. Reanalyze the matrix spike duplicate to confirm the result. Review the recovery obtained for the matrix spike. Review the results of the other QC samples (such as reference materials) to determine if other analytical problems are a potential source of the poor spike recovery.
Laboratory Duplicate	Reanalyze the duplicate samples to confirm the results. Visually inspect the samples to determine if a high RPD between the results could be attributed to sample heterogeneity. For duplicate results due to matrix heterogeneity, or where ambient concentrations are below the reporting limit, qualify the results and document the heterogeneity.
Field Quality Control	**Recommended Corrective Action**
Field Duplicate	Visually inspect the samples to determine if a high RPD between results could be attributed to sample heterogeneity. For duplicate results due to matrix heterogeneity, or where ambient concentrations are below the reporting limit, qualify the results and document the heterogeneity. All failures should be communicated to the project coordinator, who in turn will follow the process detailed in the method.
Field Blank, Travel Blank, Equipment Blank	Investigate the source of contamination. Potential sources of contamination include sampling equipment, protocols, and handling. The laboratory should report evidence of field contamination as soon as possible so corrective actions can be implemented. Samples collected in the presence of field contamination should be flagged.

Semi-Volatile Organic Compounds in Fresh and Marine Water

A list of compounds included in this category may be found in the associated QAPrPTableReference.

Terms appearing in the tables are defined in the *Surface Water Ambient Monitoring Program Quality Assurance Program Plan*, which contains a glossary (Appendix E), as well as a list of abbreviations and acronyms (Appendix F).

Table 1: Quality Control[1]: Semi-Volatile Organic Compounds in Fresh and Marine Water[2]

Laboratory Quality Control	Frequency of Analysis	Measurement Quality Objective
Tuning[3]	Per analytical method	Per analytical method
Calibration	Initial method setup or when the calibration verification fails	• Correlation coefficient (r^2 >0.990) for linear and non-linear curves • If RSD<15%, average RF may be used to quantitate; otherwise use equation of the curve • First- or second-order curves only (not forced through the origin) • Refer to SW-846 methods for SPCC and CCC criteria[3] • Minimum of 5 points per curve (one of them at or below the RL)
Calibration Verification	Per 12 hours	• Expected response or expected concentration ±20% • RF for SPCCs=initial calibration[3]
Laboratory Blank	Per 20 samples or per analytical batch, whichever is more frequent	<RL for target analyte
Reference Material	Per 20 samples or per analytical batch	70-130% recovery if certified; otherwise, 50-150% recovery
Matrix Spike	Per 20 samples or per analytical batch, whichever is more frequent	50-150% or based on historical laboratory control limits (average±3SD)
Matrix Spike Duplicate	Per 20 samples or per analytical batch, whichever is more frequent	50-150% or based on historical laboratory control limits (average±3SD); RPD<25%
Surrogate	Included in all samples and all QC samples	Based on historical laboratory control limits (50-150% or better)
Internal Standard	Included in all samples and all QC samples (as available)	Per laboratory procedure

[1] Unless method specifies more stringent requirements

[2] All detected analytes must be confirmed with a second column, second technique, or mass spectrometry

[3] Mass spectrometry only

Table 1: Quality Control[1]: Semi-Volatile Organic Compounds in Fresh and Marine Water[2] (continued)

Field Quality Control	Frequency of Analysis	Measurement Quality Objective
Field Duplicate	5% of total project sample count	Per method
Field Blank, Travel Blank, Equipment Blank	Per method	<RL for target analyte

[1] Unless method specifies more stringent requirements

[2] All detected analytes must be confirmed with a second column, second technique, or mass spectrometry

[3] Mass spectrometry only

Table 2: Sample Handling: Semi-Volatile Organic Compounds in Fresh and Marine Water

Recommended Container[2]	Recommended Preservation[3]	Required Holding Time[1]
G	Cool to ≤6 °C	7 days until extraction, 40 days after extraction

[1] Each "Required Holding Time" is based on the assumption that the "Recommended Preservation" (or a method-mandated alternative) has been employed. If a "Required Holding Time" for filtration, preservation, preparation, or analysis is not met, the project manager and SWAMP Quality Assurance Officer must be notified. Regardless of preservation technique, data not meeting the "Required Holding Time" will be appropriately flagged in the SWAMP database.

[2] "G" is glass

[3] Per 40 CFR 136.3, aqueous samples must be preserved at ≤6 °C, and should not be frozen unless data demonstrating that sample freezing does not adversely impact sample integrity is maintained on file and accepted as valid by the regulatory authority. The preservation temperature does not apply to samples that are analyzed immediately (less than 15 minutes).

Table 3: Recommended Corrective Action: Semi-Volatile Organic Compounds in Fresh and Marine Water

Laboratory Quality Control	Recommended Corrective Action
Calibration	Recalibrate the instrument. Affected samples and associated quality control must be reanalyzed following successful instrument recalibration.
Calibration Verification	Reanalyze the calibration verification to confirm the result. If the problem continues, halt analysis and investigate the source of the instrument drift. The analyst should determine if the instrument must be recalibrated before the analysis can continue. All of the samples not bracketed by acceptable calibration verification must be reanalyzed.
Laboratory Blank	Reanalyze the blank to confirm the result. Investigate the source of contamination. If the source of the contamination is isolated to the sample preparation, the entire batch of samples, along with the new laboratory blanks and associated QC samples, should be prepared and/or re-extracted and analyzed. If the source of contamination is isolated to the analysis procedures, reanalyze the entire batch of samples. If reanalysis is not possible, the associated sample results must be flagged to indicate the potential presence of the contamination.
Reference Material	Reanalyze the reference material to confirm the result. Compare this to the matrix spike/matrix spike duplicate recovery data. If adverse trends are noted, reprocess all of the samples associated with the batch.
Matrix Spike	The spiking level should be near the midrange of the calibration curve or at a level that does not require sample dilution. Reanalyze the matrix spike to confirm the result. Review the recovery obtained for the matrix spike duplicate. Review the results of the other QC samples (such as reference materials) to determine if other analytical problems are a potential source of the poor spike recovery.
Matrix Spike Duplicate	The spiking level should be near the midrange of the calibration curve or at a level that does not require sample dilution. Reanalyze the matrix spike duplicate to confirm the result. Review the recovery obtained for the matrix spike. Review the results of the other QC samples (such as reference materials) to determine if other analytical problems are a potential source of the poor spike recovery.
Internal Standard	Check the response of the internal standards. If the instrument continues to generate poor results, terminate the analytical run and investigate the cause of the instrument drift.
Surrogate	Analyze as appropriate for the utilized method. Troubleshoot as needed. If no instrument problem is found, samples should be re-extracted and reanalyzed if possible.
Field Quality Control	**Recommended Corrective Action**
Field Duplicate	Visually inspect the samples to determine if a high RPD between results could be attributed to sample heterogeneity. For duplicate results due to matrix heterogeneity, or where ambient concentrations are below the reporting limit, qualify the results and document the heterogeneity. All failures should be communicated to the project coordinator, who in turn will follow the process detailed in the method.
Field Blank, Travel Blank, Equipment Blank	Investigate the source of contamination. Potential sources of contamination include sampling equipment, protocols, and handling. The laboratory should report evidence of field contamination as soon as possible so corrective actions can be implemented. Samples collected in the presence of field contamination should be flagged.

Solid Parameters in Fresh and Marine Water

A list of parameters included in this category may be found in the associated QAPrPTableReference.

Terms appearing in the tables are defined in the *Surface Water Ambient Monitoring Program Quality Assurance Program Plan*, which contains a glossary (Appendix E), as well as a list of abbreviations and acronyms (Appendix F).

Table 1: Quality Control[1]: Solid Parameters in Fresh and Marine Water

Laboratory Quality Control	Frequency of Analysis	Measurement Quality Objective
Laboratory Blank[2]	Per 20 samples or per analytical batch, whichever is more frequent	<RL for target analyte
Laboratory Duplicate[3]	Per 20 samples or per analytical batch, whichever is more frequent	RPD<25% (n/a if native concentration of either sample<RL)
Field Quality Control	**Frequency of Analysis**	**Measurement Quality Objective**
Field Duplicate	5% of total project sample count	RPD<25% (n/a if native concentration of either sample<RL)
Field Blank, Equipment Blank	Per method	<RL for target analyte

[1] Unless method specifies more stringent requirements

[2] Not applicable to volatile suspended solids

[3] Applicable only to total suspended solids, total dissolved solids, and ash-free dry mass

Table 2: Sample Handling: Solid Parameters in Fresh and Marine Water

Parameter	Recommended Container[1]	Recommended Preservation[2]	Required Holding Time[3]
Ash-Free Dry Mass	Pre-combusted glass-fiber filter	Field filter; cool to ≤6 ˚C (foil-wrapped); freeze to ≤-20 ˚C	28 days
Fixed & Volatile Dissolved Solids **Volatile Suspended Solids**	Per method	Cool to ≤6 ˚C	7 days
Suspended Sediment Concentration **Total Suspended Solids**	G, P	Cool to ≤6 ˚C	7 days
Total Dissolved Solids	P	Cool to ≤6 ˚C	7 days

[1] "P" is polyethylene; "G" is glass

[2] Per 40 CFR 136.3, aqueous samples must be preserved at ≤6 °C, and should not be frozen unless data demonstrating that sample freezing does not adversely impact sample integrity is maintained on file and accepted as valid by the regulatory authority. The preservation temperature does not apply to samples that are analyzed immediately (less than 15 minutes).

[3] Each "Required Holding Time" is based on the assumption that the "Recommended Preservation" (or a method-mandated alternative) has been employed. If a "Required Holding Time" for filtration, preservation, preparation, or analysis is not met, the project manager and SWAMP Quality Assurance Officer must be notified. Regardless of preservation technique, data not meeting the "Required Holding Time" will be appropriately flagged in the SWAMP database.

Table 3: Recommended Corrective Action: Solid Parameters in Fresh and Marine Water

Laboratory Quality Control	Recommended Corrective Action
Laboratory Blank	Reanalyze the blank to confirm the result. Investigate the source of contamination. If the source of the contamination is isolated to the sample preparation, the entire batch of samples, along with the new laboratory blanks and associated QC samples, should be prepared and/or re-extracted and analyzed. If the source of contamination is isolated to the analysis procedures, reanalyze the entire batch of samples. If reanalysis is not possible, the associated sample results must be flagged to indicate the potential presence of the contamination.
Laboratory Duplicate	Reanalyze the duplicate samples to confirm the results. Visually inspect the samples to determine if a high RPD between the results could be attributed to sample heterogeneity. For duplicate results due to matrix heterogeneity, or where ambient concentrations are below the reporting limit, qualify the results and document the heterogeneity.
Field Quality Control	**Recommended Corrective Action**
Field Duplicate	Visually inspect the samples to determine if a high RPD between results could be attributed to sample heterogeneity. For duplicate results due to matrix heterogeneity, or where ambient concentrations are below the reporting limit, qualify the results and document the heterogeneity. All failures should be communicated to the project coordinator, who in turn will follow the process detailed in the method.
Field Blank, Equipment Blank	Investigate the source of contamination. Potential sources of contamination include sampling equipment, protocols, and handling. The laboratory should report evidence of field contamination as soon as possible so corrective actions can be implemented. Samples collected in the presence of field contamination should be flagged.

Synthetic Organic Compounds in Fresh and Marine Water

Groups associated with this category are defined in the following compound lists:

Carbamate Pesticides	Organotins	Pyrethroid Pesticides
Diesel Range Organics	Polynuclear Aromatic Hydrocarbons	Surfactants
Glyphosates	Polybrominated Diphenyl Ethers	Triazine Pesticides
Organochlorine Pesticides	Polychlorinated Biphenyls	Wastewater Organochlorine Pesticides
Organophosphate Pesticides	Phenols	

Terms appearing in the tables are defined in the *Surface Water Ambient Monitoring Program Quality Assurance Program Plan*, which contains a glossary (Appendix E), as well as a list of abbreviations and acronyms (Appendix F).

Table 1: Quality Control[1, 2]: Synthetic Organic Compounds in Fresh and Marine Water[3]

Laboratory Quality Control	Frequency of Analysis	Measurement Quality Objective
Tuning[4]	Per analytical method	Per analytical method
Calibration	Initial method setup or when the calibration verification fails	• Correlation coefficient (r^2 >0.990) for linear and non-linear curves • If RSD<15%, average RF may be used to quantitate; otherwise use equation of the curve • First- or second-order curves only (not forced through the origin) • Refer to SW-846 methods for SPCC and CCC criteria[4] • Minimum of 5 points per curve (one of them at or below the RL)
Calibration Verification	Per 12 hours	• Expected response or expected concentration ±20% • RF for SPCCs=initial calibration[4]
Laboratory Blank	Per 20 samples or per analytical batch, whichever is more frequent	<RL for target analytes
Reference Material	Per 20 samples or per analytical batch (preferably blind)	70-130% recovery if certified; otherwise, 50-150% recovery
Matrix Spike	Per 20 samples or per analytical batch, whichever is more frequent	50-150% or based on historical laboratory control limits (average±3SD)
Matrix Spike Duplicate	Per 20 samples or per analytical batch, whichever is more frequent	50-150% or based on historical laboratory control limits (average±3SD); RPD<25%
Surrogate	Included in all samples and all QC samples	Based on historical laboratory control limits (50-150% or better)
Internal Standard	Included in all samples and all QC samples (as available)	Per laboratory procedure

Table 1: Quality Control[1, 2]: Synthetic Organic Compounds in Fresh and Marine Water[3] (continued)

Field Quality Control	Frequency of Analysis	Measurement Quality Objective
Field Duplicate	5% of total project sample count	Per method
Field Blank, Travel Blank, Equipment Blank	Per method	<RL for target analytes

[1] Unless method specifies more stringent requirements; ELISA results must be assessed against kit requirements.

[2] Pyrethroids quality control guidelines are presented in Table 2 immediately below.

[3] All detected analytes must be confirmed with a second column, second technique, or mass spectrometry.

[4] Mass spectrometry only

Table 2: Quality Control[1]: Synthetic Organic Compounds in Whole Water - Pyrethroids Only

Laboratory Quality Control	Frequency of Analysis	Measurement Quality Objective
Tuning[2]	Per analytical method	Per analytical method
Calibration	Daily, or just prior to analysis; five or more standards spanning the sample result range[3], with the lowest standard at or below the RL	r ≥0.995 (or r^2 ≥0.995, all curve types not forced through origin)
Calibration Verification	Per 10 analytical samples[4]	80-120%[5]
Laboratory Blank	Per 20 samples or per analytical batch, whichever is more frequent	<RL for target analytes
Laboratory Control Sample[6,]	Per 20 samples or per analytical batch, whichever is more frequent	50-150%
Matrix Spike	Per 20 samples or per analytical batch, whichever is more frequent	50-150%
Matrix Spike Duplicate	Per 20 samples or per analytical batch, whichever is more frequent	50-150%; RPD≤35%
Surrogate[7]	Included in all samples and all QC samples	Based on historical laboratory control limits (50-150% or better)
Internal Standard	Included in all samples and all QC samples (as available)	Per laboratory procedure
Field Quality Control[8]	**Frequency of Analysis**	**Measurement Quality Objective**
Field Duplicate	5% of total project sample count	RPD ≤ 35%

[1] Unless project specifies more stringent requirements

[2] Mass spectrometry only

[3] Sample results above the highest standard are to be diluted and re-analyzed.

[4] Analytical samples include samples only and do not include clean-out or injection blanks.

[5] Limit applies to a mid-level standard; low-level calibration checks near the reporting limit may have a wider range that is project - specific

[6] Laboratory control samples must be matrix-specific. A clean sediment, roasted sand, or roasted sodium sulfate may be used for sediments.

[7] Laboratory historical limits for surrogate recovery must be submitted to the SWAMP database in the lab result comment section.

[8] A technical group consisting of regional, laboratory, and research representatives determined that field blanks do not provide technical value to a pyrethroids data set.

Table 3: Sample Handling: Synthetic Organic Compounds in Fresh and Marine Water[1]

Matrix	Recommended Container[2]	Recommended Preservation[4]	Required Holding Time[2]
Carbamate Pesticides **Organochlorine Pesticides** **Organophosphate Pesticides** **Wastewater Organochlorine Pesticides**	G	Cool to ≤6 °C; pH 5-9	7 days until extraction, 40 days after extraction
Diesel Range Organics **Triazine Pesticides**	G	Cool to ≤6 °C	7 days until extraction, 40 days after extraction
Glyphosate	G	Cool to ≤6 °C; store in the dark; 0.008% $Na_2S_2O_3$ if residual chlorine is present; freeze to ≤-20 °C	18 months (14 days if unfrozen)
Phenols[5]	G	Cool to ≤6 °C; 0.008% $Na_2S_2O_3$ if residual chlorine is present	7 days until extraction, 40 days after extraction
Polychlorinated Biphenyls (as Congeners/Aroclors)	G	Cool to ≤6 °C	1 year until extraction, 1 year after extraction
Polynuclear Aromatic Hydrocarbons	G	Cool to ≤6 °C; store in the dark; 0.008% $Na_2S_2O_3$ if residual chlorine is present	7 days until extraction, 40 days after extraction
Pyrethroids	G	Cool ≤ 6 °C in the dark; samples must be extracted or preserved according to laboratory procedures with suitable preservative or extraction solvent within 72 hours of collection	7 days until extraction, 40 days after extraction
Surfactants	G	Cool to ≤6 °C, store in the dark	7 days until extraction, 40 days after extraction

[1] Pyrethroids information applies to a whole water matrix.

[2] "G" is glass

[3] Per 40 CFR 136.3, aqueous samples must be preserved at ≤6 °C, and should not be frozen unless data demonstrating that sample freezing does not adversely impact sample integrity is maintained on file and accepted as valid by the regulatory authority. The preservation temperature does not apply to samples that are analyzed immediately (less than 15 minutes).

[4] Each "Required Holding Time" is based on the assumption that the "Recommended Preservation" (or a method-mandated alternative) has been employed. If a "Required Holding Time" for filtration, preservation, preparation, or analysis is not met, the project manager and SWAMP Quality Assurance Officer must be notified. Regardless of preservation technique, data not meeting the "Required Holding Time" will be appropriately flagged in the SWAMP database.

[5] This table applies to phenols analysis using gas chromatography. Guidelines for the colorimetric analysis of phenols are located in *Conventional Parameters in Water* Table 2*: Sample Handling.*

Table 4: Recommended Corrective Action: Synthetic Organic Compounds in Fresh and Marine Water[1]

Laboratory Quality Control	Recommended Corrective Action
Calibration	Recalibrate the instrument. Affected samples and associated quality control must be reanalyzed following successful instrument recalibration.
Calibration Verification	Reanalyze the calibration verification to confirm the result. If the problem continues, halt analysis and investigate the source of the instrument drift. The analyst should determine if the instrument must be recalibrated before the analysis can continue. All of the samples not bracketed by acceptable calibration verification must be reanalyzed.
Laboratory Blank	Reanalyze the blank to confirm the result. Investigate the source of contamination. If the source of the contamination is isolated to the sample preparation, the entire batch of samples, along with the new laboratory blanks and associated QC samples, should be prepared and/or re-extracted and analyzed. If the source of contamination is isolated to the analysis procedures, reanalyze the entire batch of samples. If reanalysis is not possible, the associated sample results must be flagged to indicate the potential presence of the contamination.
Reference Material	Reanalyze the reference material to confirm the result. Compare this to the matrix spike/matrix spike duplicate recovery data. If adverse trends are noted, reprocess all of the samples associated with the batch.
Matrix Spike	The spiking level should be near the midrange of the calibration curve or at a level that does not require sample dilution. Reanalyze the matrix spike to confirm the result. Review the recovery obtained for the matrix spike duplicate. Review the results of the other QC samples (such as reference materials) to determine if other analytical problems are a potential source of the poor spike recovery.
Matrix Spike Duplicate	The spiking level should be near the midrange of the calibration curve or at a level that does not require sample dilution. Reanalyze the matrix spike duplicate to confirm the result. Review the recovery obtained for the matrix spike. Review the results of the other QC samples (such as reference materials) to determine if other analytical problems are a potential source of the poor spike recovery.
Internal Standard	Check the response of the internal standards. If the instrument continues to generate poor results, terminate the analytical run and investigate the cause of the instrument drift.
Surrogate	Analyze as appropriate for the utilized method. Troubleshoot as needed. If no instrument problem is found, samples should be re-extracted and reanalyzed if possible.
Field Quality Control	**Recommended Corrective Action**
Field Duplicate	Visually inspect the samples to determine if a high RPD between results could be attributed to sample heterogeneity. For duplicate results due to matrix heterogeneity, or where ambient concentrations are below the reporting limit, qualify the results and document the heterogeneity. All failures should be communicated to the project coordinator, who in turn will follow the process detailed in the method.
Field Blank, Travel Blank, Equipment Blank	Investigate the source of contamination. Potential sources of contamination include sampling equipment, protocols, and handling. The laboratory should report evidence of field contamination as soon as possible so corrective actions can be implemented. Samples collected in the presence of field contamination should be flagged.

[1] Pyrethroids corrective actions are presented in Table 5 immediately below

Table 5: Recommended Corrective Action: Synthetic Organic Compounds in Whole Water – Pyrethroids Only

Laboratory Quality Control	Recommended Corrective Action
Calibration	Affected samples and associated quality control must be reanalyzed following successful instrument recalibration.
Calibration Verification	Initial calibration is analyzed immediately after calibration and should be from a source different than the calibration curve. Bracketing continuing calibration standards are used every ten sample runs for quantitation per method protocol. The analysis must be halted, the problem investigated, and the instrument recalibrated. All samples after the last acceptable continuing calibration verification must be reanalyzed.
Laboratory Blank	The sample analysis must be halted, the source of the contamination investigated, the samples along with a new laboratory blank prepared and/or re-extracted, and the sample batch and fresh laboratory blank reanalyzed. If reanalysis is not possible due to sample volume, flag associated samples.
Laboratory Control Sample	The LCS is analyzed in the same manner as an environmental sample and the spike recovery demonstrates the accuracy of the method. Affected samples and associated quality control must be reanalyzed following LCS troubleshooting and resolution. After troubleshooting, compare to matrix spike/matrix spike duplicate recovery data. If adverse trends are noted, reprocess all samples associated with the batch.
Matrix Spike	The spiking level should be near the midrange of the calibration curve or at a level that does not require sample dilution. Appropriately spiked results should be compared to the matrix spike duplicate to investigate matrix interference. If matrix interference is suspected, the matrix spike result must be flagged. Appropriately spiked results should be compared to the matrix spike duplicate to investigate matrix interference. If matrix interference is suspected and LCS recoveries are acceptable, the matrix spike and matrix spike duplicate results must be flagged.
Matrix Spike Duplicate	The spiking level should be should be near the midrange of the calibration curve or at a level that does not require sample dilution. Appropriately spiked results should be compared to the matrix spike to investigate matrix interference. If matrix interference is suspected and LCS recoveries are acceptable, the matrix spike duplicate result must be flagged.
Surrogate	Analyze as appropriate per method. Trouble shoot as appropriate, if no instrument problem is found samples should be re-extracted and re-analyzed if possible.
Internal Standard	Analyze as appropriate per method. Troubleshoot as appropriate. If, after trouble-shooting, the responses of the internal standards remain unacceptable, the analysis must be terminated and the cause of drift investigated.
Field Quality Control	**Recommended Corrective Action**
Field Duplicate	For duplicates with a heterogeneous matrix or ambient levels below the reporting limit, failed results may be flagged. All failures should be communicated to the project coordinator, who in turn will follow the process detailed in the method.

Acute Freshwater Toxicity Testing

A list of species and tests included in this category may be found in the associated QAPrPTableReference.

Terms appearing in the tables are defined in the *Surface Water Ambient Monitoring Program Quality Assurance Program Plan*, which contains a glossary (Appendix E), as well as a list of abbreviations and acronyms (Appendix F).

Table 1: Quality Control[1]: Acute Freshwater Toxicity Testing

Negative Controls	Frequency of Analysis	Control Limits
Laboratory Control Water	Laboratory control water consistent with Section 7 of the appropriate EPA method/manual must be tested with each analytical batch.	Laboratory control water must meet all test acceptability criteria (please refer to Section 7 of the appropriate EPA method/manual) for the species of interest.
Conductivity/Salinity Control Water	A conductivity or salinity control must be tested when these parameters are above or below the species tolerance.	Follow EPA guidance on interpreting data and refer to tables below for tolerance ranges.
Additional Control Water	Additional method blanks are required whenever manipulations are performed on one or more of the ambient samples within each analytical batch (e.g., pH adjustments, continuous aeration).	There must be no statistical difference between the laboratory control water and each additional control water within an analytical batch.
Sediment Control	Sediment control consistent with Section 7 of the appropriate EPA method/manual must be tested with each analytical batch of sediment toxicity tests.	Sediment control must meet all data acceptability criteria (please refer to Section 7 of the appropriate EPA method/manual) for the species of interest.
Positive Controls	**Frequency of Analysis**	**Control Limits**
Reference Toxicant Tests	Reference toxicant tests must be conducted monthly for species that are raised within a laboratory, or per analytical batch for commercially-supplied or field-collected species.	Last plotted data point (LC50 or EC50) must be within 2 SD of the cumulative mean (n=20). Reference toxicant tests that fall outside of recommended control chart limits are evaluated to determine the validity of associated tests. An out of control reference toxicant test result does not necessarily invalidate associated test results. More frequent and/or concurrent reference toxicant testing may be advantageous if recent problems have been identified in testing.

[1]Unless method specifies more stringent requirements.

In special cases where the criteria listed in the above tables cannot be met, EPA minimum criteria may be followed. The affected data should be flagged accordingly.

Test data are reviewed to verify that the test acceptability criteria for a valid test have been met. Any test not meeting the minimum test acceptability criteria is considered invalid. All invalid tests should be repeated with the newly collected sample. If this is not possible, the test should be repeated with an archived sample and all tests must be properly flagged.

Deviations from the summary of recommended test conditions must be evaluated on a project-specific basis to determine the validity of test results. Depending on the degree of the departure and the objective of the test, deviations from recommended conditions may or may not invalidate a test result. Before rejecting or accepting a test result as valid, the reviewer should consider the degree of the deviation and the potential or observed impact of the deviation on the test result. For example, if dissolved oxygen is measured below 4.0 mg/L in one test chamber, the reviewer should consider whether any observed mortality in that test chamber corresponded with the drop in dissolved oxygen.

Table 1: Quality Control[1]: Acute Freshwater Toxicity Testing (continued)

Field Quality Control	Frequency of Analysis	Control Limits
Sample Duplicate	5% of total project sample count	Recommended acceptable RPD<20%
Field Blanks	Based on project requirements	No statistical difference between the laboratory control water (or sediment control) and the field blank within an analytical batch
Bottle Blanks	Based on project requirements	No statistical difference between the laboratory control water and the equipment blank within an analytical batch

[1]Unless method specifies more stringent requirements.

In special cases where the criteria listed in the above tables cannot be met, EPA minimum criteria may be followed. The affected data should be flagged accordingly.

Test data are reviewed to verify that the test acceptability criteria for a valid test have been met. Any test not meeting the minimum test acceptability criteria is considered invalid. All invalid tests should be repeated with the newly collected sample. If this is not possible, the test should be repeated with an archived sample and all tests must be properly flagged.

Deviations from the summary of recommended test conditions must be evaluated on a project-specific basis to determine the validity of test results. Depending on the degree of the departure and the objective of the test, deviations from recommended conditions may or may not invalidate a test result. Before rejecting or accepting a test result as valid, the reviewer should consider the degree of the deviation and the potential or observed impact of the deviation on the test result. For example, if dissolved oxygen is measured below 4.0 mg/L in one test chamber, the reviewer should consider whether any observed mortality in that test chamber corresponded with the drop in dissolved oxygen.

Table 2: Corrective Action: Acute Freshwater Toxicity Testing

Negative Controls	Corrective Action
Laboratory Control Water	If tested with in-house cultures, affected samples and associated quality control must be retested within 24 hours of test failure. If commercial cultures are used, they must be ordered within 16 hours of test failure for the earliest possible receipt. Retests must be initiated within 30 hours of receipt, depending on the need for organism acclimation. The laboratory should try to determine the source of the control failure, document the investigation, and document the steps taken to prevent a recurrence.
Conductivity/Salinity Control Water	Affected samples and associated quality control must be flagged.
Additional Control Water	Based on the objectives of the study, a water sample that has similar qualities to the test sample may be used as an additional control. Results that show statistical differences from the laboratory control should be flagged. The laboratory should try to determine the source of variation, document the investigation, and document the steps taken to prevent a recurrence. This is not applicable for TIE method blanks.
Sediment Control	Based on the objectives of the study, a sediment sample that has similar qualities to the test sample may be used as an additional control. Results that show statistical differences from the laboratory control should be flagged. The laboratory should try to determine the source of variation, document the investigation, and document the steps taken to prevent a recurrence.
Positive Controls	**Corrective Action**
Reference Toxicant Tests	If the LC50 exceeds +/- two standard deviations of the running mean of the last 20 reference toxicant tests, the test should be flagged.
Field Quality Control	**Corrective Action**
Field Duplicate	For duplicates with a heterogeneous matrix, results that do not meet SWAMP criteria should be flagged. The project coordinator should be notified so that the sampling team can identify the source of variation and perform corrective action prior to the next sampling event.
Field Blanks	If contamination of the field blanks and associated samples is known or suspected, the laboratory should flag the affected data. The project coordinator should be notified so that the sampling team can identify the contamination source(s) and perform corrective action prior to the next sampling event.
Equipment Blanks	If contamination of the field blanks and associated samples is known or suspected, the laboratory should flag the affected data. The project coordinator should be notified so that the sampling team can identify the contamination source(s) and perform corrective action prior to the next sampling event.

Table 3: Acute Freshwater Testing: 96-Hour Survival *Ceriodaphnia dubia* Toxicity Test

Method Recommendation	
EPA/821/R-02/012 (Test Method 2002.0) or validated and SWAMP-approved alternative method	
Data Acceptability Requirements	
Parameter	*Criteria*
Test Acceptability Criteria[1]	≥90% survival in the controls
Data Qualification	
Test Conditions	*Required*
Test Type	Static renewal
Age at Test Initiation	<24hours
Replication at Test Initiation	4 (minimum)
Organisms/Replicate	5 (minimum)
Food Source	YCT and *Selenastrum* or comparable food
Test Duration	96 hours
Renewal Frequency	100% Daily Renewal
Feeding Regime	Feed while holding prior to test and 2 hours prior to test solution renewal
Endpoints	Survival
Test Conditions	*Recommended* [2]
Temperature Range	25 ± 1 °C (±3 °C required)
Light Intensity	10 – 20 µE/m^2/s OR 50 – 100 ft-c
Photoperiod	16 hours of ambient laboratory light, 8 hours dark
Test Chamber Size	20 - 40 mL
Replicate Volume	≥15 mL
Laboratory Control Water	Moderately hard water prepared in accordance with EPA protocols
Minimum Sample Volume	1 L for one time grab sample
Sensitivity	*Performance Criteria*
Reference Toxicant Testing	See Table 2
Water Chemistry	
Test Parameter	*Required Frequency*
Initial Water Chemistry	One DO, pH, conductivity, ammonia, alkalinity, hardness, and temperature measurement per sample and per dilution
Daily Water Chemistry	One initial DO, one final DO, and one final pH measurement per sample
Final Water Chemistry	One DO, pH, and temperature measurement per sample and per dilution
Test Parameter	*Recommended Criteria*
Initial DO Range	4.0 mg/L - 100% saturation
Initial pH Range	6.0 - 9.0
Conductivity Controls	Include appropriate controls when sample conductivities are 0 – 100, or >1900 µS/cm. Substitute with *Hyalella azteca* if conductivity is >2500.
Sample Handling/Collection	
Test Parameter	*Recommended Conditions*
Relevant Media	Water column
Sample Container Type	Amber glass
Sample Preservation	Wet or blue ice in field, 0 - 6 °C refrigeration in laboratory, dark at all times
Sample Receipt Temperature	0 - 6 °C
Holding Time	<48 hours@ 0 - 6 °C; dark

[1]Test data are reviewed to verify that test acceptability criteria (TAC) requirements for a valid test have been met. Any test not meeting these criteria is considered invalid. All invalid tests must be repeated with a newly collected sample.

[2]Deviations from the summary of recommended test conditions must be evaluated on a project-specific basis to determine the validity of test results. Depending on the degree of the departure and the objective of the test, deviations from recommended conditions may or may not invalidate a test result.

Table 4: Acute Freshwater Testing: 96-Hour Survival *Hyalella azteca* Toxicity Test

Method Recommendation	
EPA/821/R-02/012 or validated and SWAMP-approved alternative method	
Data Acceptability Requirements	
Parameter	*Criteria*
Test Acceptability Criteria[1]	≥90% survival in controls
Data Qualification	
Test Conditions	*Required*
Test Type	Static renewal
Age at Test Initiation	7 – 14 days old
Replication at Test Initiation	4 (minimum)
Organisms/Replicate	10 (minimum)
Food Source	YCT
Renewal Frequency	80% renewal on Day 2
Test Duration	96 hours
Endpoints	Survival
Test Conditions	*Recommended* [2]
Temperature Range	23 ± 1.0 °C (±3 °C required)
Light Intensity	10 – 20 µE/m^2/s or 50 – 100 ft-c
Photoperiod	16 hours of ambient laboratory light, 8 hours dark
Test Chamber Size	300 mL
Replicate Volume	100 mL water
Feeding Regime	1.5 mL YCT every other day
Laboratory Control Water	Moderately hard water prepared in accordance with EPA protocols
Minimum Sample Volume	1L for one time grab sample
Sensitivity	*Performance Criteria*
Reference Toxicant Testing	See Table 2
Water Chemistry	
Test Parameter	*Required Frequency*
Initial Water Chemistry	One DO, pH, conductivity, ammonia, alkalinity, hardness, and temperature measurement per sample and per dilution
Renewal Water Chemistry	One initial DO, one final DO, and one final pH measurement per sample
Final Water Chemistry	One DO, pH, and temperature measurement per sample and per dilution
Test Parameter	*Recommended Criteria*
Initial DO Range	2.5 mg/L - 100% saturation
Initial pH Range	6.0 - 9.0
Conductivity Controls	Include appropriate controls when sample conductivities are 0 – 100, or >10,000 µS/cm
Sample Handling/Collection	
Test Parameter	*Recommended Conditions*
Relevant Media	Water
Sample Container Type	Amber glass
Sample Preservation	Wet or blue ice in field; 0 - 6 °C refrigeration in laboratory; dark at all times
Sample Receipt Temperature	0 - 6 °C
Holding Time	<48 hours@ 0 - 6 °C; dark

[1]Test data are reviewed to verify that test acceptability criteria (TAC) requirements for a valid test have been met. Any test not meeting these criteria is considered invalid. All invalid tests must be repeated with a newly collected sample.

[2]Deviations from the summary of recommended test conditions must be evaluated on a project-specific basis to determine the validity of test results. Depending on the degree of the departure and the objective of the test, deviations from recommended conditions may or may not invalidate a test result.

Table 5: Acute Freshwater Testing: 10-Day Survival *Hyalella azteca* Toxicity Test

Method Recommendation	
EPA/821/R-02/012 or validated and SWAMP-approved alternative method	
Data Acceptability Requirements	
Parameter	*Criteria*
Test Acceptability Criteria[1]	≥80% survival in controls
Data Qualification	
Test Conditions	*Required*
Test Type	Static renewal
Age at Test Initiation	7 – 14 days old
Replication at Test Initiation	5 (minimum)
Organisms/Replicate	10 (minimum)
Food Source	YCT
Renewal Frequency	80% renewal every 48 hours
Test Duration	10 days
Endpoints	Survival
Test Conditions	*Recommended* [2]
Temperature Range	23 ± 1.0 °C (±3 °C required)
Light Intensity	10 – 20 µE/m^2/s or 50 – 100 ft-c
Photoperiod	16 hours of ambient laboratory light, 8 hours dark
Test Chamber Size	300 mL
Replicate Volume	100 mL water
Feeding Regime	1.5 mL YCT every other day
Laboratory Control Water	Moderately hard water prepared in accordance with EPA protocols
Minimum Sample Volume	1L for one time grab sample
Sensitivity	*Performance Criteria*
Reference Toxicant Testing	See Table 2
Water Chemistry	
Test Parameter	*Required Frequency*
Initial Water Chemistry	One DO, pH, conductivity, ammonia, alkalinity, hardness, and temperature measurement per sample and per dilution
Renewal Water Chemistry	One initial DO, one final DO, and one final pH measurement per sample
Final Water Chemistry	One DO, pH, and temperature measurement per sample and per dilution
Test Parameter	*Recommended Criteria*
Initial DO Range	2.5 mg/L - 100% saturation
Initial pH Range	6.0 - 9.0
Conductivity Controls	Include appropriate controls when sample conductivities are 0 – 100, or >10,000 µS/cm
Sample Handling/Collection	
Test Parameter	*Recommended Conditions*
Relevant Media	Water
Sample Container Type	Amber glass
Sample Preservation	Wet or blue ice in field; 0 - 6 °C refrigeration in laboratory; dark at all times
Sample Receipt Temperature	0 - 6 °C
Holding Time	<48 hours@ 0 - 6 °C; dark

[1]Test data are reviewed to verify that test acceptability criteria (TAC) requirements for a valid test have been met. Any test not meeting these criteria is considered invalid. All invalid tests must be repeated with a newly collected sample.

[2]Deviations from the summary of recommended test conditions must be evaluated on a project-specific basis to determine the validity of test results. Depending on the degree of the departure and the objective of the test, deviations from recommended conditions may or may not invalidate a test result.

Chronic Freshwater Toxicity Testing

A list of species and tests included in this category may be found in the associated QAPrPTableReference.

Terms appearing in the tables are defined in the *Surface Water Ambient Monitoring Program Quality Assurance Program Plan,* which contains a glossary (Appendix E), as well as a list of abbreviations and acronyms (Appendix F).

Table 1: Quality Control[1]: Chronic Freshwater Toxicity Testing

Negative Controls	Frequency of Analysis	Control Limits
Laboratory Control Water	Laboratory control water consistent with Section 7 of the appropriate EPA method/manual must be tested with each analytical batch.	Laboratory control water must meet all test acceptability criteria (please refer to Section 7 of the appropriate EPA method/manual) for the species of interest.
Conductivity/Salinity Control Water	A conductivity or salinity control must be tested when these parameters are above or below the species tolerance.	Follow EPA guidance on interpreting data and refer to tables below for tolerance ranges.
Additional Control Water	Additional method blanks are required whenever manipulations are performed on one or more of the ambient samples within each analytical batch (e.g., pH adjustments, continuous aeration).	There must be no statistical difference between the laboratory control water and each additional control water within an analytical batch.
Sediment Control	Sediment control consistent with Section 7 of the appropriate EPA method/manual must be tested with each analytical batch of sediment toxicity tests.	Sediment control must meet all data acceptability criteria (please refer to Section 7 of the appropriate EPA method/manual) for the species of interest.
Positive Controls	**Frequency of Analysis**	**Control Limits**
Reference Toxicant Tests	Reference toxicant tests must be conducted monthly for species that are raised within a laboratory, or per analytical batch for commercially-supplied or field-collected species.	Last plotted data point (LC50 or EC50) must be within 2 SD of the cumulative mean (n=20). Reference toxicant tests that fall outside of recommended control chart limits are evaluated to determine the validity of associated tests. An out of control reference toxicant test result does not necessarily invalidate associated test results. More frequent and/or concurrent reference toxicant testing may be advantageous if recent problems have been identified in testing.

[1]Unless method specifies more stringent requirements.

In special cases where the criteria listed in the above tables cannot be met, EPA minimum criteria may be followed. The affected data should be flagged accordingly.

Test data are reviewed to verify that the test acceptability criteria for a valid test have been met. Any test not meeting the minimum test acceptability criteria is considered invalid. All invalid tests should be repeated with the newly collected sample. If this is not possible, the test should be repeated with an archived sample and all tests must be properly flagged.

Deviations from the summary of recommended test conditions must be evaluated on a project-specific basis to determine the validity of test results. Depending on the degree of the departure and the objective of the test, deviations from recommended conditions may or may not invalidate a test result. Before rejecting or accepting a test result as valid, the reviewer should consider the degree of the deviation and the potential or observed impact of the deviation on the test result. For example, if dissolved oxygen is measured below 4.0 mg/L in one test chamber, the reviewer should consider whether any observed mortality in that test chamber corresponded with the drop in dissolved oxygen.

Table 1: Quality Control[1]: Chronic Freshwater Toxicity Testing (continued)

Field Quality Control	Frequency of Analysis	Control Limits
Sample Duplicate	5% of total project sample count	Recommended acceptable RPD<20%
Field Blanks	Based on project requirements	No statistical difference between the laboratory control water (or sediment control) and the field blank within an analytical batch
Bottle Blanks	Based on project requirements	No statistical difference between the laboratory control water and the equipment blank within an analytical batch

[1]Unless method specifies more stringent requirements.

In special cases where the criteria listed in the above tables cannot be met, EPA minimum criteria may be followed. The affected data should be flagged accordingly.

Test data are reviewed to verify that the test acceptability criteria for a valid test have been met. Any test not meeting the minimum test acceptability criteria is considered invalid. All invalid tests should be repeated with the newly collected sample. If this is not possible, the test should be repeated with an archived sample and all tests must be properly flagged.

Deviations from the summary of recommended test conditions must be evaluated on a project-specific basis to determine the validity of test results. Depending on the degree of the departure and the objective of the test, deviations from recommended conditions may or may not invalidate a test result. Before rejecting or accepting a test result as valid, the reviewer should consider the degree of the deviation and the potential or observed impact of the deviation on the test result. For example, if dissolved oxygen is measured below 4.0 mg/L in one test chamber, the reviewer should consider whether any observed mortality in that test chamber corresponded with the drop in dissolved oxygen.

Table 2: Corrective Action: Chronic Freshwater Toxicity Testing

Negative Controls	Corrective Action
Laboratory Control Water	If tested with in-house cultures, affected samples and associated quality control must be retested within 24 hours of test failure. If commercial cultures are used, they must be ordered within 16 hours of test failure for the earliest possible receipt. Retests must be initiated within 30 hours of receipt, depending on the need for organism acclimation. The laboratory should try to determine the source of the control failure, document the investigation, and document the steps taken to prevent a recurrence.
Conductivity/Salinity Control Water	Affected samples and associated quality control must be flagged.
Additional Control Water	Based on the objectives of the study, a water sample that has similar qualities to the test sample may be used as an additional control. Results that show statistical differences from the laboratory control should be flagged. The laboratory should try to determine the source of variation, document the investigation, and document the steps taken to prevent a recurrence. This is not applicable for TIE method blanks.
Sediment Control	Based on the objectives of the study, a sediment sample that has similar qualities to the test sample may be used as an additional control. Results that show statistical differences from the laboratory control should be flagged. The laboratory should try to determine the source of variation, document the investigation, and document the steps taken to prevent a recurrence.
Positive Controls	**Corrective Action**
Reference Toxicant Tests	If the LC50 exceeds +/- two standard deviations of the running mean of the last 20 reference toxicant tests, the test should be flagged.
Field Quality Control	**Corrective Action**
Field Duplicate	For duplicates with a heterogeneous matrix, results that do not meet SWAMP criteria should be flagged. The project coordinator should be notified so that the sampling team can identify the source of variation and perform corrective action prior to the next sampling event.
Field Blanks	If contamination of the field blanks and associated samples is known or suspected, the laboratory should flag the affected data. The project coordinator should be notified so that the sampling team can identify the contamination source(s) and perform corrective action prior to the next sampling event.
Equipment Blanks	If contamination of the field blanks and associated samples is known or suspected, the laboratory should flag the affected data. The project coordinator should be notified so that the sampling team can identify the contamination source(s) and perform corrective action prior to the next sampling event.

Table 3: Chronic Freshwater Testing: 7-Day Survival and Growth *Pimephales promelas* Toxicity Test

Method Recommendation	
EPA/821/R-02/013 (Test Method 1000.0) or validated and SWAMP-approved alternative method	
Data Acceptability Requirements	
Parameter	*Criteria*
Test Acceptability Criteria[1]	80% or greater survival in controls and an average dry weight per original organism in control chambers equals or exceeds 0.25 mg
Data Qualification	
Test Conditions	*Required*
Test Type	Static renewal
Age at Test Initiation	Newly-hatched larvae <24 hours old. If shipped, <48 hours old with a 24-hour age range
Replication at Test Initiation	4 (minimum)
Organisms/Replicate	10 (minimum)
Food Source	Newly-hatched *Artemia* nauplii (<24 hours old)
Renewal Frequency	Daily
Test Duration	7 days
Endpoints	Survival and growth (biomass)
Test Conditions	*Recommended* [2]
Temperature Range	25 ± 1.0 °C (±3 °C required)
Light Intensity	10 – 20 µE/m^2/s or 50 – 100 ft-c
Photoperiod	16 hours of ambient laboratory light, 8 hours dark
Test Chamber Size	>500 mL or per method specific requirements
Replicate Volume	>250 mL or per method specific requirements
Feeding Regime	2 or 3 times per day
Laboratory Control Water	Moderately hard water prepared in accordance with EPA protocols
Minimum Sample Volume	7 L for one-time grab sample
Sensitivity	*Performance Criteria*
Reference Toxicant Testing	See Table 2
Water Chemistry	
Test Parameter	*Required Frequency*
Initial Water Chemistry	One DO, pH, conductivity, ammonia, alkalinity, hardness, and temperature measurement per sample and per dilution
Daily Water Chemistry	One initial DO, one final DO, and one final pH measurement per sample
Final Water Chemistry	One DO, pH, and temperature measurement per sample and per dilution
Test Parameter	*Recommended Criteria*
Initial DO Range	4.0 mg/L - 100% saturation
Initial pH Range	6.0 - 9.0
Conductivity Controls	Include appropriate controls when sample conductivities are 0 – 100, or above 1900 µS/cm
Sample Handling/Collection	
Test Parameter	*Recommended Conditions*
Relevant Media	Water column
Sample Container Type	Amber glass
Sample Preservation	Wet or blue ice in field, 0 - 6 °C refrigeration in laboratory, dark at all times
Sample Receipt Temperature	0 - 6 °C
Holding Time	<48 hours@ 0 - 6 °C; dark

[1]Test data are reviewed to verify that test acceptability criteria (TAC) requirements for a valid test have been met. Any test not meeting these criteria is considered invalid. All invalid tests must be repeated with a newly collected sample.

[2]Deviations from the summary of recommended test conditions must be evaluated on a project-specific basis to determine the validity of test results. Depending on the degree of the departure and the objective of the test, deviations from recommended conditions may or may not invalidate a test result.

Table 4: Chronic Freshwater Testing: 6-8 Day Survival and Reproduction *Ceriodaphnia dubia* Toxicity Test

Method Recommendation	
EPA/821/R-02/013 (Test Method 1002.0) or validated and SWAMP-approved alternative method	
Data Acceptability Requirements	
Parameter	*Criteria*
Test Acceptability Criteria[1]	≥80% survival in controls and an average of 15 or more young per surviving female. 60% of the surviving control females must produce three broods.
Data Qualification	
Test Conditions	*Required*
Test Type	Static renewal
Age at Test Initiation	<24 hours old and all released within an 8-h period
Replication at Test Initiation	10 (minimum)
Organisms/Replicate	One (assigned using blocking by known parentage)
Food Source	YCT and *Selenastrum* or comparable food
Renewal Frequency	Daily
Test Duration	6-8 days (when 60% surviving females produces 3rd brood
Endpoints	Survival and reproduction
Test Conditions	*Recommended* [2]
Temperature Range	25 ± 1 °C (±3 °C required)
Light Intensity	10 – 20 µE/m^2/s or 50 – 100 ft-c
Photoperiod	16 hours of ambient laboratory light, 8 hours dark
Test Chamber Size	20 - 40 mL
Replicate Volume	>15 mL
Feeding Regime	Daily
Laboratory Control Water	Moderately hard water prepared in accordance with EPA protocols
Minimum Sample Volume	2 L for one-time grab sample
Sensitivity	*Performance Criteria*
Reference Toxicant Testing	See Table 2
Water Chemistry	
Test Parameter	*Required Frequency*
Initial Water Chemistry	One DO, pH, conductivity, ammonia, alkalinity, hardness, and temperature measurement per sample and per dilution
Daily Water Chemistry	One initial DO, one final DO, and one final pH measurement per sample
Final Water Chemistry	One DO, pH, and temperature measurement per sample and per dilution
Test Parameter	*Recommended Criteria*
Initial DO Range	4.0 mg/L - 100% saturation
Initial pH Range	6.0 - 9.0
Conductivity Controls	Include appropriate controls when sample conductivities are 0 – 100, or >1900 µS/cm. Substitute with *Hyalella azteca* if conductivity is >2500.
Sample Handling/Collection	
Test Parameter	*Recommended Conditions*
Relevant Media	Water column
Sample Container Type	Amber glass
Sample Preservation	Wet or blue ice in field, 0 - 6 °C refrigeration in laboratory, dark at all times
Sample Receipt Temperature	0 - 6 °C
Holding Time	<48 hours@ 0 - 6 °C; dark

[1]Test data are reviewed to verify that test acceptability criteria (TAC) requirements for a valid test have been met. Any test not meeting these criteria is considered invalid. All invalid tests must be repeated with a newly collected sample.

[2]Deviations from the summary of recommended test conditions must be evaluated on a project-specific basis to determine the validity of test results. Depending on the degree of the departure and the objective of the test, deviations from recommended conditions may or may not invalidate a test result.

Table 5: Chronic Freshwater Testing: 96-Hour Growth *Selenastrum capricornutum* Toxicity Test

Method Recommendation	
EPA/821/R-02/013 (Test Method 1003.0) or validated and SWAMP-approved alternative method	
Data Acceptability Requirements	
Parameter	*Criteria*
Test Acceptability Criteria[1]	Mean cell density of at least 1 X 10^6 cells/mL in the controls and variability (CV%) among control replicates less than or equal to 20% (non-EDTA: Mean cell density of at least 2 X 10^5 cells/mL in the controls; and variability (CV%) among control replicates less than or equal to 20% (required)
Data Qualification	
Test Conditions	*Required*
Test Type	Static non-renewal
Age at Test Initiation	4 - 7 days
Replication at Test Initiation	4 (minimum)10,000 cells/mL (recommended)
Organisms/Replicate	10,000 cells/mL (recommended)
Food Source	n/a
Renewal Frequency	None
Test Duration	96 h
Endpoints	Growth
Test Conditions	*Recommended* [2]
Temperature Range	25 ± 1 °C (+/- 3 °C required)
Light Intensity	86 ± 8.6 µE/m^2/s OR 400 ± 40 ft-c
Photoperiod	Continuous Illumination (“cool white” fluorescent lighting)
Test Chamber Size	125 mL or 250 mL
Replicate Volume	50 mL or 100 mL
Feeding Regime	None
Nutrient Media	Media prepared in accordance with EPA protocols
EDTA Addition	EDTA required per method
Laboratory Control Water	Moderately hard water or stock culture medium prepared in accordance with EPA protocols
Minimum Sample Volume	1 L for one-time grab sample
Sensitivity	*Performance Criteria*
Reference Toxicant Testing	See Table 2
Water Chemistry	
Test Parameter	*Required Frequency*
Initial Water Chemistry	One DO, pH, conductivity, ammonia, alkalinity, hardness, and temperature measurement per sample and per dilution
Daily Water Chemistry	One pH measurement per sample
Final Water Chemistry	One DO, pH, and temperature measurement per sample and per dilution
Test Parameter	*Recommended Criteria*
Initial DO Range	4.0 mg/L - 100% saturation
Initial pH Range	6.0 - 9.0
Conductivity Controls	Include appropriate controls when sample conductivities exceed1500 µS/cm
Sample Handling/Collection	
Test Parameter	*Recommended Conditions*
Relevant Media	Water column
Sample Container Type	Amber glass
Sample Preservation	Wet or blue ice in field, 0 - 6 °C refrigeration in laboratory, dark at all times
Sample Receipt Temperature	0 - 6 °C
Holding Time	<48 hours@ 0 - 6 °C; dark

[1]Test data are reviewed to verify that test acceptability criteria (TAC) requirements for a valid test have been met. Any test not meeting these criteria is considered invalid. All invalid tests must be repeated with a newly collected sample.

[2]Deviations from the summary of recommended test conditions must be evaluated on a project-specific basis to determine the validity of test results. Depending on the degree of the departure and the objective of the test, deviations from recommended conditions may or may not invalidate a test result.

APPENDIX D
Monitoring List

Table D-1
Permit - Receiving Water Quality and Toxicity Screening Parameters - Wet Weather*

Constituent	Sample Type	Method[a]	ML[b]	Units	Preservation	Holding Time
Field Parameters						
pH	Grab	Field Measure	NA	pH units	-	immediately
Dissolved Oxygen	Grab	Field Measure	5	mg/L	-	immediately
Temperature	Grab	Field Measure	NA	°Celsius	-	immediately
Specific Conductance	Grab	Field Measure	1	umhos/cm	-	immediately
Turbidity	Grab	Field Measure	0.1	NTU	-	immediately
Indicator Bacteria						
E. coli (fresh water/marine water)	Grab	SM 9223	235/400	MPN/100mL	$Na_2S_2O_3$	8 hours
Total Coliform (marine water)	Grab	SM 9221B	10,000	MPN/100mL	$Na_2S_2O_3$	8 hours
Fecal Coliform (fresh and marine water)	Grab	SM 9221E	400	MPN/100mL	$Na_2S_2O_3$	8 hours
Enterococcus (marine water)	Grab	SM 9230B	104	MPN/100mL	$Na_2S_2O_3$	8 hours
Chlorinated Pesticides						
Endosulfan I (alpha)	Grab	EPA 608	0.02	µg/L	Deliver on ice, store at ≤ 6°C	7 days for extraction; 40 days for analysis
Polychlorinated Biphenyls[c]						
Total PCBs	Grab	EPA 1668C	-	µg/L	Deliver on ice, store at ≤ 6°C	7 days for extraction; 40 days for analysis
Toxicity - Receiving Water with Salinity $\geq$ 1 ppt[d]						
A. affinis Larval Survival and Growth	Grab	EPA/600/R-95/136	NA	Toxic Units	Deliver on ice, store at ≤ 6°C	36 hours preferred; up to 72 hours acceptable
S. purpuratus Fertilization	Grab	EPA/600/R-95/136	NA	Toxic Units		
M. pyrifera Germination and Growth	Grab	EPA/600/R-95/136	NA	Toxic Units		

*Includes parameters listed in the MS4 Permit as well as those detected above the lowest applicable water quality objective during the first year of CIMP monitoring (in 2016-17). All parameters listed in this table will be monitored for the remainder of the permit term during both dry weather and wet weather unless otherwise footnoted.

[a] Listed methods are those currently utilized for MS4 Permit compliance. Other EPA and Standard Methods may be acceptable.

[b] ML = Minimum Level, from 2012 MS4 Permit. Method Detection Levels (MDLs) must be lower than or equal to the ML value, as published in MLs published in Appendix 4 of the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays and Estuaries of California (SIP), unless otherwise approved by the Regional Board.

[c] Although the Screening Parameters listed in the Permit are in the form of Aroclors, this CIMP will analyze PCB in the form of congeners for program consistency. At a minimum, the congeners listed in Table C8 of the Surface Water Ambient Monitoring Work Program (SWAMP) Quality Assurance Plan (QAPP) will be analyzed and summed for Total PBCs. Also note that the EPA has requested that the Regional Board modify the 2012 MS4 Permit to include PCB congeners in place of Aroclors.

[d] During the first year of the Permit term (2016-17), a test species sensitivity screening was performed as required in Section G.3 of the MS4 Permit to determine which of the three test species were the most sensitive. During Year 2 and 3 of the Permit term only the most sensitive test species will be analyzed (i.e. *S. purpuratus*). During Year 4 of the Permit term, rescreening shall occur utilizing all three test species listed in this table following the same procedure during Year 1.

NA = Not applicable

Table D-2
Permit - Receiving Water Quality and Toxicity Screening Parameters - Dry Weather*

Constituent	Sample Type	Method[a]	ML[b]	Units	Preservation	Holding Time
Field Parameters						
pH	Grab	Field Measure	NA	pH units	-	immediately
Dissolved Oxygen	Grab	Field Measure	5	mg/L	-	immediately
Temperature	Grab	Field Measure	NA	°Celsius	-	immediately
Specific Conductance	Grab	Field Measure	1	umhos/cm	-	immediately
Turbidity	Grab	Field Measure	0.1	NTU	-	immediately
Indicator Bacteria						
E. coli (fresh water/marine water)	Grab	SM 9223	235/400	MPN/100mL	$Na_2S_2O_3$	8 hours
Total Coliform (marine water)	Grab	SM 9221B	10,000	MPN/100mL	$Na_2S_2O_3$	8 hours
Fecal Coliform (fresh and marine water)	Grab	SM 9221E	400	MPN/100mL	$Na_2S_2O_3$	8 hours
Enterococcus (marine water)	Grab	SM 9230B	104	MPN/100mL	$Na_2S_2O_3$	8 hours
General						
Hardness, Total	Grab	SM 2340C	2	mg/L	HNO_3 or H_2SO_4	6 months
Total Suspended Solids	Grab	SM 2540D	2	mg/L	Deliver on ice, store at ≤ 6°C	7 days
Metals						
Dissolved Copper	Grab	EPA 1640	0.5	µg/L	Preserved in HNO_3 after filtration	6 months
Total Copper	Grab	EPA 1640	0.5	µg/L	HNO_3	6 months
Polychlorinated Biphenyls[c]						
Total PCBs	Grab	EPA 1668C	-	µg/L	Deliver on ice, store at ≤ 6°C	7 days for extraction; 40 days for analysis
Toxicity - Receiving Water with Salinity ≥ 1 ppt[d]						
A. affinis Larval Survival and Growth	Grab	EPA/600/R-95/136	NA	Toxic Units	Deliver on ice, store at ≤ 6°C	36 hours preferred; up to 72 hours acceptable
S. purpuratus Fertilization	Grab	EPA/600/R-95/136	NA	Toxic Units		
M. pyrifera Germination and Growth	Grab	EPA/600/R-95/136	NA	Toxic Units		

*Includes parameters listed in the MS4 Permit as well as those detected above the lowest applicable water quality objective during the first year of CIMP monitoring (in 2016-17). All parameters listed in this table will be monitored for the remainder of the permit term during both dry weather and wet weather unless otherwise footnoted.

[a] Listed methods are those currently utilized for MS4 Permit compliance. Other EPA and Standard Methods may be acceptable.

[b] ML = Minimum Level, from 2012 MS4 Permit. Method Detection Levels (MDLs) must be lower than or equal to the ML value, as published in MLs published in Appendix 4 of the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays and Estuaries of California (SIP), unless otherwise approved by the Regional Board.

[c] Although the Screening Parameters listed in the Permit are in the form of Aroclors, this CIMP will analyze PCB in the form of congeners for program consistency. At a minimum, the congeners listed in Table C8 of the Surface Water Ambient Monitoring Work Program (SWAMP) Quality Assurance Plan (QAPP) will be analyzed and summed for Total PBCs. Also note that the EPA has requested that the Regional Board modify the 2012 MS4 Permit to include PCB congeners in place of Aroclors.

[d] During the first year of the Permit term (2016-17), a test species sensitivity screening was performed as required in Section G.3 of the MS4 Permit to determine which of the three test species were the most sensitive. During Year 2 and 3 of the Permit term only the most sensitive test species will be analyzed (i.e. *S. purpuratus*). During Year 4 of the Permit term, re-screening shall occur utilizing all three test species listed in this table following the same procedure during Year 1.

NA = Not applicable

Table D-3
Permit - Outfall Storm Water Quality*

Constituent	Sample Type	Method[a]	ML[b]	Units		Holding Time
Field Parameters						
Flow						
pH	Grab	Field Measure	NA	pH units	-	immediately
Dissolved Oxygen	Grab	Field Measure	5	mg/L	-	immediately
Temperature	Grab	Field Measure	NA	°Celsius	-	immediately
Specific Conductance	Grab	Field Measure	1	umhos/cm	-	immediately
Turbidity	Grab	Field Measure	0.1	NTU	-	immediately
Indicator Bacteria						
E. coli (fresh water/marine water)	Grab	SM 9223	235/400	MPN/100mL	$Na_2S_2O_3$	8 hours
Total Coliform (marine water)	Grab	SM 9221B	10,000	MPN/100mL	$Na_2S_2O_3$	8 hours
Fecal Coliform (fresh and marine water)	Grab	SM 9221E	400	MPN/100mL	$Na_2S_2O_3$	8 hours
Enterococcus (marine water)	Grab	SM 9230B	104	MPN/100mL	$Na_2S_2O_3$	8 hours
General						
Hardness, Total	Comp	SM 2340C	2	mg/L	HNO_3 or H_2SO_4	6 months
Metals[c]						
Dissolved Copper	Comp	EPA 1640	0.5	µg/L	Preserved in HNO_3 after filtration	6 months
Total Copper	Comp	EPA 1640	0.5	µg/L	HNO_3	6 months
Dissolved Zinc	Comp	EPA 1640	1	µg/L	Preserved in HNO_3 after filtration	6 months
Total Zinc	Comp	EPA 1640	1	µg/L	HNO_3	6 months
Chlorinated Pesticides						
Endosulfan I (alpha)	Comp	EPA 608	0.02	µg/L	Deliver on ice, store at ≤ 6°C	7 days for extraction; 40 days for analysis
Polychlorinated Biphenyls[d]						
PCB congeners	Comp	EPA 1668C	-	µg/L	Deliver on ice, store at ≤ 6°C	7 days for extraction; 40 days for analysis
Additional Parameters						
Parameters identified as causing toxicity at the downstream receiving water station will be added to this list. Toxicity testing will also be added if a toxicity identification evaluation (TIE) at the downstream receiving water station is inconclusive.						

*Includes parameters listed in the MS4 Permit as well as those detected above the lowest applicable water quality objective at the downstream receiving water station during the first year of the Permit term (2016-17). All parameters listed in this table will be monitored for the remainder of the permit term.

[a] Listed methods are those currently utilized for MS4 Permit compliance. Other EPA and Standard Methods may be acceptable.

[b] ML = Minimum Level, from 2012 MS4 Permit. Method Detection Levels (MDLs) must be lower than or equal to the ML value, as published in MLs published in Appendix 4 of the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays and Estuaries of California (SIP), unless otherwise approved by the Regional Board.

[c] Metals added to analyte list due to results of TIE findings in Year 2 of the Permit term (2017-18)

[d] Although the Screening Parameters listed in the Permit are in the form of Aroclors, this CIMP will analyze PCB in the form of congeners for program consistency. At a minimum, the congeners listed in Table C8 of the Surface Water Ambient Monitoring Work Program (SWAMP) Quality Assurance Plan (QAPP) will be analyzed and summed for Total PBCs. Also note that the EPA has requested that the Regional Board modify the 2012 MS4 Permit to include PCB congeners in place of Aroclors.

NA = Not applicable

Table D-4
Bacteria TMDL - Water Quality

Constituent	Sample Type	Method[a]	ML	Units	Preservation	Holding Time
Indicator Bacteria						
Total Coliform	Grab	SM9221E	20	MPN/100mL	$Na_2S_2O_3$	8 hours
E. coli [b]	Grab	SM9223	20	MPN/100mL	$Na_2S_2O_3$	8 hours
Enterococcus	Grab	SM9230B	20	MPN/100mL	$Na_2S_2O_3$	8 hours

[a] Methods used should allow for detection at or below numeric targets outlined in the TMDL. Other EPA and Standard Methods may be acceptable.

[b] *E. coli is* used as a surrogate for fecal coliform; the standard is the same as for fecal coliform.

Table D-5
Toxics TMDL - Water Quality

Constituent	Sample Type	Method[a]	ML or TMDL Limit	Units	Preservation	Holding Time
General						
Hardness, Total	Grab	SM 2340C	2	mg/L	HNO_3 or H_2SO_4	6 months
Metals						
Dissolved Copper	Grab	EPA 1640	0.5	µg/L	HNO_3	6 months
Total Copper	Grab	EPA 1640	0.5	µg/L	HNO_3	6 months
Polychlorinated Biphenyls[b]						
Total PCBs	Grab	EPA 1668C	0.00017*	µg/L	Deliver on ice, store at ≤ 6°C	7 days for extraction; 40 days for analysis

*Toxics TMDL numeric targets.

[a] Methods used should allow for detection at or below numeric targets outlined in the Toxics TMDL. Other EPA and Standard Methods may be acceptable. Per the Toxics TMDL, "Currently, several consituents of concern have numeric targets that are lower than readily available detection limits. As analytical methods and detection limits continue to improve and become more environmentally relevant, responsible parties shall incorporate new MDLs in the monitoring plan."

[b] Although the Screening Parameters listed in the Permit are in the form of Aroclors, this CIMP will analyze PCB in the form of congeners for program consistency. At a minimum, the congeners listed in Table C8 of the Surface Water Ambient Monitoring Work Program (SWAMP) Quality Assurance Plan (QAPP) will be analyzed and summed for Total PBCs. Also note that the EPA has requested that the Regional Board modify the 2012 MS4 Permit to include PCB congeners in place of Aroclors.

Table D-6
Sediment Chemistry and Toxicity

Constituent	Method[a]	Maximum Reporting Limit[b] (Dry Weight)	Units	Preservation	Holding Time
Physical/Conventional Tests					
Particle Size	ASTM D4464M	1.0	%	Deliver on ice, store at ≤ 6°C	-
Percent Solids	SM 2540B	0.1	%		-
Total Organic Carbon (TOC)	EPA 9060A	0.05	%		28 days
Metals					
Copper (Cu)	EPA 6020	52.8	mg/kg	Deliver on ice, store at ≤ 6°C	180 days
Lead (Pb)	EPA 6020	25	mg/kg		180 days
Zinc (Zn)	EPA 6020	60	mg/kg		180 days
Polychlorinated Biphenyls (congeners)[c]					
Total PCBs	EPA 8270C	-	µg/kg	Deliver on ice, store at ≤ 6°C	14 days for extraction; 40 days for analysis
Organochlorine Pesticides					
Chlordane-alpha	EPA 8270C	0.50	µg/kg	Deliver on ice, store at ≤ 6°C	14 days for extraction; 40 days for analysis
Chlordane-gamma	EPA 8270C	0.54	µg/kg		
cis-Nonachlor	EPA 8270C	0.58	µg/kg		
trans-Nonachlor	EPA 8270C	4.6	µg/kg		
Oxychlordane	EPA 8270C	0.58	µg/kg		
Total Chlordane[d]	Calculated	-	µg/kg		
2,4'-DDD	EPA 8270C	0.50	µg/kg		
2,4'-DDE	EPA 8270C	0.50	µg/kg		
2,4'-DDT	EPA 8270C	0.50	µg/kg		
4,4'-DDD	EPA 8270C	0.50	µg/kg		
4,4'-DDE	EPA 8270C	0.50	µg/kg		
4,4'-DDT	EPA 8270C	0.50	µg/kg		
Total DDTs[e]	Calculated	-	µg/kg		
Toxicity					
L. plumulosus 10-day Acute Survival	ASTM E1367-03 and EPA/600/R-95/136	NA	NA	Deliver on ice, store at ≤ 6°C	10 days preferred; up to 28 days acceptable.
M. galloprovincialis 48-Hour Sediment Water Interface Development Test[f]	Anderson et al. 1996 and EPA/600/R-95/136	NA	NA		

[a] All samples will be tested in accordance with USEPA or American Society for Testing and Materials (ASTM) methodologies where such methods exist. Approval of alternative methods should be obtained from the SWRCB. Additional methods may be acceptable if they produce results at or below the desired reporting limits and are comparable to results generated by USEPA methods.

[b] Maximum reporting limits as recommended in SCCWRP's "Sediment Quality Assessment Technical Support Manual" (January 2014). These limits are "based on the CSI classification ranges and do not necessarily reflect the maximum performance achievable with available analytical methods". This statement applies for all analytes listed in the table above except the following: particle size, percent solids, and total organic carbon. The concentrations associated with the reporting limits in the table are expressed in dry weight as should all analytical results.

[c] At a minimum, the congeners listed in Table C8 of the Surface Water Ambient Monitoring Work Program (SWAMP) Quality Assurance Plan (QAPP) will be analyzed and summed for Total PBCs.

[d] Sum of chlordane-alpha, chlordane-gamma, cis-nonachlor, trans-nonachlor and oxychlordane.

[e] Sum of 2,4'-DDD, 2,4'-DDE, 2,4'-DDT, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT.

[f] Alternatively, a 28-day *Neanthes arenaceodentata* growth test may be utilized as the sublethal test in accordance with ASTM E1611-07 and USEPA protocols. However, the *M. galloprovincialis* test has been the sublethal test utilized during previous testing.

Table D-7
Triad Analysis (SQOs) - Sediment

Constituent	Method[a]	Maximum Reporting Limit[b] (Dry Weight)	Units	Preservation	Holding Time
Physical/Conventional Tests					
Particle Size	ASTM D4464M	1.0	%	Deliver on ice, store at ≤ 6°C	-
Percent Solids	SM 2540B	0.1	%		-
Total Organic Carbon (TOC)	EPA 9060A	0.05	%		28 days
Metals					
Cadmium (Cd)	EPA 6020	0.09	mg/kg	Deliver on ice, store at ≤ 6°C	180 days
Copper (Cu)	EPA 6020	52.8	mg/kg		180 days
Lead (Pb)	EPA 6020	25	mg/kg		180 days
Mercury (Hg)	EPA 7471A	0.09	mg/kg		180 days
Zinc (Zn)	EPA 6020	60	mg/kg		180 days
Total PAHs - MLs are based on 2 grams of soil analyzed					
Low Molecular Weight PAHs					
1-Methylnaphthalene	EPA 8270	20	µg/kg	Deliver on ice, store at ≤ 6°C	14 days for extraction; 40 days for analysis
1-Methylphenanthrene	EPA 8270	20	µg/kg		
2,6-Dimethylnaphthalene	EPA 8270	20	µg/kg		
2-Methylnaphthalene	EPA 8270	20	µg/kg		
Acenaphthene	EPA 8270	20	µg/kg		
Anthracene	EPA 8270	20	µg/kg		
Biphenyl	EPA 8270	20	µg/kg		
Fluorene	EPA 8270	20	µg/kg		
Naphthalene	EPA 8270	20	µg/kg		
Phenanthrene	EPA 8270	20	µg/kg		
High Molecular Weight PAHs					
Benzo(a)anthracene	EPA 8270	80	µg/kg	Deliver on ice, store at ≤ 6°C	14 days for extraction; 40 days for analysis
Benzo(a)pyrene	EPA 8270	80	µg/kg		
Benzo(e)pyrene	EPA 8270	80	µg/kg		
Chrysene	EPA 8270	80	µg/kg		
Dibenzo(a,h)anthracene	EPA 8270	80	µg/kg		
Fluoranthene	EPA 8270	80	µg/kg		
Perylene	EPA 8270	80	µg/kg		
Pyrene	EPA 8270	80	µg/kg		
Polychlorinated Biphenyls (congeners)[c]					
Total PCBs	EPA 8270	-	µg/kg	Deliver on ice, store at ≤ 6°C	14 days for extraction; 40 days for analysis
Organochlorine Pesticides					
Chlordane-alpha	EPA 8270	0.50	µg/kg	Deliver on ice, store at ≤ 6°C	14 days for extraction; 40 days for analysis
Chlordane-gamma	EPA 8270	0.54	µg/kg		
trans-Nonachlor	EPA 8270	4.6	µg/kg		
Dieldrin	EPA 8270	2.5	µg/kg		
2,4'-DDD	EPA 8270	0.50	µg/kg		
2,4'-DDE	EPA 8270	0.50	µg/kg		
2,4'-DDT	EPA 8270	0.50	µg/kg		
4,4'-DDD	EPA 8270	0.50	µg/kg		
4,4'-DDE	EPA 8270	0.50	µg/kg		
4,4'-DDT	EPA 8270	0.50	µg/kg		
Total DDTs[d]	Calculated	-	µg/kg		
Toxicity					
L. plumulosus 10-day Acute Survival	ASTM E1367-03 and EPA/600/R-95/136	NA	NA	Deliver on ice, store at ≤ 6°C	10 days preferred; up to 28 days acceptable.
M. galloprovincialis 48-Hour Sediment Water Interface Development Test[e]	Anderson et al. 1996 and EPA/600/R-95/136	NA	NA		

[a] All samples will be tested in accordance with USEPA or American Society for Testing and Materials (ASTM) methodologies where such methods exist. Approval of alternative methods should be obtained from the SWRCB. Additional methods may be acceptable if they produce results at or below the desired reporting limits and are comparable to results generated by USEPA methods.

[b] Maximum reporting limits as recommended in SCCWRP's "Sediment Quality Assessment Technical Support Manual" (January 2014). These limits are "based on the CSI classification ranges and do not necessarily reflect the maximum performance achievable with available analytical methods". This statement applies for all analytes listed in the table above except the following: particle size, percent solids, and total organic carbon. The concentrations associated with the reporting limits in the table are expressed in dry weight as should all analytical results.

[c] At a minimum, the congeners listed in Table C8 of the Surface Water Ambient Monitoring Work Program (SWAMP) Quality Assurance Plan (QAPP) will be analyzed and summed for Total PBCs.

[d] Sum of 2,4'-DDD, 2,4'-DDE, 2,4'-DDT, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT.

[d] Alternatively, a 28-day *Neanthes arenaceodentata* growth test may be utilized as the sublethal test in accordance with ASTM E1611-07 and USEPA protocols. However, the *M. galloprovincialis* test has been the sublethal test utilized during previous testing.

Table D-8
Toxics TMDL - Outfalls (Water)

Constituent	Sample Type	Method[a]	ML	Units	Preservation	Holding Time
General						
Total Suspended Solids (TSS)	Comp	SM 2540D	2	mg/L	Deliver on ice, store at ≤ 6°C	7 days
Total Dissolved Solids (TDS)	Comp	SM 2540C	2	mg/L		7 days
Settleable Solids	Comp	SM 2540F	2	mg/L		7 days
Total Organic Carbon (TOC)[b]	Comp	SM 5310B	1	mg/L	H_2SO_4	28 days

[a] Methods used should allow for detection at or below numeric targets outlined in the Toxics TMDL. Other EPA and Standard Methods may be acceptable. Per the Toxics TMDL, "Currently, several constituents of concern have numeric targets that are lower than readily available detection limits. As analytical methods and detection limits continue to improve and become more environmentally relevant, responsible parties shall incorporate new MDLs in the monitoring plan."

[b] TOC will be analyzed in water instead of sediment per the Regional Board approval letter dated June 27, 2018.

Table D-9
Toxics TMDL - Outfalls (Suspended Sediment: Storm-borne and Non-Storm Water)

Constituent	Sample Type	Method[a]	TMDL Limit*	ML	Units	Preservation	Holding Time
Metals							
Copper	Comp	EPA 6010B	34	4.4	mg/kg	Deliver on ice, store at ≤ 6°C	6 months
Lead	Comp	EPA 6010B	46.7	2.2	mg/kg		
Zinc	Comp	EPA 6010B	150	2.2	mg/kg		
Polychlorinated Biphenyls - Congeners[b]							
Total PCBs	Comp	EPA 1668C	3.2	-	µg/kg	Deliver on ice, store at ≤ 6°C	1 year
Organochlorine Pesticides							
Total Chlordane[c]	Comp	Calculated	0.5	-	µg/kg	Deliver on ice, store at ≤ 6°C	1 year
4,4'-DDE	Comp	EPA 1699	2.2	0.04	µg/kg		
Total DDTs[d]	Comp	Calculated	1.58	-	µg/kg		

*Toxics TMDL numeric targets.

[a] Methods used should allow for detection at or below numeric targets outlined in the Toxics TMDL. Other EPA and Standard Methods may be acceptable. Per the Toxics TMDL, "Currently, several constituents of concern have numeric targets that are lower than readily available detection limits. As analytical methods and detection limits continue to improve and become more environmentally relevant, responsible parties shall incorporate new MDLs in the monitoring plan."

[b] At a minimum, the congeners listed in Table C8 of the Surface Water Ambient Monitoring Work Program (SWAMP) Quality Assurance Plan (QAPP) will be analyzed and summed for Total PBCs.

[c] Sum of chlordane-alpha, chlordane-gamma, cis-nonachlor, trans-nonachlor and oxychlordane.

[d] Sum of 2,4'-DDD, 2,4'-DDE, 2,4'-DDT, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT.

Table D-10
Toxics TMDL - Fish and Mussel Tissue (Annual)

Constituent	Method[a]	TMDL Limit	RL[b]	Units	Preservation	Holding Time
Polychlorinated Biphenyls - Congeners[c]						
Total PCBs	EPA 8270C	3.6*	-	µg/kg	f	7 days for extraction; 40 days for analysis
Organochlorine Pesticides						
Total Chlordane[d]	Calculated	-	0.04	µg/kg	f	7 days for extraction; 40 days for analysis
4,4'-DDE	EPA 8081A	-	0.08	µg/kg		
Total DDTs[e]	Calculated	-	0.08	µg/kg		

*Toxics TMDL numeric target for Fish Tissue for total PCBs.

[a] Methods used should allow for detection at or below numeric targets outlined in the Toxics TMDL. Other EPA and Standard Methods may be acceptable.

[b] Based on low mass availability for tissue.

[c] At a minimum, the congeners listed in Table C8 of the Surface Water Ambient Monitoring Work Program (SWAMP) Quality Assurance Plan (QAPP) will be analyzed and summed for Total PBCs.

[d] Sum of chlordane-alpha, chlordane-gamma, cis-nonachlor, trans-nonachlor and oxychlordane.

[e] Sum of 2,4'-DDD, 2,4'-DDE, 2,4'-DDT, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT.

[f] Tissue preparation includes whole fish filleting and/or grinding, and/or any less-involved tissue preparation approach. Samples should be cooled to ≤ 6°C within 24 hours, then frozen to ≤ -20°C,

APPENDIX E
New Development/Re-Development Program Forms

Inspection Check List for Each BMP		
System / Maintenance Item	**Satisfactory/ Unsatisfactory**	**Comments**
Inlet/Outlet		
Drainage • Overall area graded to inlet • No evidence of flow bypassing BMP • Appropriate invert elevation • No evidence of flooding due to clogging/obstruction		
Condition • Sized per specifications • Overall material condition		
Hydromodification Control (riprap/gabions) • No evidence of scouring • Protections visible • Filter fabric intact *(if applicable)*		
Basin/Trench		
Drainage • Dewaters between storms per design specifications • No Ponded/Standing Water* • No Depressions/Low spots		
Aggregate/Rock *(if applicable)* • Clean with no evidence of clogging • Top layer of stone does not need replacement		
Excessive sedimentation (≥ 2 inches deep and/or covers vegetation, or 10% of design capacity)		
Trash/Debris • Adequate maintenance • Requires maintenance		
Vegetation		
Species • Per specifications • No unauthorized plantings		
Health • Lush or dead/diseased/dying • Invasive species** • Maintained or Overgrown (grass greater than 10 inches)		
Embankments		
Hydromodification Control • Coverage per specifications • No erosion/hydromodification • No seeps/leeks/gullies		

<table>
<tr><th colspan="3">Inspection Check List for Each BMP</th></tr>
<tr><th>System / Maintenance Item</th><th>Satisfactory/ Unsatisfactory</th><th>Comments</th></tr>
<tr><td colspan="3">Bioretention Area (if applicable)</td></tr>
<tr><td>Drainage
• Dewaters between storms per design specifications
• No Ponding
• No depressions/low spots</td><td></td><td></td></tr>
<tr><td>Slopes are stable</td><td></td><td></td></tr>
<tr><td>Mulch
• Adequate cover
• Adequate depth/thickness</td><td></td><td></td></tr>
<tr><td>Underdrains
• Diameter, Spacing and Material per specifications
• Adequate gravel cover</td><td></td><td></td></tr>
<tr><td>Excessive sedimentation (covers vegetation or greater than 2 inches deep)</td><td></td><td></td></tr>
<tr><td>Trash/Debris
• Adequate maintenance
• Requires maintenance</td><td></td><td></td></tr>
<tr><td colspan="3">Riser (if applicable)</td></tr>
<tr><td>Material
Reinforced Concrete: ____
Corrugated Metal Pipe:____
Masonry:____
PVC:____</td><td></td><td></td></tr>
<tr><td>Condition
• Cracks/displacement/joint failures/water tightness
• Corrosion
• Spalling</td><td></td><td></td></tr>
<tr><td>Obstructions
• Low flow orifice obstructed
• Excessive sediment in riser</td><td></td><td></td></tr>
<tr><td colspan="3">Pre-Treatment Systems (if applicable)</td></tr>
<tr><td>Grates/Screens
• Structural condition
• Corrosion</td><td></td><td></td></tr>
<tr><td>Obstructions/Clogging</td><td></td><td></td></tr>
<tr><td>Sediment/Trash/Debris
• Adequate maintenance
• Requires maintenance</td><td></td><td></td></tr>
<tr><td colspan="3">Media Filters (if appropriate)</td></tr>
<tr><td>Media Filter
• Filter damage/breakthrough
• Staining
• Clogging</td><td></td><td></td></tr>
<tr><td>Sediment/Trash/Debris
• Adequate maintenance
• Requires maintenance</td><td></td><td></td></tr>
</table>

Inspection Check List for Each BMP		
System / Maintenance Item	**Satisfactory/ Unsatisfactory**	**Comments**
Overflow Bypass (if appropriate)		
Spillway Condition • Sized per specifications • Adequate slope protection (e.g., armoring with rip rap)		
Hydromodification • Seeps/leaks on downstream face • Cracking/bulging at toe of spillway • Sliding/gullies		
Obstructions		
Access/Fencing		
Access points in good condition (safe)		
Fences in good condition • No damage which would allow undesirable entry • Lock and gate function		
Other		
All appropriate signage in place		
Animal burrows (gopher holes, etc)		
System modifications since last inspection		
Aesthetics • Vandalism/Graffiti • Odors • Vegetation		
Complaints from residents		
Public Hazards		

* If mosquito larvae are present and persistent, contact the appropriate Vector Control authority.
** Invasive plants should be no greater than 5% of the total vegetated area.

General Post-Construction BMP Inspection Questions	
General Post-Construction BMP Inspection Questions	**Potential Indicators of Improper BMP Design and/or Installation**

1) Has a BMP been installed?
2) Does runoff flow to the BMP?
3) Have the correct inlet/outlet structures been installed? Is there an overflow outlet?
4) Does the BMP drain within design period?
5) Was the correct soil mixture used?
6) Was the BMP protected during construction?
7) Does vegetation meet species/coverage/establishment criteria? Is irrigation needed?
8) Have underdrains been installed to specification?
9) Can the BMP clog?
10) Is there evidence of excess nuisance flow?
11) Are there fencing requirements?
12) Is there access for required maintenance? Is this access safe?
 	
<u>Optional Additional Questions:</u>
A) Permeability test.
B) Is the groundwater table within 10 feet (3 meters) of the BMP invert?
	• Limited visible indicators of a BMP (e.g., pipe vent, inlet, etc)
	• Site grading drains away from an installed BMP
	• Ponding
	  ○ Deposited trash/sediment/ debris/vegetation
	  ○ High turbidity
	• Condition of BMP vegetation
	  ○ Coverage
	  ○ Species
	  ○ Vitality
	• Excess sediment loading (additional controls required)
	• Rising groundwater table
	• Soil borings not representative of conditions (e.g., high clay content)

Self-Inspection Form (Maintenance Records)				
What to Look For During BMP Inspection:	**Date of Inspection**	**Satisfactory/ Unsatisfactory**	**Maintenance Required**	**Date of Maintenance / Maintenance Completed**
Accumulation of Sediment, Debris, Litter, Grease, etc.				
Ponded/ Standing Water (Insect Breeding)				
Vegetation: • Overgrown • Establishment • Health				
Erosion/ Sedimentation				
Obstructions				
Clogged Filter Media				
Damage				

APPENDIX F
CIMP Data Management and Assessment

F.0 CIMP DATA MANAGEMENT AND ASSESSMENT

This appendix presents a discussion of the protocols for data management and methods for assessment monitoring data collected under the Coordination Implementation Monitoring Plan (CIMP) for the Marina del Rey (MdR) Watershed.

F.1 Data Management and Review

Laboratories will document, track, and archive the aspects of sample receipt and storage, analyses, and reporting. Further details of each laboratory's data management protocols can be found in each laboratory's respective quality assurance project plans (QAPPs), which will be provided by the laboratories, as needed.

All aspects of the sample collection and analysis process, including final laboratory electronic data deliverables (EDDs), field logs, and chain-of-custody forms will be tracked and documented. All data will undergo verification and validation to ensure accuracy and completeness. The data are compared to information such as the station and sample's history, sample preparation, and quality control (QC) sample data to evaluate the validity of the results. Minimum requirements for data validation include the following:

- Matrix spike and/or duplicate analyses are performed per concentration level and per matrix for every sample batch analyzed (where appropriate).
- Reference materials analyses are compared with "true" values and acceptable ranges. Values outside the acceptable ranges indicate that the sample values are invalid. Following correction of the problem, the reference material should be reanalyzed.

Corrective actions will be taken if data do not meet quality assurance (QA) and QC criteria. Once data are finalized, data will be standardized based on nomenclature developed specifically for the CIMP. Data will then be submitted to the MdR EWMP Agencies on an annual basis for preparation of the Annual Report due December 15.

Additionally, semi-annual annual data reports will be submitted with the annual monitoring report, and six months prior to the annual report (June 15 of each year). The June 15 data submittal will cover the monitoring period of July 1 through December 31, and the December 15 data submittal will cover January 1 through June 30. These semi-annual analytical data reports detail exceedances applicable to water quality based effluent limitations (WQBELs), receiving water limitations (RWLs), action levels, or aquatic toxicity thresholds, with corresponding sample dates and monitoring locations.

F.1.1 Regional Monitoring Program Data Management

The Permit requires submission of SMC program data in the latest SMC Standardized Data Transfer Formats (SDTFs) developed and managed by SCCWRP. The SMC program is not currently being conducted in the MdR Watershed and no watershed-specific data will be available. In the event that bioassessment data are collected and reported for the MdR Watershed, data will be formatted and uploaded using the SDTFs.

F.2 Receiving Water Assessment

F.2.1 Permit – Receiving Water Assessment – Water Quality

The National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit Order No. R4-2012-0175 (Permit) defines the Monitoring and Reporting Program (MRP) requirements, which will be used to assess conditions in the Receiving Water Monitoring Station(s) where data is collected for Permit compliance. This assessment methodology is only applicable to Permit compliance monitoring data and ought not be extrapolated to data collected for Total Maximum Daily Load (TMDL) compliance data assessment.

Water quality data collected from the MdR receiving water for Permit compliance will be compared with all applicable receiving water limitations. According to Section C.2 of the California Ocean Plan, the provisions and water quality objectives defined therein do not apply to enclosed bays and estuaries. Per Appendix I to the California Ocean Plan, enclosed bays include indentation along the coast which enclose an area of oceanic water within distinct headland or harbor works. Therefore, these receiving water limitations do not apply to the MdR Watershed.

The Los Angeles Basin Plan directly or by reference identifies saltwater limitations (Table F-1) that may be applicable for assessment of MdR receiving water permit compliance monitoring data.

Table F-1. Potentially Applicable Saltwater Receiving Water Limitations for Assessment of MdR Receiving Water Permit Compliance Monitoring Data

Parameter	Units	CMC for Saltwater
4-4'-DDT	µg/L	0.13
Aldrin	µg/L	1.3
Chloride	mg/L	N/A
Chlordane	µg/L	0.09
Cyanide	mg/L	0.001
Dieldrin	µg/L	0.71
Arsenic, Total	µg/L	69
Cadmium, Total	µg/L	42
Chromium (III), Total	µg/L	N/A
Chromium (VI) Total	µg/L	1,100
Copper, Total	µg/L	4.8
Lead, Total	µg/L	210
Nickel, Total	µg/L	74
Selenium, Total	µg/L	290
Silver, Total	µg/L	1.9

Table F-1. Potentially Applicable Saltwater Receiving Water Limitations for Assessment of MdR Receiving Water Permit Compliance Monitoring Data

Parameter	Units	CMC for Saltwater
Zinc, Total	µg/L	90
Arsenic, Dissolved	µg/L	69
Cadmium, Dissolved	µg/L	42
Chromium (III), Dissolved	µg/L	BP
Chromium (VI), Dissolved	µg/L	1100
Copper, Dissolved	µg/L	4.8
Lead, Dissolved	µg/L	210
Nickel, Dissolved	µg/L	[Reserved]
Selenium, Dissolved	µg/L	290
Silver, Dissolved	µg/L	1.9
Zinc, Dissolved	µg/L	90
Dissolved Oxygen	mg/L	BP
alpha-Endosulfan	µg/L	0.034
beta-Endosulfan	µg/L	0.034
Endrin	µg/L	0.037
gamma-BHC (lindane)	µg/L	0.16
Heptachlor	µg/L	0.053
Heptachlor epoxide	µg/L	0.053
Nitrate (NO_3)	mg/L	BP
Nitrate-N	mg/L	BP
Nitrite-N	mg/L	BP
Pentachlorophenol	µg/L	13
pH	pH units	BP
Sulfate	mg/L	N/A
Total dissolved solids (TDS)	mg/L	N/A
Toxaphene	µg/L	0.21

Note: This list of parameters is based on the 2012-2013 Monitoring Annual Report and may require modification based on regional (County-wide) implementation of Permit programs.
N/A – Not Applicable.
BP – Freshwater receiving water limitation identified in the Basin Plan.
CMC - Criterion Maximum Concentration, the acute CTR water quality standard.
*The California Ocean Plan receiving water values do not apply to the MdR Watershed.

Toxicity assessments will follow the guidelines set forth in the MRP and clarified in the LARWQCB's August 7, 2015 Toxicity Clarification Memo (Toxicity Memo). If toxicity is present in the receiving water sample and if either the survival or sublethal endpoint demonstrates a Percent Effect value equal to or greater than 50% at the instream waste concentration (IWC) then a TIE will be conducted. Percent effect is defined as the effect value—denoted as the difference between the mean control response and the mean IWC response, divided by the mean control response—multiplied by 100. If toxicity is present but does not trigger a TIE, toxicity will continue to be monitored at the station and an evaluation similar to a toxicity reduction evaluation (TRE) will be conducted per the guidelines established in the Toxicity Memo.

If a TIE is conducted at the receiving water station and is inconclusive during dry weather, toxicity monitoring will be added to the upstream outfall monitoring station. If the TIE is inconclusive during wet weather monitoring, toxicity monitoring will be added to the upstream outfall station after a second inconclusive TIE at the receiving water station.

If a TIE is conducted at the receiving water station and identifies the pollutant or class of pollutants contributing to the toxicity, then these pollutants will be added to monitoring at the receiving water station and at the upstream outfall station. If results from monitoring at the outfall station are above applicable WQBELs or RWLs, then a TRE will be conducted.

F.2.2 Bacteria TMDL – Receiving Water Assessment – Water Quality

Bacteria grab samples will be compared with the single-sample numeric targets presented in the Bacteria TMDL. An assessment of the single-sample monitoring data will be conducted monthly using the site-specific allowable number of exceedance days.

Rolling geometric mean calculations will be used to determine compliance with the Bacteria TMDL. Geometric means concentrations will be calculated for each indicator bacteria on a station-by-station basis using the historical dataset available for MdR Watershed. The geometric mean shall be calculated weekly as a rolling geometric mean using five or more samples, for 6-week periods, starting all calculations on Sunday. Geometric mean targets may not be exceeded at any time.

F.2.3 Toxics TMDL – Receiving Water Assessment – Water, Sediment and Fish Tissue Quality

Chemistry data for water, sediment, and fish tissue will be compared to the Toxics TMDL numeric targets defined in the Regulatory Drivers Appendix A.

Sediment toxicity results will be compared to appropriate laboratory controls.

F.2.4 Toxics TMDL – Receiving Water Assessment – Triad Assessment

Sediment chemistry, toxicity, and benthic community condition will be assessed once every five years using California's sediment quality objectives (SQOs) as described in the *Water Quality Control Plan for Enclosed Bays and Estuaries* (SWRCB and Cal EPA, 2009). The goals of the SQOs are to determine whether pollutants in sediments are present in quantities that are toxic to benthic organisms and/or will bioaccumulate in marine organisms to levels that may be harmful to humans. The SQOs are based on a multiple lines-of-evidence (MLOE) approach in which sediment toxicity, sediment chemistry, and benthic community condition are the lines of evidence (LOEs). The MLOE approach evaluates the severity of biological effects and the potential for chemically mediated effects to provide a final station level assessment.

Categorization values for benthic infauna, sediment quality guidelines (toxicity), and SQOs (chemistry) are described in the *Water Quality Control Plan for Enclosed Bays and Estuaries* (SWRCB and Cal EPA, 2009). Data analyses will be performed to determine what physical and chemical factors most greatly influenced the distribution of benthic organisms as discussed below. Data may be integrated and summarized using the reporting template presented in Figure F-1.

<u>*Benthic Infauna Index of Biotic Integrity*</u>
The Benthic community condition was assessed using a combination of four benthic indices, the Benthic Response Index (BRI), Relative Benthic Index (RBI), Index of Biotic Integrity (IBI), and a predictive model based on the River Invertebrate Prediction and Classification System (RIVPACS). The four indices will be calculated following the 2014 guidance provided by SCCWRP entitled, *Sediment Quality Assessment Technical Support Manual* (SCCWRP, 2014).

Each benthic index result was categorized according to four levels of disturbance, including reference, low, moderate, and high disturbance:

- **Reference:** Equivalent to a least affected or unaffected site.
- **Low Disturbance:** Some indication of stress is present, but is within measurement error of unaffected condition.
- **Moderate Disturbance:** Clear evidence of physical, chemical, natural, or anthropogenic stress.
- **High Disturbance:** High magnitude of stress.

Sediment Quality Guidelines (Toxicity)

Sediment toxicity is assessed using two tests, a 10-day *L. plumulosus* (or *E. estuarius* depending on program [e.g., Bight program]) survival test and a sublethal test using the mussel *M. galloprovincialis*. Sediment toxicity test results from each site will be statistically compared to control test results; normalized to the control survival; and categorized as nontoxic, low, moderate, or high toxicity. The average of the test responses will be calculated to determine the final toxicity level of exposure (LOE) category. If the average falls midway between the two categories, it will be rounded up to the higher of the two. Tables with criteria are presented in the SQO guidelines (SCCWRP, 2014).

Sediment Quality Objectives (Chemistry)

Concentrations of chemicals detected in sediments will be compared to the California Logistic Regression Model (CA LRM) and the Chemical Score Index (CSI). The CA LRM is a maximum probability model (P_{MAX}) that uses logistic regression to predict the probability of sediment toxicity. The CSI is a predictive index that relates sediment chemical concentration to benthic community disturbance. Sediment chemistry results according to CA LRM and CSI will be categorized as having minimal, low, moderate, or high exposure to pollutants. The final sediment LOE category is the average of the two chemistry exposure categories. If the average falls midway between the two categories, it will be rounded up to the higher of the two. For example, if the CA LRM is low exposure and the CSI is moderate exposure, then the final sediment LOE category will be moderate exposure.

Location: MdR Watershed - Harbor Receiving Water Stations
Station:
Final Site Assessment =

Chemical Analyte	Units	Actual Sediment Concentration	CA LRM P Values	Score As part of CSI Calculation (Benthic Disturbance Category)
Cadmium	mg/kg			N/A
Copper	mg/kg			
Lead	mg/kg			
Mercury	mg/kg			
Zinc	mg/kg			
PAHs, total high MW	ng/g			
PAHs, total low MW	ng/g			
Chlordane, alpha	ng/g			
Chlordane, gamma	ng/g		N/A	
Dieldrin	ng/g			N/A
Trans nonachlor	ng/g			N/A
Total PCBs	ng/g			
4,4'DDT	ng/g			N/A
DDDs, total	ng/g		N/A	
DDEs, total	ng/g		N/A	
DDTs, total	ng/g		N/A	
		PMAX value		
		Mean CSI		
		Category		
		Final Chemistry LOE Category		

Test Species/Endpoint	%Normal Alive	% N-A (Control Normalized)	Statistical Significance	Test Response Category	Final Toxicity LOE Category
Eohaustorius survival					
Mytilus Normal					

Index	Score	Index Disturbance Category	Final Benthic LOE Category
BRI			
IBI			
RBI			
RIVPACS			

CA LRM = California Logistics Regression Model
CSI = Chemical Score Index
PMAX value = maximum probability model value
LOE Category = Line of Evidence category
N/A = Not Applicable

Figure F-1. Triad Assessment – Integrated Data Summary Template

F.3 Stormwater Outfall Monitoring – Water Quality Assessment

F.3.1 Permit – Stormwater Outfall Monitoring Assessment – Water Quality

The MRP defines the requirements which will be used to assess conditions at Outfall Monitoring Stations where data is collected for Permit compliance. This assessment methodology is only applicable to Permit compliance monitoring data and ought not be extrapolated to data collected for TMDL compliance data assessment. Water quality data collected from the MdR Outfall Monitoring Station(s) for Permit compliance will be compared to the municipal action levels (MALs) defined in Attachment G of the Permit. The MALs, per Attachment G of the Permit and presented in Table F-2, are based on nationwide Phase I MS4 monitoring data for pollutants in Storm Water (upper 25th percentile results). Data assessment will include a running average of water quality data for each Outfall Monitoring Station. If the running average is 20% or greater than the MALs, an MAL Action Plan will be written and submitted beginning in Year 3 of CIMP implementation to the Regional Water Board Executive Officer.

Table F-2. Water Quality Assessment of Outfall Data for Permit Compliance – Storm Water Municipal Action Levels

Parameter	Units	Storm Water MALs
pH	pH Units	6.0 – 9.0
Total Suspended Solids (TSS)	mg/L	264.1
Chemical Oxygen Demand (COD)	mg/L	247.5
Total Kjeldahl Nitrogen (TKN)	mg/L	4.56
Total Nitrate & Nitrite	mg/L	1.85
Total Phosphorous	mg/L	0.80
Cadmium, Total Recoverable	µg/L	2.52
Chromium, Total Recoverable	µg/L	20.20
Copper, Total Recoverable	µg/L	71.12
Lead, Total Recoverable	µg/L	102.00
Nickel, Total Recoverable	µg/L	27.43
Zinc, Total Recoverable	µg/L	641.3
Mercury, Total Recoverable	µg/L	0.32

F.3.2 Permit – Stormwater Outfall Monitoring Assessment – Toxicity Endpoint Assessment and Toxicity Identification Evaluation Triggers

Toxicity assessments will be conducted in accordance with the MRP and guidelines set forth in the Toxicity Memo. If toxicity is present in the receiving water sample (station MdRH-MC) and exceeds the trigger for a TIE (see Section F.2.1) then the following actions will be taken at the Permit outfall station (MdR-5):

1. If the TIE at the receiving water station identified the pollutant or class of pollutants causing toxicity then::

   a. The toxicant(s) shall be monitored at the outfall station (MdR-5) during the next scheduled sampling event (at least 45 days following the toxicity sample collection date).
   b. Monitoring shall continue until the deactivation criteria are met at the outfall station (two consecutive samples do not exceed RWLs or WQBELs).
   c. If the toxicant is present in the discharge from the outfall at levels above the applicable RWL or WQBEL, a TRE will be performed for that toxicant at the outfall location.
2. If the TIE at the receiving water station was inconclusive, then the following actions shall be taken at the outfall station:
   a. If the sample was collected during dry weather, toxicity monitoring shall be conducted at the outfall monitoring station during the next scheduled monitoring event.
   b. If the sample was collected during wet weather, then toxicity monitoring need not commence at the outfall until a second TIE at the receiving water station is inconclusive.

The list of constituents monitored at the outfall monitoring station for Permit compliance will be modified based on the results of any TIEs conducted. Monitoring for those constituents will occur as soon as feasible following the completion of a successful TIE (i.e., the next monitoring event that is at least 45 days following the toxicity laboratory's report transmitting the results of a successful TIE). The requirements of the TREs will be met as part of the adaptive management process in the MdR EWMP rather than conducted via the CIMP. The identification and implementation of control measures to address the causes of toxicity are tied to management of the stormwater program, not the CIMP. It is expected that the requirements of TREs will only be conducted for toxicants that are not already addressed by an existing Permit requirement (i.e., TMDLs) or existing or planned management actions.

If toxicity samples have been collected at an outfall station for Permit compliance monitoring, toxicity results will be compared to appropriate laboratory controls. Toxicity test endpoints will be analyzed, per the MRP, using the TST t-test approach (USEPA, 2010). The Permit specifies that the chronic IWC is set at 100% effluent for outfall samples. For chronic marine and estuarine aquatic toxicity tests conducted at outfall stations for Permit compliance monitoring, the percent effect will be calculated. If there is no toxicity identified, toxicity monitoring will continue until the deactivation criteria are met (two consecutive samples pass the TST t-test during the same condition [wet or dry]) at the outfall station, or a TIE at the receiving water site identifies the constitute causing toxicity.

If toxicity is present but at levels below the trigger for a TIE, toxicity testing will continue until either the deactivation criteria are met (two consecutive samples pass the TST t-test during the same condition [wet or dry]), the TIE conducted at the receiving waster site identifies the pollutant causing toxicity, or the discharged is eliminated. An evaluation similar to the TRE shall also be conducted.

If toxicity is present, exceeds the trigger for a TIE and the TIE identifies the pollutant contributing to the toxicity then the pollutant will be added to the monitoring list for this station until the deactivation criteria are met (two consecutive samples do not exceed RWLs or WQBELs) and a TRE will be conducted. If toxicity is present, exceeds the trigger for a TIE and the TIE is inconclusive, a TRE-like investigation will be conducted as described in the Toxicity Memo and toxicity testing will continue at the outfall until two consecutive samples pass the TST t-test, a TIE identifies the pollutant causing the toxicity, or the discharge is eliminated.

F.3.3 Bacteria TMDL – Stormwater Outfall Monitoring Assessment – Water Quality

Not Applicable.

F.3.4 Toxics TMDL – Stormwater Outfall Monitoring Assessment – Water Quality and Storm-Borne Sediment

Results for monitored parameters for water and storm-borne suspended sediment samples will be compared to the Toxics TMDL numeric targets. The Toxics TMDL requires the monitoring of total dissolved solids (TDS), total suspended solids (TSS), and settleable solids at the corresponding monitoring stations. The storm-borne suspended sediment monitoring parameters include Copper, Zinc, Lead, Chlordane, Total PCBs, Total DDTs, and p,p'-DDE. Total organic carbon (TOC) will be analyzed in water samples. An overview of monitoring frequency and methods is presented in the CIMP. Appendix C describes the analytical methods, sampling procedures, and data management to be used during the implementation of the CIMP.

F.4 Statistical Analysis

Statistical analysis will be used to assess MdR Watershed monitoring data for Permit and TMDLs compliance and evaluate changes in conditions over time.

Environmental monitoring data possess distributional characteristics that generally require specialized approaches to trend testing. Water quality datasets can contain censored (less than) values, outliers, multiple detection limits, missing values, and serial correlation. These characteristics commonly present problems in the use of conventional parametric statistics based on normally distributed datasets. The presence of censored data, non-negative values, and outliers generally leads to a non-normal data distribution, which is common for many datasets. These skewed datasets require use of specific non-parametric statistical procedures for their analysis. Nonparametric statistical tests are more powerful when applied to non-normally distributed data, and almost as powerful as parametric tests when applied to normally distributed data (Helsel and Hirsch, 1992).

For trend analysis for Permit and Toxics TMDL compliance, data will be organized by station, date of collection, and type of monitoring event (Storm Water or Non-storm Water). It is necessary to include a minimum of 3 years of data in this analysis. The nonparametric Mann-Kendall trend analysis will be used to evaluate whether a constituent has increased or decreased significantly since the base year. The test is non-parametric, rank order-based, and insensitive to missing values. Statistical significance will be based on a 95% confidence level (e.g., a 5% probability of obtaining a test statistic, or a p-value of less than 0.05).

Sen's slope, a non-parametric estimator of the magnitude of the change in parameter concentration over time (Sen, 1968), will be calculated for parameters with statistically significant trends. Sen's slope can only be calculated if the proportion of samples assessed below the minimum detection limit (MDL) was less than 15% (Sen, 1968). Sen's slope estimator is insensitive to outliers and can be used to infer the magnitude of a trend in the data.

The dataset may contain results below the MDL. These values will be assigned the value of one-half the MDL. Over time, TMDL requirements and laboratory analytical techniques have lowered their limit of detection. An artifact of this advance is that the lower detection limit values of measurements later in the data record may be falsely detected as a downward trend. To avoid this, water quality values will be censored to one-half of the highest detection limit of the analysis period as part of the data handling prior to analysis.

Datasets with large numbers of values identified as detected but not quantified (DNQ) may create statistical problems for trend analyses. The Mann-Kendall test for trend adjusts variance estimates upward for ties in magnitude (Gilbert, 1990). Considering that DNQ values in the raw dataset produce such ties, trend analyses of datasets with high percentages of DNQ results will be based upon greater variances than those without DNQ results. Thus, the power of the trend analyses is reduced for the datasets with values below detection limit (BDLs) compared to those without detection limits censoring.

A simulation analysis on the effect of DNQ results on Mann Kendall test and Sen's slope estimator has provided standard guidelines for reporting trend statistics (Alden et al., 2000). These guidelines are widely accepted based on the percentage of DNQ results present in the dataset (Ebersole et al., 2002). The simulation analysis found that the power of the Mann-Kendall test begins to noticeably decline when censoring exceeds 35%. However, if the Mann-Kendall test produces a significant result when the level of censoring is between 35% and 50%, this result may be valid despite the loss of power. If the Mann-Kendall test fails to produce a significant result when censoring is in the 35% to 50% interval, this failure may have resulted from a loss of power. Also; the Sen's slope estimator begins to exhibit noticeable bias when censoring exceeds 15%. At levels of censoring of 15% or less, both the Mann-Kendall test results and the Sen's slope estimator were found to be reliable.

The following guidelines were used to report trend information:

- If the percentage of BDL observations is 15 or less, report the trend test p-value, direction, and magnitude of the trend (i.e., Sen Slope).
- If the percentage of BDL observations is greater than 15 and less than or equal to 35, report the trend test p-value and direction only. Do not report the trend magnitude.
- If the percentage of BDL observations is greater than 35 and less than or equal to 50 and the trend test p-value indicates a significant trend, report the trend test p-value and direction. Do not report the trend magnitude.
- If the percentage of BDL observations is greater than 35 and less than or equal to 50 and the trend test p-value does not indicate a significant trend, report that there are too many observations below the detection limit to determine the presence or absence of trend.

If the percentage of BDL observations is greater than 50, report there are too many observations below the detection limit to determine the presence or absence of trend.

F.5 References

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APPENDIX G
MdR CIMP GIS Data

APPENDIX H
Data Analysis used to Support Toxics TMDL Monitoring Program Changes

H.0 DATA ANALYSIS USED TO SUPPORT TOXICS TMDL MONITORING PROGRAM CHANGES

This appendix presents the data and data evaluations used to support the proposed monitoring program changes for the Toxics Total Maximum Daily Load (TMDL). The proposed changes are included in the main body of the Coordinated Integrated Monitoring Program (CIMP) for the Marina del Rey (MdR) Watershed. A summary of the monitoring requirements and proposed changes is presented in Table H-1. Justification and data analysis for each change follows the table, organized by matrix and contaminant (Harbor Water – Dissolved Copper, Harbor Water – Total Polychlorinated biphenyls [PCBs], and Sediment).

Table H-1. Summary of Toxics TMDL Monitoring

Toxics TMDL Monitoring Component	Pre-CIMP Monitoring	CIMP Monitoring
Monitoring Frequency		
Frequency of Toxics TMDL Storm Water Monitoring	During wet weather events, up to 24.	3 storms per year at the four monitoring stations.
Frequency of Toxics TMDL Harbor Water Monitoring	Monthly dissolved copper and Total PCB (Aroclor) monitoring.	1. Dissolved Copper - no change to monitoring frequency (monthly). 2. Total PCBs - Analyze PCB congeners instead of Aroclors, using EPA Method 1668.
Frequency of Toxics TMDL Sediment Monitoring	Annual chemistry and toxicity monitoring.	No Change.
Frequency of Toxics TMDL Fish and Mussel Tissue Monitoring	Annual monitoring.	No change.
Monitoring Locations		
Toxics TMDL Monitoring Locations - Storm Water	Five locations within the watershed.	Four locations within the watershed (MdR-4ORB, MdR-5, MdRU-C-1P11, and MdRU-C-1)
Toxics TMDL Monitoring Locations - Harbor Water	Dissolved copper monitored in each front and back basin and in the main channel between Basins D and E. PCB Aroclors monitored in each back basin and in the main channel between Basins D and E.	1. Dissolved Copper - Monthly rotation - station MdRH-A, MdRH-C, MdRH-E, and MdRH-G will be sampled one month; the following month stations MdRH-B, MdRH-D, MdRH-F and MdRH-H will be sampled. Main channel station monitored every month. 2. Total PCBs - Follow the same monthly rotation schedule as described for dissolved copper.

H.1 Toxics TMDL Storm water Monitoring

Toxics TMDL storm water and storm-borne suspended sediment outfall monitoring will occur during three storms (>0.25 inch) per wet weather season (October 1st through April 15th). Flow data will be collected or modeled for all non-monitored storm events (>0.1 inch). Three storm events were selected as the maximum number of storm events each wet weather season in order to maintain consistency with the Permit monitoring requirement and other CIMP groups that are also subject to a Toxics TMDL. Larger storms of >0.25 inches were selected in order to maximize the capture of sufficient storm water for analysis.

Based on historical rainfall data of 966 storm events greater than 0.1 inches from 1940-2014, 74% of storms were > 0.25 inch, and 26% were 0.1-0.25 inch (Table H-2). If the required number of storms has not been monitored as the storm season ends, smaller storms will be targeted to achieve the three-storm minimum (Table H-2).

Table H-2. Number of Storm Events >0.25 inches from 1940-2014

Rainfall Total	Frequency	Percent
0.1-0.25 inches	254	26%
>0.25 inches	712	74%

H.2 Toxics TMDL Dissolved Copper Harbor Water Data Analysis

Monthly monitoring of dissolved copper has been conducted in both the Front and Back Basins of the Harbor since 2010. Monitoring results have remained relatively consistent over time, and while they do vary somewhat between basins, it is possible to monitor a sub-set of basins each month and rotate the monitoring stations without losing important information regarding dissolved copper concentrations (Table H-3). Box whisker plots of the data collected between 2010 and 2013 are presented in Figure H-1, below. The median is shown, along with the range of the data and the 25th and 75th percentiles. The TMDL target of 4.8 micrograms per Liter (µg/L) is shown as a red line.

Further examination of the data was conducted to determine the intra-station variability, and therefore the necessity of continued monthly monitoring at every station (i.e., if the observed variability of dissolved copper concentrations at a station is low, it is not necessary to continue monitoring at the same frequency). Table H-4 includes all of dissolved copper samples analyzed between 2010 and 2013 at each of the monitoring locations, as well as summary statistics. Note that the coefficient of variation (standard deviation divided by the mean) for dissolved copper concentrations in the individual basins has ranged between 0.36 and 0.43. A coefficient of variation less than one is considered low for environmental data.

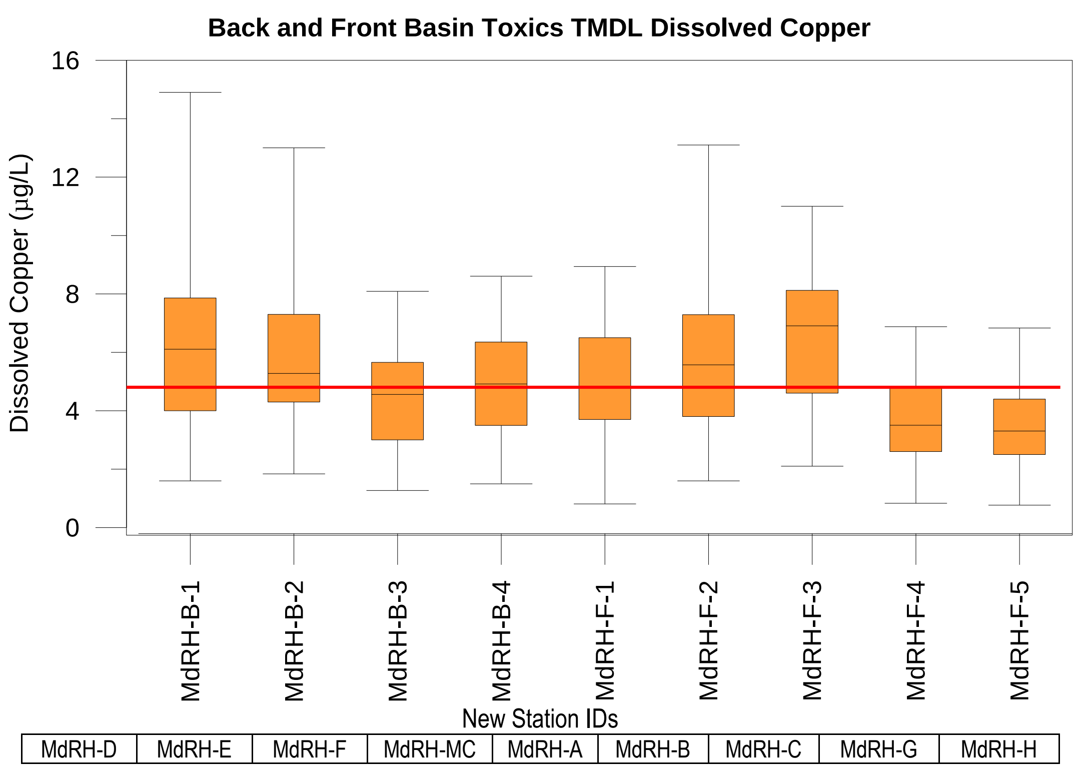

Figure H-1. Marina del Rey Toxics TMDL Dissolved Copper Compliance Monitoring Results (2010-2013)

Table H-3. Marina del Rey Toxics TMDL CIMP Harbor Water Monitoring Schedule

Monitoring Schedule	Front Basins	Back Basins	Main Channel
Month 1, 3, 5, 7, 9, 11	MdRH-A , MdRH-C, MdRH-G	MdRH-E	MdRH-MC
Month 2, 4, 6, 8, 10, 12	MdRH-B and MdRH-H	MdRH-D and MdRH-F	MdRH-MC

Table H-4. Marina del Rey Toxics TMDL Dissolved Copper Monitoring Results and Summary Statistics (2010-2013)

Summary Statistics										
Station ID (new)	**Units**	**MDRH-D**	**MdRH-E**	**MdRH-F**	**MdRH-MC**	**MdRH-A**	**MdRH-B**	**MdRH-C**	**MdRH-G**	**MdRH-H**
Historic Station ID		**MdRH-B-1**	**MdRH-B-2**	**MdRH-B-3**	**MdRH-B-4**	**MdRH-F-1**	**MdRH-F-2**	**MdRH-F-3**	**MdRH-F-4**	**MdRH-F-5**
Average	mg/L	6.20	5.73	4.57	4.92	4.98	5.66	6.66	3.72	3.55
Standard Deviation	mg/L	2.68	2.35	1.69	1.75	1.79	2.46	2.40	1.43	1.38
Coefficient of Variation		0.43	0.41	0.37	0.36	0.36	0.43	0.36	0.39	0.39
Standard error	mg/L	0.446	0.392	0.282	0.292	0.299	0.409	0.400	0.239	0.229
Raw Data										
Date	**Units**	**MdRH-B-1**	**MdRH-B-2**	**MdRH-B-3**	**MdRH-B-4**	**MdRH-F-1**	**MdRH-F-2**	**MdRH-F-3**	**MdRH-F-4**	**MdRH-F-5**
8/20/2010	mg/L	7.71	5.04	5.26	5.87	6.74	6.6	8.12	5.58	3.61
9/20/2010	mg/L	6.88	5.26	5.26	5.88	6.74	4.47	6.15	5.02	4.96
10/22/2010	mg/L	10.4	8.67	8.09	7.5	8.94	9.82	10.9	6.88	6.63
11/16/2010	mg/L	6.4	3.8	3.6	6.5	4.5	5	7.1	3	3.6
12/9/2010	mg/L	8.6	7.3	5.4	6.1	6.6	8.2	10	2.4	2.4
1/25/2011	mg/L	7.7	5.1	4.6	4.6	5.3	6.1	7.7	3.2	4.4
2/24/2011	mg/L	4.1	2.1	2.6	4.5	4.6	5.8	6.9	2.8	3.2
3/23/2011	mg/L	2.4	2.7	2.1	1.5	0.81	1.6	2.1	0.83	0.77
4/21/2011	mg/L	3.1	4.6	3.2	3.4	4.3	4.3	4.5	2.9	2.8
5/19/2011	mg/L	4	5	3.6	3.5	3.7	4.3	4.6	2.6	2.5
6/23/2011	mg/L	7.4	7.2	5.5	6.4	6.5	6.5	7.9	3.9	3.4
7/21/2011	mg/L	3.6	5.8	4.5	4	3.2	4.6	3.7	1.9	2.9
8/25/2011	mg/L	5.3	6	4.4	5	4.1	3.9	5.1	3.6	3.7
9/22/2011	mg/L	6.1	5.3	4.5	4.9	6.3	6.2	6.2	2.6	3.8
10/27/2011	mg/L	3.4	3.3	2.6	2.5	2.7	1.8	2.2	1.7	2.2
11/17/2011	mg/L	6.1	5.8	4.3	4.7	4.3	4.5	5.5	3.8	3.1
12/14/2011	mg/L	4.7	5.5	5.4	4.1	3.9	3.5	4.8	4.3	3.2
1/11/2012	mg/L	5.6	13	5.9	4.8	3.8	3.9	5.6	3.4	3
2/8/2012	mg/L	4.7	4.7	2.9	2.3	3.5	3.7	4.3	2.3	2.1
3/7/2012	mg/L	4.4	4.9	3	3.8	3.2	3.4	4	2.9	2.4
4/12/2012	mg/L	2.8	2.8	2.6	2.3	3.7	3.8	4.9	2.7	2.7
5/10/2012	mg/L	3.8	4.3	2.5	3.2	3.5	3.4	3.7	2.2	1.8
6/7/2012	mg/L	2.7	3	2.2	2.8	2.8	3.3	3.7	1.9	1.6
7/3/2012	mg/L	7.07	8.55	5.96	4.93	7.69	7.29	7.5	6.33	5.17
8/29/2012	mg/L	1.6	4.54	1.27	2.01	1.63	1.96	6.9	4.09	3.84
9/26/2012	mg/L	9.12	7.15	6.03	8.61	6.43	9.01	9.62	4.24	4.93
10/17/2012	mg/L	6.11	3.79	4.92	5.4	5.18	8.49	7.88	3.06	3.78
11/15/2012	mg/L	7.54	9.98	6.67	6.63	6.37	7.91	9.77	5.97	6.83
12/19/2012	mg/L	7.96	5.68	4.7	6.35	6.26	6.39	7.91	5.06	4.04
1/9/2013	mg/L	14.9	1.84	4.52	6.34	5.28	13.1	10.5	3.97	2.77
2/14/2013	mg/L	7.86	7.77	5.66	4.48	6.65	6.25	7.35	4.82	6.08
3/6/2013	mg/L	9.55	8.44	7.61	8.24	7.12	8.59	11	5.93	5.37
4/4/2013	mg/L	7.03	5.07	3.66	5.04	4.72	5.87	6.91	4.6	2.31
5/14/2013	mg/L	8.46	8.63	7.04	6.49	6.48	7.28	9.49	5.13	4.23
6/5/2013	mg/L	8.16	7.71	7.57	6.73	6.9	7.6	8.3	4.74	4.6
7/1/2013	mg/L	5.99	6.04	4.79	5.59	4.96	5.35	6.92	3.41	3.21

H.3 Toxics TMDL Total PCB Data Analysis

Total PCBs in harbor water have been monitored as part of the MdR Coordinated Monitoring Plan (CMP) monitoring from 2010-present. However, Total PCBs have not been detected using Method 608. Method 608 detection limits are higher than the TMDL target for Total PCBs in the water column, which, in turn, makes the compliance assessment uncertain. During the Low Detection Level study (LDL study) conducted for the MdR Enhanced Watershed Management Plan (EWMP) Agencies and Caltrans, harbor water samples from the Back Basins of the harbor were analyzed using a high resolution method, EPA Method 1668. Results (Table H-5) were consistent during the spring and summer timeframe within a single Basin. The coefficient of variation was also low within each basin, ranging from 0.07 in Basin D to 0.30 in Basin F and an overall coefficient of variation of 0.31 for the Back Basins as a whole.

Table H-5. Marina del Rey Toxics TMDL Special Study (Low Detection Limit) Total PCB Results

Constituent			Total PCBs	Average	Standard Deviation	Coefficient of Variation
New Station ID	**Existing Station ID**	**Date**	**pg/L**	**pg/L**	**pg/L**	**pg/L**
MdRH-D	**MDRH-B-1**	3/23/2011	3380			
		4/21/2011	3380			
		6/23/2011	3440			
		7/21/2011	3911	3527.8	257.1	0.07
MdRH-E	**MdRH-B-2**	3/23/2011	2100			
		4/21/2011	2260			
		6/23/2011	3760			
		7/21/2011	2536	2664.0	752.5	0.28
MdRH-F	**MdRH-B-3**	3/23/2011	4230			
		4/21/2011	3950			
		6/23/2011	6240			
		7/21/2011	3104	4381.0	1328.6	0.30
MdRH-MC	**MdRH-B-4**	3/23/2011	3580			
		4/21/2011	2030			
		6/23/2011	3560			
		7/21/2011	2499	2917.3	777.7	0.27
Back Basins Average				3372.50	1033.07	0.31
Trip Blanks		3/23/2011	3990	NA	NA	NA
		4/21/2011	1260	NA	NA	NA
		6/23/2011	837	NA	NA	NA
		7/21/2011	1609.5	NA	NA	NA

NA – not applicable

In addition to the successful PCB data collection, the MdR EWMP Agencies learned through the study that:

- Only one laboratory in California, and a few in the nation, currently have the capability to conduct the high resolution method, meaning the analytical method is not commercially, locally readily available for a routine monitoring program, such as this CIMP. Using such a method may create logistical issues including shipping and handling of the samples on a regular basis. Moreover, a prime contract laboratory will add-on a surcharge per sample for shipping and handling on top of the already high analytical cost.

- PCBs are ubiquitous in the environment. Background PCB concentrations measured in trip blanks were higher than the TMDL target. Special blank water must be obtained from the contract laboratory in order to properly collect samples, which adds to the analytical cost of the method. Properly cleaned sample bottles and sampling equipment are also necessary, which adds even more additional cost.
- Analytical cost per sample is very high compared to the method used in the current monitoring program. PCB analytical cost under the current program is $55 per sample, whereas the cost for the high resolution method was $970 per sample during the LDL study.

Due to these logistical, technical, and cost issues, PCBs will be monitored in the Harbor water column at five locations each month, on a rotating basis. The rotating schedule will be the same as that shown in Table H-3 above with monitoring occurring one month at stations MdRH-A, MdRH-C, MdRH-E, MdRH-G, and the main channel (MdRH-MC). The next month of sampling will be conducted at stations MdRH-B, MdRH-D, MdRH-F, MdRH-H and MdRH-MC. This approach will help use monitoring resources as efficiently as possible while ensuring that the recommended detection limits in the Toxics TMDL are met.

APPENDIX I

Los Angeles County Flood Control District Background

I.0 LACFCD Background Information

In 1915, the Los Angeles County Flood Control Act established the Los Angeles County Flood Control District (LACFCD) and empowered it to manage flood risk and conserve stormwater for groundwater recharge. In coordination with the United States Army Corps of Engineers, the LACFCD developed and constructed a comprehensive system that provides for the regulation and control of flood waters through the use of reservoirs and flood channels. The system also controls debris, collects surface storm water from streets, and replenishes groundwater with storm water and imported and recycled waters. The LACFCD covers the 2,753 square-mile portion of Los Angeles County south of the east-west projection of Avenue S, excluding Catalina Island. It is a special district governed by the County of Los Angeles Board of Supervisors, and its functions are carried out by the Los Angeles County Department of Public Works. The LACFCD service area is shown in Figure I-1.

Unlike cities and counties, the LACFCD does not own or operate any municipal sanitary sewer systems, public streets, roads, or highways. The LACFCD operates and maintains storm drains and other appurtenant drainage infrastructure within its service area. The LACFCD has no planning, zoning, development permitting, or other land use authority within its service area. The permittees that have such land use authority are responsible under the Permit for inspecting and controlling pollutants from industrial and commercial facilities, development projects, and development construction sites (Permit, Part II.E, p. 17).

The MS4 Permit language clarifies the unique role of the LACFCD in storm water management programs: "[g]iven the LACFCD's limited land use authority, it is appropriate for the LACFCD to have a separate and uniquely-tailored storm water management program. Accordingly, the storm water management program minimum control measures imposed on the LACFCD in Part VI.D of this Order differ in some ways from the minimum control measures imposed on other Permittees. Namely, aside from its own properties and facilities, the LACFCD is not subject to the Industrial/Commercial Facilities Program, the Planning and Land Development Program, and the Development Construction Program. However, as a discharger of storm and non-storm water, the LACFCD remains subject to the Public Information and Participation Program and the Illicit Connections and Illicit Discharges Elimination Program. Further, as the owner and operator of certain properties, facilities and infrastructure, the LACFCD remains subject to requirements of a Public Agency Activities Program." (Permit, Part II.F, p. 18.).

Consistent with the role and responsibilities of the LACFCD under the Permit, the Enhanced Watershed Management Plans (EWMPs) and Coordinated Integrated Monitoring Plans (CIMPs) reflect the opportunities that are available for the LACFCD to collaborate with permittees having land use authority over the subject watershed area. In some instances, the opportunities are minimal; however the LACFCD remains responsible for compliance with certain aspects of the MS4 permit as discussed above.

During the development of the CIMP, LACFCD infrastructure was evaluated for monitoring opportunities. The LACFCD will be collaborating with the groups for all of the monitoring.

Figure I-1: Los Angeles County Flood Control District Service Area

APPENDIX J
Trash Monitoring and Reporting Plans (TMRPs) and Plastic Pellet Monitoring and Reporting Plans (PMRPs)

S E P T E M B E R 2 0 1 2

Santa Monica Bay Watershed Management Area (WMA) Trash Monitoring and Reporting Plan (TMRP) - Final

Submitted to:

COUNTY OF LOS ANGELES

L A R R Y
W A L K E R
ASSOCIATES

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List of Acronyms

BMP	Best Management Practice
BPA	Basin Plan Amendment
CPS	Connector Pipe Screen
DGR	Daily Generation Rate
DBH	Department of Beaches and Harbors
FCS	Full Capture System
LA	Load Allocation
MFAC	Minimum Frequency of Assessment and Collection
MS4	Municipal Separate Storm Sewer System
PCS	Partial Capture System
TMDL	Total Maximum Daily Load
TMRP	Trash Monitoring and Reporting Plan
WLA	Waste Load Allocation

Overview

The purpose of this document is to detail a Trash Monitoring and Reporting Plan (TMRP) and Minimum Frequency of Assessment and Collection/ Best Management Practice (MFAC/BMP) program to implement the Santa Monica Bay Nearshore and Offshore Debris Total Maximum Daily Load (TMDL), effective March 20, 2012. The implementation of the TMDL covers the entire Santa Monica Bay Watershed Management Area (WMA).

The TMRP encompasses a description of an MFAC program, procedures to assess compliance with the MFAC program, current BMPs, a monitoring program to quantify trash from source areas, and information on sources to prioritize BMP implementation. The TMRP includes monitoring and assessment procedures that allow for determination of compliance for both point and nonpoint sources.

The TMRP and MFAC/BMP program described herein are being submitted on behalf of the County of Los Angeles (County), the Los Angeles County Department of Beaches and Harbors (DBH), and the City of Hermosa Beach, three of the responsible parties identified in the TMDL, to address point and non-point source trash in the Unincorporated County Areas, on beaches and harbors owned and operated by the County, and non-point source trash within the Hermosa Beach owned by the City of Hermosa Beach within the Santa Monica Bay Watershed Management Area. Future implementation efforts may warrant changes based upon outcomes of subsequent studies and findings. Significant deviations from the County TMRP and MFAC/BMP program will initiate notification to the Los Angeles Regional Water Quality Control Board (Regional Board).

TRASH DEFINITION

For purposes of the TMRP and MFAC/BMP program, trash is any persistent solid material that is manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned into the environment. Materials properly placed within trash collection bins (e.g., cans or dumpsters) are not considered trash with regards to MFAC assessment or trash generation rate evaluations. Naturally occurring vegetation waste is also not considered trash.

TMRP REQUIREMENTS

TMRP requirements apply to both point sources (e.g., catch basins within the municipal separate storm sewer system) and nonpoint sources (i.e., beaches, harbors, non-beach open space and parks.) As outlined in the TMDL, assessment metrics for point source waste load allocations (WLAs) and nonpoint source load allocations (LAs) are as follows:

Point sources:

- The installation of full capture devices on all conveyances discharging to waterbodies within the Santa Monica Bay WMA[1].

Nonpoint sources:

[1] Where full capture devices are not feasible (e.g., due to size limitations), the County will elect to use partial capture devices or other controls to remove trash from the subdrainage area at the commensurate trash generation rate.

- No trash on Beaches or in Harbors immediately after a cleanup event.
- Trash is not accumulating in deleterious amounts.
- Trash generation rate of sources areas does not exceed the benchmark of 113,150 pounds per mile per year (310 lbs/mi/day) for Beaches and Harbors, or 162,468 pounds per square mile per year (640 gal/mi^2/yr) for Non-Beach Open Space and Harbors, and displays a decreasing trend over time.

In the event the assessment metrics are not met, the County may evaluate the BMPs currently being employed and determine if additional BMPs may result in attaining the metrics. If changes to existing BMPs or implementation of additional BMPs are determined to likely result in attaining the assessment metrics, the County will describe the proposed modifications and the schedule for effecting the modifications as part of the Annual Monitoring Report. Where assessment metrics are not met, the County will be in compliance with the TMDL by completing the BMP evaluation, reporting the results and schedule for changes as appropriate in the Annual Monitoring Report, and, as appropriate, implementing the identified changes.

The TMRP is designed to address the following requirements:

- Assessment and Monitoring
    - Establish nonpoint source monitoring requirements
    - Develop initial monitoring protocols, locations, and frequencies
        - MFAC assessment program for Beaches and Harbors (nonpoint sources)
        - MFAC assessment program for Non-Beach Open Space and Parks (nonpoint sources)
        - Evaluation of trash generation rates from nonpoint source areas
    - Establish reporting requirements
- BMP Implementation
    - Prioritize High Trash Generation Areas (point and nonpoint sources)
    - Evaluate and identify most appropriate Full Capture Systems (FCS) or Partial Capture Systems (PCS)/BMPs to install or implement (point and nonpoint sources)
    - Evaluate MFAC/BMP program effectiveness (nonpoint sources)
- Point source implementation
    - Outline FCS sizing.
    - Propose definitions for “major rain event” and “proper operation and maintenance”

Trash receptacles placed for proposer disposal of unwanted items, and cleanup events to collect trash, are the major BMPs of the MFAC program. The following are the proposed collection and monitoring procedures that will be used for the TMRP:

MFAC Collection Program:

- Maintain existing daily cleanup events for Beaches, Harbors, and Burton Chace Park.
- Implement daily cleanup events for trash source areas of Beaches, Harbors, and Burton Chace Park.
- Continue conducting as-needed cleanup events for Non-Beach Open Space and Parks.

Assessment program for MFAC:

- Define MFAC Assessment Sites.
- Visually survey and collect any trash within 100 foot long site reach at defined locations immediately after a cleanup event. If any trash is found, it will likely necessitate additional field staff training or evaluation of modified collection procedures to capture all trash.

Evaluation program and definition of trash generation rate for nonpoint source areas:

- Define Source Area Evaluation Sites.
- Collect all trash within evaluation area at defined locations in the late afternoon before dusk, and weigh the trash collected.
- Extrapolate the collected trash data from evaluation sites to the whole location (e.g., a beach) for comparison with the benchmark.
- Demonstrate a decreasing trend in trash generation rates over time.

Trash Monitoring Program

- Conduct monitoring as per the MS4 permit, if so required.

The proposed components of the monitoring program and the purposes they serve in the TMRP for meeting the TMDL requirements are listed in Table 1, in addition to the frequency at which the components of the program will be conducted.

Table 1. Proposed Components of the MFAC Program and the Frequency of Implementation.

Component	Purpose	Frequency
MFAC Collection Program (Cleanup Events)	Zero-trash requirement to be met immediately after cleanup events	Daily for Beaches and Harbors Daily for source areas of Beaches and Harbors Daily for Non-Beach Open Space and Parks near shorelines
MFAC Assessment Sites	MFAC assessment that zero-trash metric has been met immediately after cleanup events	Annually for Beaches and Harbors Annually for Non-Beach Open Space and Parks
Source Area Evaluation Sites	Collection of trash to determine trash generation rate for specific areas	Semi-annually for Beaches and Harbors Semi-annually for Non-Beach Open Space and Parks
Point Sources	Determination of attaining the specified point source WLAs and progressive reduction	None. Assumes all County point sources will be implementing full capture Assumes monitoring of MS4 system and drainage channels will be addressed through the MS4 permit

In addition, the County TMRP will serve as the monitoring guidelines and procedures that will be used for the MFAC/BMP program effort. Any changes and revisions to the described procedures will be included with annual monitoring reports. The MFAC/BMP program as defined in the BPA is "Established at an interval that prevents trash from accumulating in deleterious amounts that cause nuisance or adversely affect beneficial use between collections".

MFAC/BMP Program Requirements

The MFAC/BMP program applies to nonpoint sources only. Requirements for the MFAC/BMP program are associated with TMRP requirements and are as follows:

- Develop initial minimum frequency of monitoring and collection, as well as protocol and locations (nonpoint sources)
    - Collection and monitoring program for Beaches and Harbors
        - Routine trash generation rate evaluation
    - Collection and monitoring program for Non-Beach Open Space and Parks
        - Routine trash generation rate evaluation
- Implement an initial suite of structural and/or nonstructural BMPs
- Develop Health and Safety Plan

Data and results gathered from the MFAC/BMP program will assist in determining TMRP required BMP Implementation actions and may additionally affect monitoring protocols, locations, and frequencies.

GENERAL APPROACH

The County will initially use the default baseline load allocations (LAs) for nonpoint sources and the default WLA for point sources, as given in the BPA (see **Comparison with Established Baselines** section). The County TMRP proposes the following procedures for meeting the TMDL requirements as listed in the BPA:

1. Conduct initial TMRP actions to meet the following goals:
    a. Cleanup events (no monitoring), conducted daily to remove trash from Beach and Harbor shorelines, Beach and Harbor source areas, and Harbor waters.
    b. MFAC assessments, conducted annually immediately after a cleanup event to ensure all trash is collected.
    c. Evaluation of source areas, conducted semi-annually with collection conducted in late afternoon before dusk to determine if the trash generation rate is decreasing and whether the trash is accumulating at a rate deleterious to beneficial uses.
2. Prepare a monitoring report one year from the start of the required monitoring[2] and each year thereafter that provides the following information:
    a. Results of all nonpoint source monitoring efforts
        i. MFAC assessment results
        ii. Source area evaluation results
        iii. Number of cleanup, MFAC assessment, and source area evaluations conducted
    b. Summary of all efforts implemented at point sources
        i. Number of installed FCSs and percent of coverage
        ii. Summary of any point sources not addressed with FCSs
        iii. Description of point sources to be addressed the following year
    c. Determine if the County is within with TMDL assessment metrics
        i. Zero trash after MFAC assessment events
        ii. Trash generation rates below baseline
        iii. Reduction in trash generation rates
    d. Discussion of effectiveness of the MFAC/BMP program
    e. If necessary, proposed revisions to the MFAC/BMP program and TMRP, including:
        i. Assessment site revisions
        ii. Evaluation site revisions
        iii. Monitoring frequency revisions

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[2] The start of the required monitoring program will be based upon receipt of the Regional Board Executive Officer's approval letter

iv. BMP implementation revisions.

These proposed procedures comprise a tentative list that may be modified after the monitoring efforts begin. Any major deviations will warrant Regional Board notification. The annual reports will incorporate TMRP results and description of components and/or elements added or modified by the County.

PROGRAM COVERAGE

The Basin Plan Amendment (BPA) lists numerous responsible parties who are not participating in the County TMRP effort and are not covered by any component of the County TMRP. The County is assuming that non-participating responsible parties will implement their own plan/s and the Regional Board will enforce all requirements associated with BPA milestones and requirements in an equitable manner to ensure that the trash impairments are addressed in all listed areas.

The TMRP is developed to assess and evaluate the trash collection and generation rate in areas under the County jurisdiction. Specifically, the beaches may receive trash from areas outside the County jurisdiction, including from Caltrans (Pacific Coast Highway) and storm drain discharges from upstream non-County urban areas. The site selection and monitoring presented herein are designed to exclude to the extent possible trash emanating from areas outside of County control.

As subsequent implementation efforts take place, other parties within the watershed may agree to join this implementation effort, whereupon modified procedures (e.g., notification to the Regional Board of party joining the effort, increased sampling and/or MFAC/BMP program requirements, and reporting requirements covered under the joint effort) will be followed.

TRASH COLLECTION PROCEDURES

Trash collection will occur primarily through cleanup events, which occur generally on a daily basis at Beaches and Harbors. Secondary trash collection may occur through source area evaluation events. Ideally, there will be no trash remaining during MFAC assessment events, which are scheduled to occur immediately after the primary cleanup events, however, remaining trash collection will be collected and weighed. A schedule of monitoring events including cleanup, MFAC assessment, and source area evaluation events is provided in Table 2.

Cleanup Events

Cleanup events will include collection of trash from sandy beach areas and harbor waters. A specific protocol is not required for collection procedures occurring at cleanup events. As long as the frequency of cleanup events meets the frequencies specified herein, the County may use any methods or techniques desired for trash collection at cleanup events.

Monitoring, Assessment, and Evaluation Approach

For the TMRP, MFAC monitoring sites are identified for locations that fall under County jurisdiction. Depending on existing monitoring and assessment activities at each of these sites, changes in monitoring may be proposed in the future to refine the evaluation and assessment of the MFAC/BMP program. The intent of the monitoring and assessment approach is to ensure that the MFAC program requirements are being met, and to utilize available resources to the extent possible to meet other TMRP requirements so that duplicative efforts are minimized.

MONITORING SITE LOCATION APPROACH

The impaired locations listed in the BPA consist of broadly defined areas, including the waterbodies within the Santa Monica Bay WMA, the Santa Monica Bay, and the shoreline/beaches of the Santa Monica Bay. Adjacent land areas which may contribute trash to these areas (e.g., beaches, marinas, open spaces, and parks in the WMA) are also included. It is important to note that there are various leased or privately owned Beach and Harbor areas scattered along the Santa Monica Bay shoreline. Leased and privately owned areas are not addressed in the TMRP and are to be avoided when conducting TMRP and MFAC/BMP activities. Only areas owned by the County and maintained by DBH will be covered by the County TMRP. In addition, the unique topography in certain areas of the WMA contains dangerous and inaccessible areas, such as cliffs and bluffs, which cannot be safely cleaned of trash or monitored, as described in the Health and Safety Plan (see **Attachment B**).

The proposed approach for meeting both the MFAC and TMRP requirements includes the use of two types of monitoring sites:

- MFAC Assessment Sites (Assessment Sites)
- Source Area Evaluation Sites (Evaluation Sites)

The Assessment Sites are specific sites located adjacent to impaired waterbodies within the WMA, which are representative of the critical areas defined in the BPA. These sites are also considered a component of the MFAC/BMP program, and are used to monitor the assessment metric of no trash remaining after a cleanup event.

The Evaluation Sites will primarily be used to determine the trash generation rates for the nonpoint source areas. Data from Evaluation Sites will be used to help identify High Trash Generating Areas adjacent to selected Assessment Sites, evaluate the effectiveness of the MFAC/BMP program, and determine the assessment metrics to compare with TMDL baseline and trending reduction requirements.

Specific assessment and evaluation sites are listed in **Attachment A**. The following is a discussion of the site selections.

MFAC ASSESSMENT SITES

MFAC Assessment Sites (Assessment Sites) serve the following purpose under the TMRP:

- Allow for repeatable monitoring efforts and comparable data analysis to evaluate assessment metrics and the TMDL load allocation.

The Assessment Sites were selected for their representation of impaired areas as well as their safety and accessibility. Each Assessment Site is intended to provide a representative assessment of the County jurisdiction as listed in the BPA and locations for long-term assessment. For each Beach and Harbor location, generally one Assessment Site has been proposed.

Detailed monitoring of 100 foot sections of a shoreline will be conducted at each Assessment Site. Procedures for conducting monitoring are described in the **Monitoring Procedures** section of the TMRP report. Specific details pertaining to each site sampled will be included in subsequent annual monitoring reports.

SOURCE AREA EVALUATION SITES

The Source Area Evaluation Sites (Evaluation Sites) meet the following TMRP requirements:

- Evaluation of the trash generation rate for nonpoint sources.
- Measure over time for to determine trend.
- Evaluate the effectiveness of the MFAC/BMP program.

Evaluation Sites are focused in or around locations likely to be trash hotspots (e.g., parking lots, pay stations, recreation areas, and restaurants). Evaluation sites are generally areas that are cleaned on a daily basis. Monitoring procedures conducted at the Evaluation Sites will include weighing and photographing all trash that is collected. Monitoring procedures are described in the **Monitoring Procedures** section. No specific source identification data will be collected and the specific amount of information collected per Evaluation Site may vary based on feasibility, necessity of information, and accessibility of the site. Similar to the Assessment Sites, Evaluation Sites will not be located in areas deemed unsafe, inaccessible or on leased/private property where access has not been granted.

TMRP COVERAGE

The County will not be held accountable for other responsible parties not participating in the County TMRP effort (as listed in the **Overview**). The County will not be held responsible for any monitoring not conducted in the areas defined as being outside the Watershed or County boundaries characterized in Figure 1. Additionally, Trash TMDLs are effective for both the Malibu Creek and Ballona Creek Watersheds (both of which being part of the Santa Monica Bay WMA). The Malibu Creek and Ballona Creek Trash TMDL each specify the requirements for their respective areas, and are not readdressed here.

More specifically, the TMRP will cover locations deemed to be “source areas” within the WMA. Source areas[3] may be defined as locations that are in immediate proximity of the Santa Monica Bay, and thus have a strong likelihood of contributing trash directly to the waters of the Santa Monica Bay (i.e., all locations situated on a coastline waterfront, such as Beaches and Harbors). Though the TMRP will also address other locations that are likely to indirectly contribute trash to the waters of the Santa Monica Bay (e.g., Open Space and Parks not along a coastline waterfront), the only requirement for these sites will be to ensure trash is not discharged to Santa

[3] Distinct from “point source” and “nonpoint source” categorizations, which primarily serve to indicate the pattern of trash dispersion, can be used broadly to refer to any locations where trash may potentially be released, and may or may not also qualify as source areas

Monica Bay by conducting trash assessments as needed. Appropriate BMPs, which may or may not include a MFAC program, will be implemented to ensure trash is not discharged from these areas. More intensive monitoring procedures are applied at Beach and Harbor source areas, where the County plans to focus its resources. Monitoring efforts at Beaches and Harbor source areas are intended to capture all trash that would otherwise come in contact with the waters of the Santa Monica Bay.

The City of Hermosa Beach has elected to use the County TMRP and associated documents for Hermosa Beach. City of Hermosa Beach, not the County, will be solely responsible for implementation of the actions proposed in the TMRP for Hermosa Beach. Will Rogers, Venice, Dockweiler, and Point Fermin beaches will not be covered in the LA County Santa Monica WMA TMRP as the individual cities which have jurisdiction over these beaches plan to prepare separate TMRPs that will cover these locations. White Point/Royal Palms Beach will not be covered in the Santa Monica Bay WMA TMRP because shoreline conditions preclude MFAC Assessments and there are no suitable source areas under County jurisdiction. If such constraints change, the beach will be added to the TMRP and MFAC/BMP program requirements.

There is some likelihood that trash sources within the WMA that are not under County jurisdiction discharge trash to the selected monitoring locations in the TMRP, potentially causing an exceedance of the baseline WLA and/or LA. Such exceedances may likely occur with point and nonpoint sources or infrastructure maintained by Caltrans or other Municipal Separate Storm Sewer System (MS4) Permittees, especially under storm conditions. Since it is not currently feasible to differentiate County trash from non-County trash once it has been discharged and dispersed, the County will monitor all trash that is found in its source areas. For the TMRP, however, the evaluation sites are selected to exclude areas dominated by trash from non-County sources. The County will utilize all the strategies within its authority to achieve its allocations, pursuing any actions necessary to prevent or resolve such issues (e.g., obtaining necessary permits to install FCS or PCS in the infrastructure of the County flood control district). For the purposes of the TMRP, the County will assume that any further actions that are required[4] will be covered by the MS4 permits and addressed through requirements outlined within the respective permits. Documentation and discussion of these issues will be included in subsequent annual monitoring reports.

[4] Including visual monitoring and removal of trash, addressing fugitive trash deposited either illegally or through wind transport, and identifying and prioritizing areas of illicit discharge in all open channels and other MS4 drainage structures

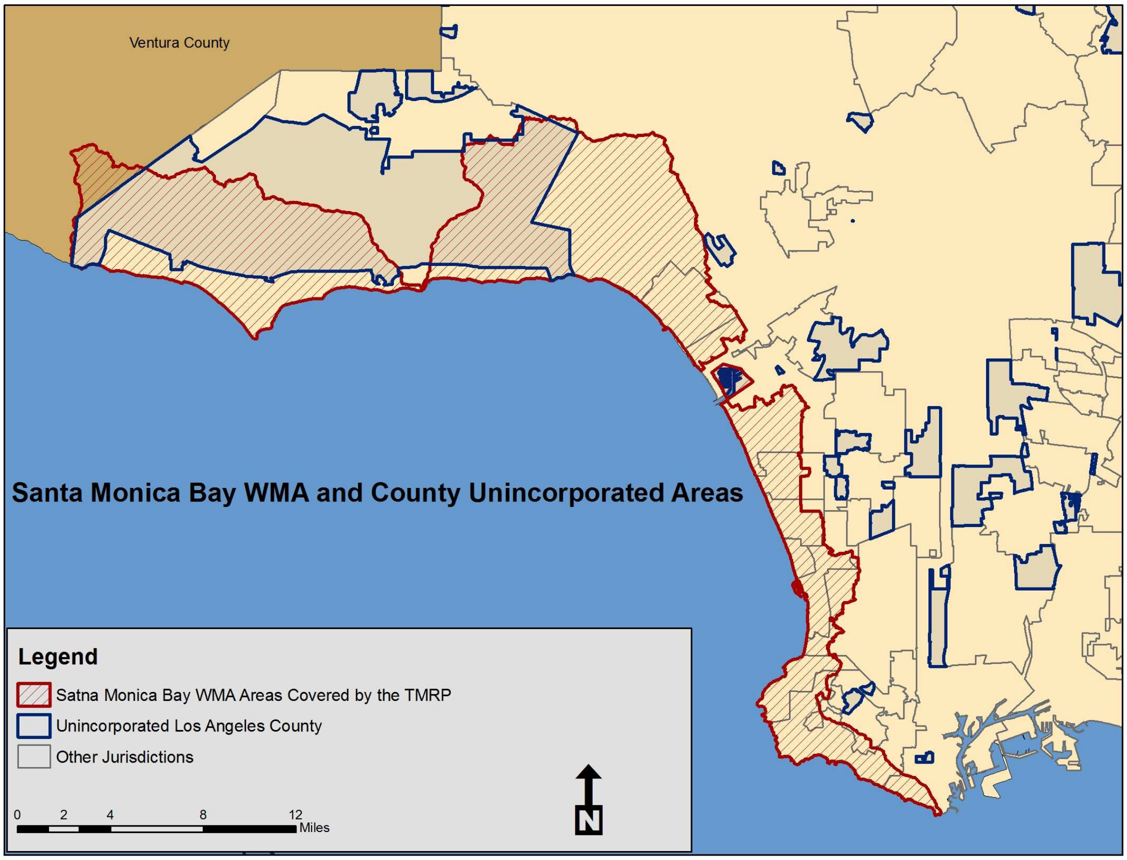

Figure 1. Santa Monica Bay WMA and County Unincorporated Areas

INACCESSIBLE AREAS

Areas of the WMA that are deemed inaccessible due to safety concerns or limited access will not receive cleanings and will not be assessed by the TMRP effort. Specifics on areas deemed inaccessible will be included in the annual monitoring reports.

MONITORING PROCEDURE APPROACH

Trash monitoring for the TMRP requires the collection of trash in a specified manner that allows for the generation of reproducible results that can be compared over time. Additionally, the monitoring procedure needs to define the metric that will be used to measure the trash collected. The standard procedures for each type of site (Assessment Site vs. Evaluation Site) also vary, with a more detailed approach used at the Assessment Sites. The procedures for monitoring can be found in the **Monitoring Procedures** section of the TMRP, and the Standard Operating Procedures for monitoring can be found in the **Standard Operating Procedures** section of the Health and Safety Plan.

The monitoring procedure approach that has been selected for the TMRP is to record the weight of trash collected.

Monitoring Locations and Frequencies

MONITORING SITE LOCATIONS

Assessment and Evaluation Sites are proposed for nonpoint sources owned by the County or maintained by DBH and are presented in **Attachment A**. Generally, each beach maintained by the DBH contains one Assessment Site and one Evaluation Site. Assessment and Evaluation Sites are summarized in Table 2.

Assessment Sites will be selected at locations where cleanup event assessment metrics will be measured. The level of monitoring effort for Assessment Sites should be minimal. These sites will be approximately 100 feet in length and follow the detailed procedures for identification and assessment given in the TMRP. The number of Assessment Sites will be based on the County's selected approach.

Evaluation Sites will be used to provide additional coverage requirements for the impaired areas listed in the BPA. These sites will be utilized for source area evaluation, assessment for Areas of High Trash Generation, and/or BMP effectiveness requirements. The level of effort for Evaluation Site monitoring will be greater than that required for Assessment Sites.

MONITORING FREQUENCY

The frequency of required monitoring for impaired locations listed in the BPA may vary from one to two times per year. The overview of the proposed frequency of cleanup, MFAC assessment, and source area evaluation events is presented in Table 2.

A summary of the event frequencies is as follows:

1. Total Assessment Sites = 13 (one per nonpoint source where site conditions permit)
    a. 11 sites monitored once per year (Beaches)
    b. 1 site monitored once per year (Harbors)
    c. 1 site monitored once per year (Non-Beach Open Space and Parks)
2. Total Evaluation Sites = 12 (one per Beach, Harbor, Open Space and Park)
    a. 10 sites monitored twice per year (Beaches)
    b. 1 site monitored twice per year (Harbors)
    c. 1 site monitored twice per year (Non-Beach Open Space and Parks)

Table 2. Proposed Monitoring Events in the Santa Monica WMA

Location	Event Frequency		
	Cleanup	Morning MFAC Assessment(1)	Afternoon Source Area Evaluation(2)
Beaches			
Nicholas Canyon Beach	Once per day	Annually	Semi-annually
Zuma Beach	Once per day	Annually	Semi-annually
Point Dume Beach	Once per day	Annually	Semi-annually
Latigo Shores Beach	Once per day	None(3)	Semi-annually
Dan Blocker Beach	Once per day	Annually	None(4)
Malibu/Surfrider Beach	Once per day	Annually	None(4)
Las Tunas Beach	Once per day	None(3)	Semi-annually
Topanga Beach	Once per day	Annually	Semi-annually
Marina Beach	Once per day	Annually	Semi-annually
Manhattan Beach	Once per day	Annually	None(4)
Hermosa Beach	Once per day	Annually	Semi-annually
Redondo Beach	Once per day	Annually	Semi-annually
Torrance Beach	Once per day	Annually	Semi-annually
White Point/ Royal Palms Beach	Once per day	None(3)	None(4)
Harbors			
Marina Del Rey	Once per day	Annually	Semi-annually
Non-Beach Open Space and Parks			
Burton Chace Park	Once per day	Annually	Semi-annually

(1) MFAC assessments performed immediately after cleanup events, generally at one site per location
(2) Source Area evaluations performed generally at one site per location
(3) Shoreline conditions preclude MFAC Assessments
(4) No suitable source areas under County jurisdiction

MFAC Assessment Sites

MFAC assessments at Beaches and Harbors will be performed on an annual basis, immediately following a cleanup event. Cleanup events at Harbor shorelines and sandy areas of Beaches are performed on a daily basis year round.

Burton Chace Park in Marina del Ray is the only park within the County jurisdiction identified as potentially contributing trash to beach shorelines or harbor waters. DBH performs daily cleanups at Burton Chace Park. Annual MFAC assessments will be conducted at Burton Chace Park. If other Non-Beach Open Spaces and Parks are found to be source areas of trash to the Santa Monica Bay shoreline or Harbor waters, then appropriate BMPs will be defined and applied to these areas. Instead of conducting MFAC assessment at other Non-Beach Open Spaces and Parks, however, the County may opt to focus its resources on monitoring efforts at Beaches and Harbors where trash has the highest likelihood of making contact with the waters of the Santa Monica Bay.

No point source monitoring is proposed because it is anticipated that all County point sources will be addressed through full capture. FCSs are designed to capture any particles measuring 5 millimeters or more in any direction, and will be sized for the peak flow rate of a "major rain event", defined as a one-year, one-hour storm in the subdrainage area. For full capture, the County will use connector pipe screen (CPS) devices.[5]

A CPS device is a vertical screen with 5 mm openings, installed inside a catch basin directly upstream of the connector pipe in such a manner that all water entering the basin must pass through the device. A vertical opening is provided around the perimeter of the screen to allow storm water to bypass in the event of a large storm or if the screen becomes clogged. CPS devices are currently manufactured and installed by Advanced Solutions (Stormtek) and American Storm Water (Debris Dam). CPS screens and bypass openings will be sized according to the recommendations and procedures given in the County CPS design manual.[6]

The purpose of a Connector Pipe Screen (CPS) is to contain trash within a catch basin and exclude it from the storm drain system. As such, routine maintenance will likely be necessary to remove trash from the catch basin to prevent it from accumulating to a point that would affect the performance of the CPS or the catch basin itself. Per the County CPS design manual, "proper operation and maintenance" will be defined as inspecting and cleaning each catch basin each year (e.g., at least once between May 1 and September 30), as well as inspecting and providing additional cleaning of any catch basin that is at least 40% full of trash and/or debris.

The County will perform phased implementation of FCSs at point sources over an eight year period. See Table 4 for a schedule of planned FCS implementation. If FCSs cannot be or are otherwise not implemented at point sources, trash generation rate monitoring procedures will need to be implemented. Monitoring at these locations will use the weight of trash collected from the catch basins not draining to a FCS.

For MFAC assessment sites, the proposed schedule of monitoring frequency is given in Table 2.

Source Area Evaluation Sites

Source area evaluation will be performed at Beaches and Harbors source areas on a semi-annual basis. For both Beaches and Harbors, source area evaluation will be conducted in the afternoon. To optimize usage of County resources, the frequency and locations of subsequent (e.g., year two) Evaluation Site monitoring may be modified upon review of the data gathered. As listed in the BPA, after the first year effort, monitoring frequencies may be revised pending review of the data collected through the MFAC/BMP program. A proposed monitoring schedule for Evaluation Sites is given in Table 2.

The County will initiate the given monitoring program within six months from the receipt of a letter of approval from the Regional Board Executive Officer (E.O.).

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[5] CPS devices were certified by the Regional Board as an approved full-capture device on August 1, 2007

[6] Connector Pipe Screen Design: Full Capture TMDL Compliance, Screen and Bypass Sizing Requirements, Technical Report (April 2007), available at: http://www.waterboards.ca.gov/rwqcb4/water_issues/programs/tmdl/fcc/la%20county%20full%20capture%20request%20package.pdf

Monitoring Event Preparation

Monitoring events should only be conducted during daylight hours under safe weather conditions. The weather forecast should be checked immediately prior to each monitoring event. Monitoring events will not occur during or immediately after storm events. Precipitation events within the WMA can cause elevated water levels and unsafe conditions. If at any time during a monitoring event, field personnel feel that site conditions are unsafe for any reason, the event should be abandoned and the project manager notified of the situation.

Prior to mobilization for each monitoring event, field personnel should prepare the equipment necessary to conduct the trash assessment monitoring event. Required equipment is listed in Table 3.

Table 3. Equipment Checklist

Required Trash Assessment Items	
☐ First Aid Kit ☐ Cellular Telephone ☐ Copy of TMRP document	☐ Large Trash Bags (e.g., Green ‘N’ Pack Eco Friendly Lawn & Leaf Bags [30” x 33” x 1.1 mil, 30 gallon] or Glad ForceFlex Lawn Drawstring Bags [32.5" x 38" x 1.1 mil, 39 gallon])
☐ Trash Monitoring Worksheets	☐ Work Gloves/Medical Gloves
☐ Hazardous Material/Intractable Trash Logs	☐ Sharps Container
☐ Clipboard	☐ Digital Camera
☐ Notebook	☐ Garbage Bag Tags
☐ Pens/Pencils and Permanent Marker	☐ Scale (e.g., Hand-Held Scale)
☐ Side Pack/Messenger Bag	☐ Hiking Boots
☐ GPS Unit	☐ Wader Boots
☐ Measuring Wheel/Tape Measure	☐ Maps and Aerial Photos
☐ Cones/Flagging Stakes	☐ Sunscreen Lotion
☐ Timepiece	☐ Hat/Sunglasses
☐ Trash Grabber (e.g., Ettore 49036 Grip ‘n Grab)	☐ Coins and small bills for parking

Additionally, any necessary permits required for access to restricted areas and/or trash removal will be obtained prior to the monitoring event.

SITE DEFINITION

For all monitoring locations, site locations have been identified as listed in the **Monitoring Site Locations** section. At each of the selected monitoring locations (see **Attachment A**), monitoring will take place at a defined 100 foot section of the impaired area that is identified as the monitoring site. All subsequent monitoring events will take place within the same identified 100 foot area. If for any reason the location of a site is modified during an assessment event, the field crews will need to note the change and contact the project manager of the deviation.

Site Length

When the site is first established the 100 foot section will be accurately measured that includes sinuosity of the location. The length should be measured as the actual shoreline, channel/drain, open space, or park length (including curves), not necessarily in a straight line. Where possible, the upper and lower boundaries of each site should be identified by clearly visible and fixed landmarks, such as structures or natural formations that are notable. If possible, the boundaries may be flagged or physically marked to save time during subsequent assessment events. In addition, GPS coordinates should be recorded for the boundaries of each site during the first event. Again, if a section of the length is blocked or deemed inaccessible, the site can be moved to a more accessible location but any move will need to be noted and the project manager notified upon completion of the event.

Site Width

During the first site visit, the field team will document the transverse boundaries of the lengths to be monitored. For trash assessment events at Beaches, the site boundaries will be defined by the area between the current visible high-water line or beach crest[7] and the lowest level to which the water recedes. For trash assessment events at Non-Beach Open Space and Parks as well as trash evaluation events at all nonpoint sources, site boundaries will be five to ten feet wide and will represent the areas within which trash can be carried to the waterbody by wind or water. For trash assessment events at Harbors, the site boundaries will be confined to the water. As appropriate, the boundaries may be defined by a physical structure, such as a fence or roadway, and will be documented in field notes and/or with digital photographs. Subsequent monitoring events will follow similar procedures within the same specified boundaries. If unable to resample previous areas, field crews will note the change and reason for the change in the monitoring worksheets.

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[7] The approximate line along and closest to a shoreline where the slope of the beach changes in steepness due to wave action. No sand or rocks wetted by waves will be found above the current visible high-water line or beach crest.

Monitoring Procedures

For the required monitoring events, trash will be collected following standard operation procedures as outlined in the TMRP. The amount of effort per event will vary based on the types of sites being monitored for that specific event. In particular, the BPA specifies that assessment shall focus on the shorelines or interface along Santa Monica Bay. However, procedures as outlined in TMRP are still required to be followed. During each monitoring event the weight of trash will be recorded. As such, the amount of trash will be determined using weight of trash as the standard metric.

MFAC Assessment and Source Area Evaluation Events

During each MFAC assessment and source area evaluation event at each site, a crew comprised of a minimum one or two-person monitoring crew will move through the entire Assessment Site or Evaluation Site. Though there should be no trash present at Assessment Sites during an assessment event, the monitoring crew will note and collect any trash not captured by the prior collection event. Trash collected during an assessment event will be weighed and recorded. At Evaluation Sites and Assessment Sites, the monitoring crew will collect and weigh every piece of trash[8] found. Collecting all trash items will allow the site to be revisited and re-assessed for impairment and usage patterns. No waste receptacles will be covered by MFAC assessment and source area evaluation efforts.

A trash grabber or similar tool (e.g., metal kitchen tongs) should be used to help pick up trash. It is important to look under vegetative cover to see if trash has accumulated beneath. The ground and substrate should be inspected to ensure that small items are picked up and collected.

*****To avoid injury while picking up trash, team members should always wear gloves and avoid touching trash with unprotected hands*****

All collected trash shall be placed in trash bags and weighed to determine the weight of trash collected at each site. The amount of time needed for the trash monitoring should also be recorded.

To account for items which are too heavy to be lifted or are embedded in the area (e.g., boats that wash up during storms), referred to as intractable or "legacy trash", specific notes will be written on the trash monitoring worksheet (along with GPS coordinates and/or digital photographs) as to avoid noting the same item/s during the next monitoring event. Legacy trash items will need to be removed by qualified individuals with appropriate equipment, therefore the monitoring crew will not attempt to remove these items themselves.[9]

Prior to deployment, the monitoring crew shall be informed or trained as to what hazardous materials are and may potentially be, and how to safely remove these items. If a potentially hazardous item is found during the assessment, the crew will not touch or move the item but shall inform the lead field technician. If the lead field technician determines that the item cannot

[8] Trash as defined in the TMRP

[9] Intractable or legacy trash is usually heavy and will interfere with assessment and evaluation efforts, which use weight as the single metric for measuring amounts of trash

be safely removed, the location of the item will be documented (along with photographs and/or GPS coordinates). Hazardous material identification and removal is further defined in the Health and Safety Plan along with a detailed list of items that are considered "Hazardous" and banned from disposal in the trash. More information can be found on the California Integrated Waste Management Board Website: www.ciwmb.ca.gov/hhw/info/. The appropriate authorities will be contacted immediately for removal of the hazardous item(s), if proper training or collection materials are not available to the monitoring crew.

MFAC ASSESSMENT SITE PROCEDURES

MFAC assessment will occur at Beaches and Harbors as well as Non-Beach Open Space and Parks. While monitoring Assessment Sites, the field crew will fill out a trash Monitoring Worksheet (**Attachment D**). Trash MFAC assessment will be conducted using the following procedures:

At Beaches

Before the first event at each site, set the specific shoreline location for the reference endpoints. Provide the coordinates for the two reference endpoints of each site, as located along the current visible high-water line or beach crest. Each site reach must be approximately 100 feet in length. Also provide a description for the general location.

1. Immediately after a cleanup event at each designated site, at least one field crew member will be deployed for the follow-up assessment event.

2. A Monitoring Worksheet will be used to record observations and notes. If available, multiple individuals can participate in an assessment event, but only one individual is to be recording information on the Monitoring Worksheet in order to minimize the potential for errors.

3. Using the description and coordinates of the reference endpoints, find the approximate location at which to begin the assessment.

    a. If for some reason it is not possible to access an endpoint or entire site, note the reason/s and contact the project manager for further directions.

    b. If project manager is unavailable, note the time of the visit and continue on to the next site.

4. Record the coordinates for each of the two corners of the starting location.[10] The distance between these points should encompass the site width to be monitored, with the higher point situated on the current visible high-water line or beach crest and the other point on the lowest level to which the water recedes.

5. Before beginning the assessment, record the starting time.

[10] If a line were drawn between the two corner points, the line would lie roughly perpendicular to the adjacent shoreline.

6. Proceed to walk along and visually sweep the shoreline area between the current visible high-water line or beach crest and the lowest level to which the water recedes. Look carefully for any articles of trash. Head towards the far end of the 100 foot reach, noting and collecting any trash that may be found within the site. Make additional notes as appropriate, and check the GPS device every so often to ensure that assessment efforts are confined to the approximate designated location.

7. If large items are identified or hazardous materials are found, follow the procedures in the **Identified Hazardous Materials and Intractable Trash** section of the Health and Safety Plan.

8. Upon arriving at the approximate end location, record the stop time and then record the coordinates of each of the two corners of the end location.

9. Take a digital photograph to document the cleanliness of the site.

10. Complete any remaining relevant portions of the Monitoring Worksheet.

If the monitoring group identifies a more efficient and/or modified method to record monitoring information, the method will be noted in the subsequent annual report.

At Harbors

Before the first event at each site, set the specific shoreline location for the reference endpoints. Provide the coordinates for the two reference endpoints of each site, as located along land-water interface. Each site reach must be approximately 100 feet in length. Also provide a description for the general location.

1. Immediately after a cleanup event at each designated site, at least one field crew member will be deployed for the follow-up assessment event.

2. A Monitoring Worksheet will be used to record observations and notes. If available, multiple individuals can participate in an assessment event, but only one individual is to be recording information on the Monitoring Worksheet in order to minimize the potential for errors.

3. Using the description and coordinates of the reference endpoints, find the approximate location at which to begin the assessment.

    a. If for some reason it is not possible to access an endpoint or entire site, note the reason/s and contact the project manager for further directions.

    b. If project manager is unavailable, note the time of the visit and continue on to the next site.

4. Record the coordinates for each of the two corners of the starting location.[11] The distance between these points should encompass the site width to be monitored.

5. Before beginning the assessment, record the starting time.

6. Proceed to move along and visually sweep the general area. Look carefully for any articles of trash. Head towards the far end of the 100 foot reach, noting and collecting any trash that may be found within the site. Make additional notes as appropriate, and check the GPS device every so often to ensure that assessment efforts are confined to the approximate designated location.

7. If large items are identified or hazardous materials are found, follow the procedures in the **Identified Hazardous Materials and Intractable Trash** section of the Health and Safety Plan.

8. Upon arriving at the approximate end location, record the stop time and then record the coordinates of each of the two corners of the end location.

9. Take a digital photograph to document the cleanliness of the site.

10. Complete any remaining relevant portions of the Monitoring Worksheet.

At Non-Beach Open Space and Parks

Before the first event at each site, set the specific endpoints by providing coordinates for each of the four corners of the site. Each site reach must be 100 feet in length and at least 5 to 10 feet in width. Also provide a description for the general location.

1. Immediately after a cleanup event at each designated site, at least one field crew member will be deployed for the follow-up assessment event.
2. A Monitoring Worksheet will be used to record observations and notes. If available, multiple individuals can participate in an assessment event, but only one individual is to be recording information on the Monitoring Worksheet in order to minimize the potential for errors.

3. Using the description and coordinates of the endpoints, find the approximate location at which to begin the assessment.

    a. If for some reason it is not possible to access an endpoint or entire site, note the reason/s and contact the project manager for further directions.

    b. If project manager is unavailable, note the time of the visit and continue on to the next site.

[11] If a line were drawn between the two corner points, the line would lie roughly perpendicular to the adjacent shoreline.

4. Record the coordinates for each of the two corners of the starting location. The distance between these points should encompass the site width to be monitored.
5. Before beginning the assessment, record the starting time.
6. Proceed to walk along the length of the reach, visually sweeping across the width. Look carefully for any articles of trash. Head towards the far end of the 100 foot reach, removing any trash that may be found within the site for subsequent weighing. Make additional notes as appropriate, and check the GPS device every so often to ensure that assessment efforts are confined to the approximate designated location.
7. If large items are identified or hazardous materials are found, follow the procedures in the **Identified Hazardous Materials and Intractable Trash** section of the Health and Safety Plan.
8. Upon arriving at the approximate end location, record the stop time and then record the coordinates of each of the two corners of the end location.
9. Take a digital photograph to document the cleanliness of the site.
10. Complete any remaining relevant portions of the Monitoring Worksheet.

MFAC Assessement Site Completion

Following the completion of the site assessment, the team should check the Monitoring Worksheet for completion. The total time for the assessment event, including start time and end time, should also be noted on the worksheet. It is important to complete the worksheets before leaving the site while the memory is still fresh.

Observations about the condition of the site, locations of any possible trash found, potential contributing sources, and other observations should be recorded in the appropriate spaces on the trash monitoring worksheet.

SOURCE AREA EVALUATION SITE PROCEDURES

The effort for the Evaluation Site monitoring will include trash collection and take place at a later time of day. Trash collection may include items on the ground or items caught within structures or vegetation, but will exclude all items contained within waste receptacles. Source area evaluation will occur at Beaches and Harbors as well as Non-Beach Open Space and Parks. Evaluation procedures are as follows:

At Beaches, Harbors, Non-Beach Open Spaces and Parks

Before the first event at each site, set the specific endpoints by providing coordinates for each of the four corners of the site. Each site reach must be 100 feet in length and at least 5 to 10 feet in width. Also provide a description for the general location.

1. In the late afternoon before dusk, at least two field crew members will be deployed for an evaluation event. A Monitoring Worksheet will be used to record observations and notes, but only one individual is to be recording information on the worksheet to minimize the potential for errors.

2. Using the description and coordinates of the endpoints, find the approximate location at which to begin the assessment.

    a. If for some reason it is not possible to access an endpoint or entire site, note the reason/s and contact the project manager for further directions.

    b. If project manager is unavailable, note the time of the visit and continue on to the next site.

3. Before beginning the evaluation, record the start time.
4. Proceed to walk along the length of the reach, visually sweeping across the width.
5. Collect any articles of trash found, heading towards the far end of the 100 foot reach. Make additional notes as appropriate, and check the GPS device periodically to ensure that evaluation efforts are confined to the approximate designated location.

    a. In areas where large amounts of trash are accumulating, note any observations on the Monitoring Worksheet.

    b. If large items are identified or hazardous materials are found, follow the procedures in the **Identified Hazardous Materials and Intractable Trash** section of the Health and Safety Plan.

6. Upon arriving at the approximate end location, record the stop time and then record the coordinates of each of the two corners of the end location.

7. Take a digital photograph to document the cleanliness of the site.

8. If trash was found and a trash bag used to contain items found within the site, secure the bag opening and label the bag with the site name and date.

9. Use a hand-held scale to weigh the bag. Record the weight on the Monitoring Worksheet.

10. Complete any remaining relevant portions of the Monitoring Worksheet.

Source Area Evaluation Site Completion

Following completion of the site, the team should check the Monitoring Worksheet for completion. The total time for the collection event, including start time and end time, should also be noted on the worksheet. General site observations should be recorded on the trash monitoring worksheet as well. It is important to complete the worksheets before leaving the site while the memory is still fresh.

POST-EVENT ACTIVITIES

At the completion of source area evaluation events, all collected trash will be taken to a County facility. At the County facility, all trash will be placed in a dumpster and subsequently be sent to a landfill or recycling facility for appropriate disposal.

The contracted agency should make all reasonable attempts to recycle the materials collected during the event, with time permitting. The recycling of materials is not a requirement of the TMDL or the TMRP/MFAC and is at the discretion of the contractor. If items are too large to remove or are deemed hazardous or “Legacy Trash”, the contractor shall immediately contact the program manger to initiate removal of the items.

In addition, the trash generation rate will be calculated at the completion of source area evaluation events. Dividing the weight of trash collected by the site length (Beaches and Harbors) or area (Non-Beach Open Space and Parks) will yield an approximated site-specific trash generation rate, which may be used to estimate the trash generation rate for the entire location. For trash generation rate calculations, site length will be 100 feet and site width may be calculated using the coordinates of the monitored area, as recorded on a Monitoring Worksheet. The collected data will be used to inform the annual report in assessment of the comparison to baseline and, over time, evaluation of reducing trend in the rate.

Special Circumstances for Safety Consideration

Within the Santa Monica WMA there are several potentially hazardous factors that exist. One of these is the potential to encounter homeless individuals that are known to occupy the area. The other factors include steep cliffs and access trails, ocean currents, confined spaces, and invasive species. The potential for these special circumstances are discussed in more detail below and in the Health and Safety Plan (**Attachment B**). The Health and Safety Plan provides a more comprehensive review of special circumstances for safety consideration, including additional special circumstances not covered in the TMRP. Cleanup, assessments, and evaluations will not occur in areas with safety concerns.

HOMELESS INDIVIDUALS AND PROPERTY

There is the potential for encounters and/or interactions with homeless individuals during trash collection activities. The possibility of unknowingly collecting items which may be deemed property of a homeless individual may create the potential for a serious altercation. During any cleanup or monitoring event, field staff are required to use discretion in all interactions with individuals in the field (standard for any encounter, homeless or not) and should handle themselves in a professional and courteous manner. If at any time field staff feel uncomfortable or in danger, activities must immediately cease and all staff must return to a safe location. Field staff will record the amount of monitoring that took place prior to the work interruption, and note on the field sheets the end point location and time. If any situation escalates to a perceived dangerous level, field staff must immediately leave the area and contact the appropriate authorities. In the event that trash items appear to be property of a homeless individual, field staff should thus consider the items “Legacy Trash” and follow procedures outlined in the **Hazardous Materials and Legacy Trash** section of the Health and Safety Plan. Care must be taken when collecting pertinent data, and as previously stated, if at any time during monitoring or cleanup field staff feel threatened or in danger, cease all activities and move to a more secure location.

STEEP CLIFFS AND ACCESS TRAILS

Some of the assessment sites are located near or at the base of steep cliff sides and access trails. Commonly paired with crumbling earth, sharp rocks, and uneven terrain, the potential to slip and fall causing serious injury is possible at these locations, even during the driest of weather. Steep cliffs may also present the danger of landslides. Field crews will need to ensure that all precautions are taken when sampling adjacent to environments exhibiting these conditions. Field crews should avoid cliff sides and precarious trails, and identify safe routes to the designated sites. During assessment efforts, field crews should take caution when using dirt access trails and ensure that all procedures as outlined in the Health and Safety Plan are followed. Dangerous environments are deemed off limits during all assessment events.

OCEAN TIDES AND CURRENTS

The combination of ocean tides and rocky terrain often produce slippery surfaces. Especially when working in close proximity to the water, strong waves and/or rip currents may present additional dangers. Field crews should be aware of their surroundings at all times, take precaution when walking on wet surfaces, and consider wearing a pack to keep their hands as free as possible.

Collection, assessment, and evaluation events may be curtailed during periods of high surf.

CONFINED SPACES

At no time are field crews to enter any confined spaces, including storm drain outlets, freeway underpass tunnels, or any confined area located at or near a monitoring location. These confined spaces can include areas of dangerous gas buildup and other potential hazards that field crews will not be trained properly in addressing. If trash is accumulating in a confined space, notification will be given the project manager which will include a specific site location, a brief narrative of the observations, and the time and date of the observation.

Reporting Requirements

ANNUAL MONITORING REPORT

Each year, an annual monitoring report will be submitted to the Regional Board. The annual report will address Point Sources, Beaches, Harbors, and Non-Beach Open Space and Parks. Any instances of not attaining TMDL WLAs or LAs, TMRP, or MFAC/BMP Program provisions; and any BMPs proposed to address assessment metrics not meeting desired levels will also be described in the annual report.

Point Sources

For point sources, the County will:

- Include a report of the number and percent coverage of installed FCSs.
- State whether the County is attaining the TMDL schedule for installation.
- Provide an estimate of the number of point sources to be included in County efforts for the following year.
- Identify any point sources that cannot be fitted with a FCS (e.g., at a catch basin due to size constraints).

In the case that a point source is not suitable for or cannot be fitted with a FCS, the County will default to using a PCS or performing institutional controls to demonstrate the removal of trash at the daily generation rate (DGR). Institutional controls that are used at point sources without FCSs will be noted in the annual report.

Beaches

For Beaches, the County will:

- Provide a tabulation of the number of cleanup, assessment, and evaluation events conducted at shorelines and source areas.
- Include results from MFAC assessments.
- Include results from source area evaluations.
- State whether the County is attaining the following:
    - Zero trash after assessments
    - Trash generation rate below baseline
    - Trash generation rate at a reducing trend (evaluated beginning with the third annual report)

In the event any of the above are not achieved, the County will evaluate current BMPs and propose changes to existing BMPs or institute additional BMPs to ensure future assessment metrics are met in the future. Possible BMPs that may be implemented include providing additional training for field crew members, providing additional trash receptacles, or increasing legal enforcement for littering. If determined necessary, proposed modifications will be included in the Annual Report.

Harbors

For Harbors, the County will:

- Provide a tabulation of the number of cleanup, assessment, and evaluation events conducted at shorelines and source areas.
- Include results from source area evaluations.
- State whether the County is attaining the following:
    - Zero trash after assessments
    - Trash generation rate below baseline
    - Trash generation rate at a reducing trend (evaluated beginning with the third annual report)

In the event any of the above are not achieved, the County will evaluate existing BMPs and propose changes to existing BMPs or institute additional BMPs to ensure future assessment metrics are met in the future (e.g., additional training for field crew members, additional trash receptacles, and increasing legal enforcement for littering). If determined necessary, proposed modifications will be included in the Annual Report.

Non-Beach Open Space and Parks

For Non-Beach Open Space and Parks, the County will:

- Provide a tabulation of the number of cleanup assessment, and evaluation events conducted.
- Include results from MFAC assessments.
- Include results from source area evaluations.
- State whether the County is attaining the following:
    - Zero trash after assessments
    - Trash generation rate below baseline
    - Trash generation rate at a reducing trend (evaluated beginning with the third annual report)

In the event any of the above are not achieved, the County will evaluate existing BMPs and propose changes to existing BMPs or institute additional BMPs to ensure future assessment metrics are met in the future and include a description of any program modifications in the annual report.

TMRP/MFAC REVISION

All proposed revisions the County determines to be necessary to the TMRP and/or MFAC/BMP program will be proposed in the annual monitoring report. Revisions may include procedural modifications, increasing or reducing the frequency of MFAC assessment and collection, redefining “critical conditions” as given in the BPA, and changing the location or number of MFAC assessment and source area evaluation sites.

COMPARISON WITH ESTABLISHED BASELINES

To perform source area evaluation, the County will be using the baseline LAs and WLA as established in the BPA, for nonpoint sources and point sources, respectively.

Nonpoint Sources

For Beaches and Harbors, the data collected at Evaluation Sites will be used to compare trash generation rates to the TMDL default baselines. Additionally, monitoring sites are to show a decreasing trend of accumulation.[12] As mentioned in the BPA, compliance with the nonpoint source LAs may be achieved through the implementation of the MFAC/BMP program.

Point Sources

Point sources will be addressed using FCSs. A FCS "is any single device or series of devices that traps all particles retained by a 5 mm mesh screen and has a design treatment capacity of not less than the peak flow rate Q resulting from a one-year, one-hour, storm in the subdrainage area".[13,14] If there are physical constraints that prevent the usage of a FCS, alternative methods of compliance will be proposed on a case-by-case basis. As such, a small percentage of catch basins may require some combination of PCS/BMPs.

For the annual monitoring report, the County will prepare and include a plan outlining the proposed FCS installation schedule and/or PCS installation and BMPs to be implemented. Point sources will not be prioritized for FCS installation. For the TMRP, the County has identified 62 catch basins for inclusion as shown in Figure 2 of **Attachment A**. The projected general timeline for FCS installation at the identified point sources is given in Table 4.

Table 4. General Timeline for FCS Installation.

Final Date	Number of FCSs Installed(1)
March 20, 2016	13
March 20, 2017	25
March 20, 2018	38
March 20, 2019	50
March 20, 2020	62

(1) Based on 62 catch basins covered by the TMRP

CURRENT BMP EFFORTS

The County actively engages in a three-pronged approach for pollution prevention: 1) Education; 2) Incentives; and 3) Enforcement. Listed below are current trash management procedures or

[12] A decreasing trend constitutes a negative slope when the data is graphed on a time series plot

[13] Per Resolution No. 04-023, adopted by the Regional Board on March 4, 2004

[14] "Rational equation is used to compute the peak flow rate: Q = C x I x A, where Q = design flow rate (cubic feet per second, cfs); C = runoff coefficient (dimensionless); I = design rainfall intensity (inches per hour, as determined per the rainfall isohyetal map), and A = subdrainage area (acres)."

BMPs that have been put in place by the County. The given BMPs, combined with the monitoring described in the TMRP, represent the initial MFAC/BMP program for the County. As new BMPs are implemented in the Watershed, this list will be updated to account for increased efforts. Each Annual Report will include the suite of BMPs employed for the corresponding year. Current BMPs include:

- Daily cleaning of all County-owned or operated beaches.
- Daily cleaning of all harbor waters.
- *Ordinances*
    - Title 12 Chapter 12.85 - Ban on plastic carryout bags
    - Title 17 Chapter 12.365 - Smoking prohibited on County beaches
    - Title 17 Chapter 4.645 - Smoking prohibited at County parks
    - Low Impact Development Ordinance - Reduce impacts from stormwater runoff
- *FCSs*
    - Ballona Creek Watershed - There are 368 catch basins that collect runoff from County-unincorporated communities located within the Ballona Creek Watershed. To date, the County has achieved a total 88.5 percent reduction to date with the installation of 333 full-capture devices and a 81.1 percent reduction based on a 3-year average for all of the County unincorporated areas within the Ballona Creek Watershed.
    - Malibu Creek Watershed - The County has installed 192 FCSs in catch basins within the Malibu Creek Watershed in unincorporated County areas.
- *Trash and Recycling Receptacles* - Wedded clamshell-lid trash and recycling cans have been installed at areas owned, operated, or otherwise maintained by the County. These receptacles are also marked with messages and images that encourage their usage.
- *Industrial and Commercial Inspections* - Annual inspections targeting facilities lacking minimum stormwater BMPs and housekeeping practices to reduce sources of trash.
- *Maintenance and Cleanup Activities* – Parking lot and street sweeping program with most streets swept on a weekly basis in unincorporated County areas.
- *Public Information and Participation Programs* - CleanLA public outreach program and website (www.888CleanLA.org) educates residents about stormwater pollution prevention. The CleanLA campaign teaches residents about proper disposal of waste and the importance of watershed protection. Information provided through these programs includes how to report illegal dumping, why it is important to prevent animal waste and general pollution from entering the storm drain system, and locations for proper RV sewage waste disposal. The creative multimedia campaign includes broadcast of stormwater pollution prevention messages through radio, television, billboards, newspapers, video aired on Metro buses, and the Internet.
- *Storm Drain Markers* - All storm drains in the unincorporated County are appropriately marked with a “no dumping” message.

- *Development Planning Program* - The County requires post-construction BMPs to reduce the impact of development on water quality including reducing the transport of trash via stormwater runoff.

S E P T E M B E R 2 0 1 2

Santa Monica Bay Watershed Management Area (WMA) Trash Monitoring and Reporting Plan (TMRP) - Monitoring Sites

Submitted to:

COUNTY OF LOS ANGELES

L A R R Y
W A L K E R
ASSOCIATES

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Proposed Monitoring Sites

Nonpoint and point sources are provided below, along with select monitoring sites for each nonpoint source. These sites highlight approximate areas of concern, and may exceed the 100 foot length to be used during the monitoring events. For the first monitoring event at each site, the County will select a 100 foot reach within or otherwise encompassing these sites and document the exact locations so that subsequent TMRP and MFAC/BMP program monitoring events will occur at the same locations so the results can be accurately compared. Proposed designations are included for sites that may be considered for monitoring (i.e., MFAC Assessment Sites [Assessment Sites or MFACs] and/or Source Area Evaluation Sites [Evaluation Sites or Evals]). Proposed Assessment Sites and Evaluation Sites were selected based on observations noted during preliminary site visits. The following general parameters were used to select sites:

- Proximity to structures and objects (e.g., parking lots, food stands, and trash cans)
- Physical/topographical features
- Amount of trash observed
- Volume, concentration, and flow of visitors
- Feedback from lifeguards.

NONPOINT SOURCES

Nonpoint sources include beaches and harbors, as well as non-beach open spaces and parks. The following nonpoint sources are organized by category and listed in sequential order, proceeding from northwest to southeast direction along the Santa Monica Bay coastline. Individual monitoring sites may or may not be listed in the same manner.

Beaches and Harbors

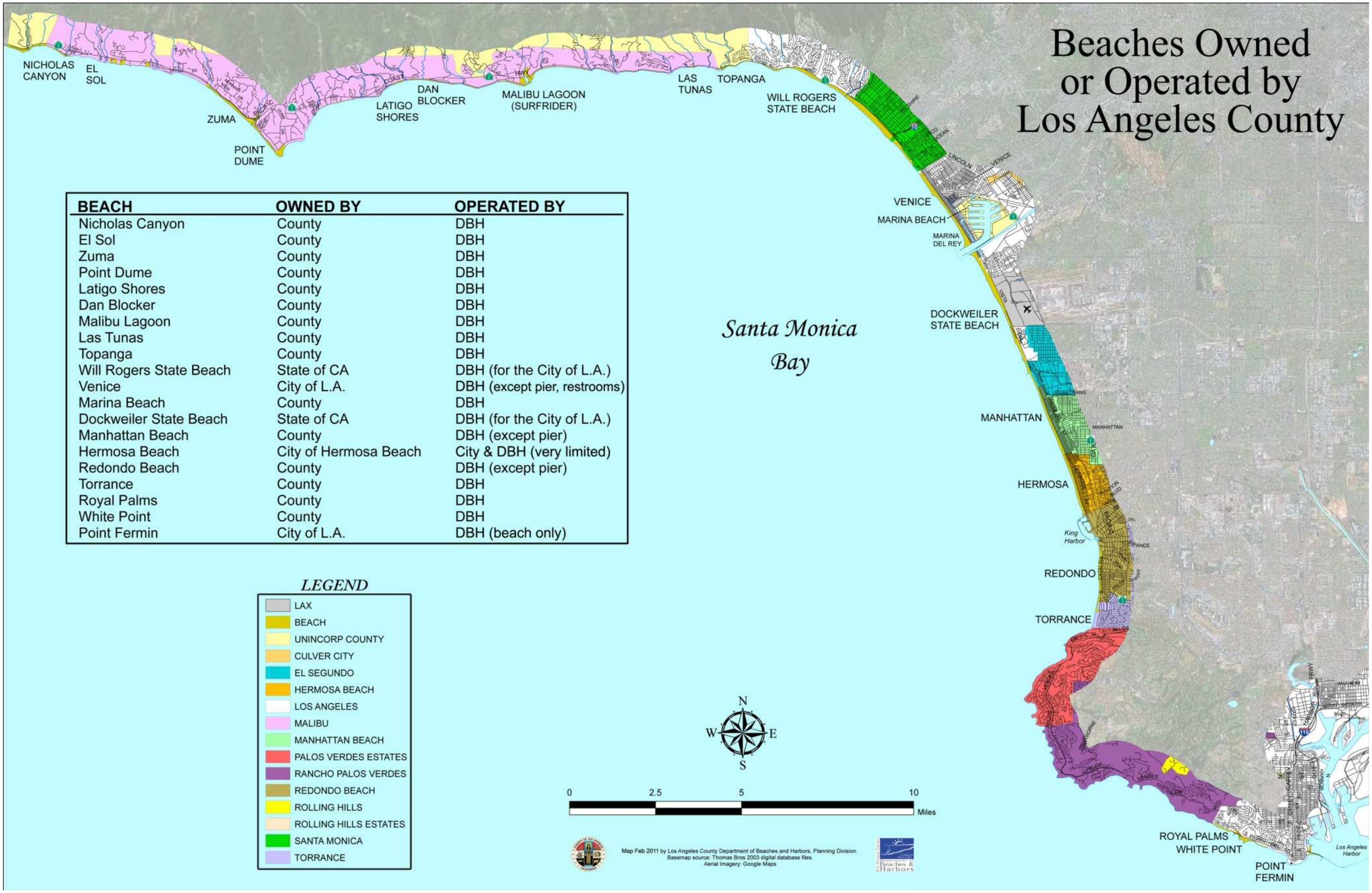
Beaches owned or operated by the County are shown in Figure 1. Preliminary site visits were conducted at the beaches of Nicholas Canyon, Zuma, Point Dume, Latigo Shores, Dan Blocker, Malibu/Surfrider, Las Tunas, Topanga, Marina Beach, Manhattan, Hermosa, Redondo, and Torrance.[1] Will Rogers, Venice, Dockweiler, and Point Fermin beaches will not be covered in the LA County Santa Monica WMA TMRP as the individual cities which have jurisdiction over these beaches plan to prepare separate TMRPs that will cover these locations. White Point/Royal Palms Beach will not be covered in the Santa Monica Bay WMA TMRP because shoreline conditions preclude MFAC Assessments and there are no suitable source areas under County jurisdiction. If such constraints change, the beach will be added to the TMRP and MFAC/BMP program requirements. A site visit was also conducted at Marina Del Rey Harbor. For details on

[1] El Sol Beach is situated at the base of a bluff-top and currently does not have an access trail. Since the beach can only be reached on foot by “making a 20-minute trek at low tide” over algae-covered rocks and the County does not currently have plans to access this location by boat, El Sol will be considered unsafe and inaccessible for the purposes of the Santa Monica Bay WMA TMRP. In the event the County further develops access to the beach, it will be added to the TMRP and MFAC/BMP program requirements. (http://wikimapia.org/5163129/El-Sol-County-Beach-Park-Public-Access-low-tide)

proposed MFAC Assessment and Source Area Evaluation sites at Beaches and Harbors, see Table 1.

Parks and Open Space

One Non-Beach Open Space and Park location was identified for inclusion in the TMRP. The identified location, Burton Chace Park, is located within Marina Del Rey. See Table 2 below for the proposed sites at Burton Chace Park.



BEACH	OWNED BY	OPERATED BY
Nicholas Canyon	County	DBH
El Sol	County	DBH
Zuma	County	DBH
Point Dume	County	DBH
Latigo Shores	County	DBH
Dan Blocker	County	DBH
Malibu Lagoon	County	DBH
Las Tunas	County	DBH
Topanga	County	DBH
Will Rogers State Beach	State of CA	DBH (for the City of L.A.)
Venice	City of L.A.	DBH (except pier, restrooms)
Marina Beach	County	DBH
Dockweiler State Beach	State of CA	DBH (for the City of L.A.)
Manhattan Beach	County	DBH (except pier)
Hermosa Beach	City of Hermosa Beach	City & DBH (very limited)
Redondo Beach	County	DBH (except pier)
Torrance	County	DBH
Royal Palms	County	DBH
White Point	County	DBH
Point Fermin	City of L.A.	DBH (beach only)

Figure 1. Beaches Owned or Operated by the County

Table 1. Proposed Assessment (MFAC) and Evaluation (Eval) Beach and Harbor Sites

Proposed Designation[1]					
MFAC	Eval	Location	Description	GPS Coordinates[2] (Lat, Long)	Notes
Nicholas Canyon Beach (NIC)					
✓		Shoreline (NIC_S1)	Area parallel to concrete emergency beach access ramp, all the way to edge of eroded stretch of ramp pavement	(34.0438,-118.9192)	Nearby trash can at ramp bottom seldom serviced; likely source of beach trash/debris
	✓	Parking lot (NIC_P)	Southeast corner, curbside closest to ocean	(34.0427, -118.9152)	Trash hotspot, trash also in dirt planters/caught in vegetation
Zuma Beach (ZUM)					
✓		Shoreline (ZUM_S1)	Adjacent to picnic tables/ parking lot	(34.0228, -118.8332) to (34.0218, -118.8318)	Well frequented, no trash
	✓	Shoreline (ZUM_S2)	Adjacent to volleyball courts/ parking lot on southeast end	(34.0153, -118.8229) to (34.0153, -118.8219)	Well frequented, no trash
Point Dume Beach (PTD)					
✓	✓	Shoreline (PTD_S1)	LG station 3-4	(34.0098, -118.8163)	Minimal trash
Latigo Shores Beach (LTS)					
	✓	Parking lot (LTS_P)	Roadside off PCH, east of intersection of PCH and Latigo Shores Dr.	(34.0312, -118.7497)	Lots of trash at road/fence interface
Dan Blocker Beach (DBL)					
✓		Shoreline (DBL_S2)	From outfall pipe (at given Lat/Long) to channel outflow underpass/bridge west of LG station 2	(34.0329, -118.7329)	Well frequented

continued

Table 1. Continued.

Proposed Designation(1)					
MFAC	Eval	Location	Description	GPS Coordinates(2) (Lat, Long)	Notes
Malibu Lagoon/Surfrider Beach (MLS)					
✓		Shoreline (MLS_S3)	Approximate midpoint of beach	(34.0319, -118.6800)	Beach nearly clean and trash-free
Las Tunas Beach (LTN)					
	✓	Parking lot (LTN_P)	Dirt lot adjacent to LG station LT1, specifically next to concrete safety barrier and portable toilets	(34.0393, -118.5972)	
Topanga Beach (TOP)					
✓	✓	Shoreline (TOP_S1)	Between American Apparel and outfall (Topanga Creek)	(34.0378, -118.5841)	
Marina Beach (MAR)					
✓		Shoreline (MAR_S1)	At high water mark of eastern end bordered by riprap; near kayak/boat/dingy rentals and boat launch walkway	(33.9814, -118.4559)	Some trash
	✓	Parking lot (MAR_P)	Lot closest to gazebo barbeque/picnic table area, LG station, and buoyed swim area	(33.9816, -118.4586)	Moderate trash

continued

Table 1. Continued.

Proposed Designation(1)					
MFAC	Eval	Location	Description	GPS Coordinates(2) (Lat, Long)	Notes
Marina Del Rey Harbor (MDR)					
✓		Water (MDR_W1)	Along Basin H, Parcel 77, or any berths in Marina	(33.9775, -118.4430)	All berths accumulate trash in varying amounts
	✓	Misc. (MDR_M)	Trash and recycling collection pen near end of Basin E, located on sidewalk overhang above water	(33.9812, -118.4555)	Moderate amount of trash piled in holding pen
Manhattan Beach (MAN)					
✓		Shoreline (MAN_S3)	On north end of beach, between Rosecrans and 45th St.	(33.9032, -118.4227)	Well frequented
Hermosa Beach (HER)(3)					
✓		Shoreline (HER_S1)	At southern end of beach, bordered by jetty	(33.8507, -118.3997)	
	✓	Parking lot (HER_P)	Lot A, at corner of 11th St. and Hermosa Ave.	(33.8615, -118.4001)	
Redondo Beach (RED)					
✓		Shoreline (RED_S2)	Between LG station AVE A and main maintenance building	(33. 8278, -118.3911)	No trash, adjacent to temporary trash collection center (parked cleaning vehicles, equipment, cans, etc.) (pictured)- may potentially release trash
	✓	Shoreline (RED_S3)	Around LG station AVE H	(33.8202, -118.3908)	No trash

continued

Table 1. Continued.

Proposed Designation(1)					
MFAC	Eval	Location	Description	GPS Coordinates(2) (Lat, Long)	Notes
Torrance Beach (TOR)					
✓		Shoreline (TOR_S1)	Far southern section where beach turns to cobble and sand diminishes	(33.8035, -118.3951) to (33.8040, -118.3944)	
	✓	Shoreline (TOR_S3)	Between LG stations RAMP and HR	(33.8116, -118.3916)	

(1) MFAC = MFAC Assessment Site, Eval = Source Area Evaluation Site

(2) Approximate locations given primarily in Description field. GPS coordinates are supplementary, and may refer to the actual reach of interest; or a relevant landmark, midpoint, or endpoint within the described site

(3) City of Hermosa Beach, and not the County, will be solely responsible for TMRP implementation at the identified non-point source sites. The Santa Monica Bay WMA TMRP serves only to propose how the non-point source TMRP component for Hermosa Beach will be addressed and monitored.

Non-Beach Open Space and Parks

One Non-Beach Open Space and Park location was identified for inclusion in the TMRP. The identified location, Burton Chace Park, is located within Marina Del Rey. See Table 2 below for the proposed sites at Burton Chace Park.

Table 2. Proposed Sites at Burton Chace Park (BCP)

Proposed Designation(1)					
MFAC	Eval	Location	Description	GPS Coordinates(2) (Lat, Long)	Notes
✓	✓	Shoreline	Along fence line between park and harbor	(33.9765, -118.4454) to (33.9766, -118.4451)	West of restrooms

(1) MFAC = MFAC Assessment Site, Eval = Source Area Evaluation Site

(2) Approximate locations given primarily in Description field. GPS coordinates are supplementary, and may refer to the actual reach of interest; or a relevant landmark, midpoint, or endpoint within the described site

POINT SOURCES

Point sources proposed for TMRP coverage include 62 Los Angeles County Flood Control District (LACFCD) catch basins which are shown in Figure 2.

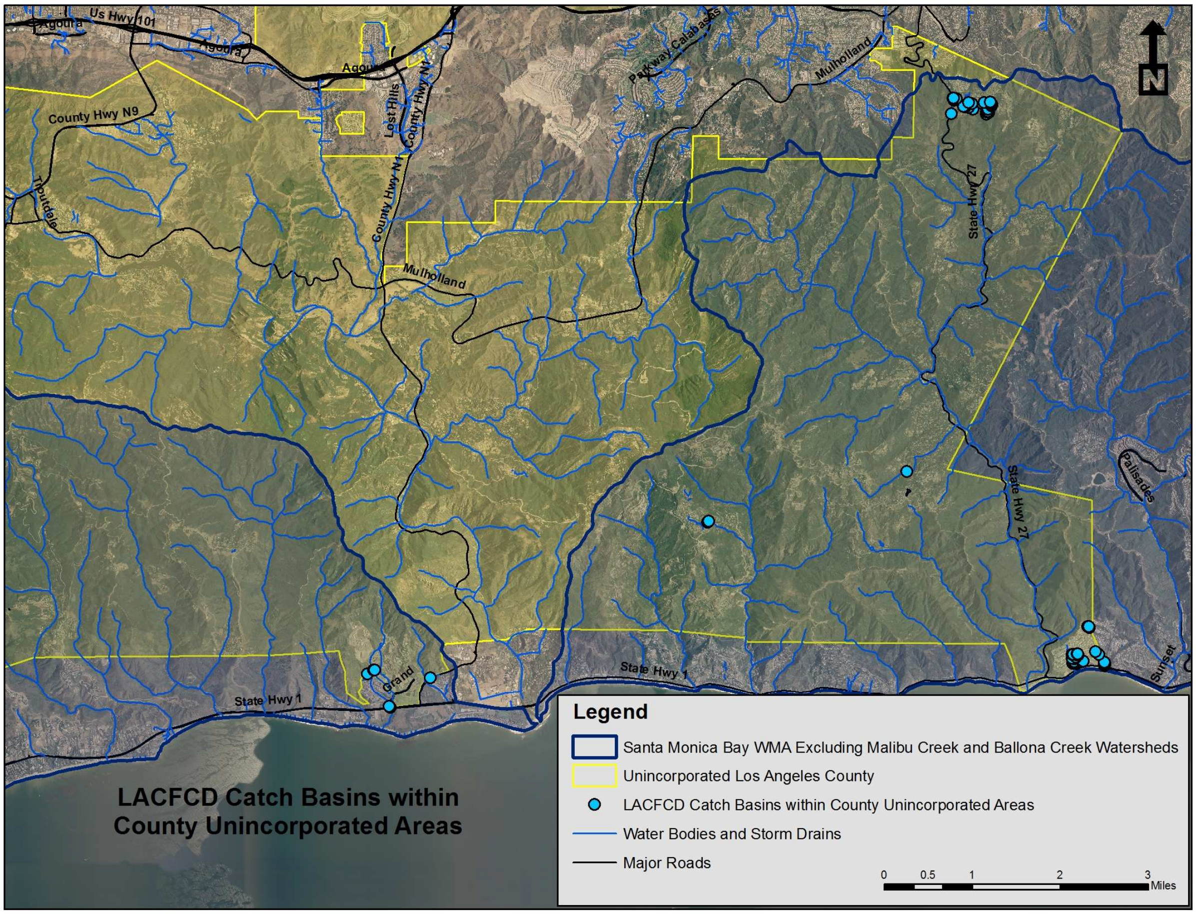


Figure 2. County Unincorporated Area LACFCD-Owned Catch Basins

S E P T E M B E R 2 0 1 2

Santa Monica Bay Watershed Management Area (WMA) Trash Monitoring and Reporting Plan (TMRP) - Health and Safety Plan (HSP)

Provided for the:

COUNTY OF LOS ANGELES

L A R R Y
W A L K E R
ASSOCIATES

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List of Acronyms

HM	Hazardous Materials
HSP	Health and Safety Plan
IT	Intractable Trash
MFAC	Minimum Frequency of Assessment and Collection
PM	Program Manager
PPE	Personal Protective Equipment
SOPs	Standard Operating Procedures
TMDL	Total Maximum Daily Load
TMRP	Trash Monitoring and Reporting Plan
WMA	Watershed Management Area

Overview

The objective of the Health and Safety Plan (HSP) is to provide a guidance document that supplements the information provided in the Santa Monica Bay Nearshore and Offshore Debris Total Maximum Daily Load (TMDL) Trash Monitoring and Reporting Plan (TMRP), protects Field Staff from injury or illness during their monitoring activities, and ensures that such activities do not compromise any County laws, ordinances or safety policies. Prior to any monitoring activities, Field Staff should review any existing HSPs or similar documents that may be in place. The objective of the Santa Monica Bay Watershed Management Area (WMA) TMRP HSP will be achieved through planning, common sense, effective communication, and training. The HSP can be used in conjunction with, or to complement any existing plan.

The HSP alone cannot create a safe work environment, and it is not intended to be a comprehensive "safety manual" for the program, the HSP should serve to remind staff of health and safety policies that apply specifically to field monitoring, trash collection/assessment, and associated activities of this program. The HSP will also act as a general guide regarding how collection activities should be performed.

All Field Staff that will be participating in trash collection efforts associated with the TMRP and MFAC/BMP program shall follow the HSP. All staff participating in any component of the collection and assessment/evaluation effort shall be responsible for reading the HSP and following its procedures. The HSP should also be reviewed periodically and updated as needed, but annually at a minimum. Numerous items may be identified, including omitted items not initially considered, clarification of a particular component of the program, corrections, or additions once monitoring has been initiated, and should be addressed during the review and updating process.

The HSP has been divided into two sections, the first being an overview of the Standard Operating Procedures (SOPs) that should be followed prior to, during, and after a monitoring event. The first section is meant to complement the information included in the **Monitoring Procedures** section of the TMRP. The second section focuses on the general health and safety procedures that must be incorporated into day to day activities associated with monitoring efforts. This second section is meant to complement the information contained in the **Special Circumstances for Safety Consideration** section of the TMRP.

Standard Operating Procedures

The **Standard Operating Procedures** (SOPs) section outlines general operating procedures that should be followed by all individuals involved with this program. The **SOPs** section provides basic guidance that will allow for more efficient collection efforts and build a basic structure that will ensure HSP procedures are followed. <u>This section should be reviewed periodically and updated as necessary, but annually at a minimum.</u>

KEY STAFF

This section specifies key program personnel involved in the TMRP activities. Table 1 includes generic titles and specific responsibilities with relation to maintaining compliance with the HSP guidelines. While it is not mandatory to adopt the actual titles in this table, it should be used as a guide and general hierarchical structure.

Table 1. Key TMRP HSP Staff and Responsibilities

Title	Responsibilities
Program Manager	• Ensure that program is performed in compliance with the HSP • Monitor HSP compliance • Manage and resolve issues dealing with health and safety • Ensure that the program HSP is continually implemented • Ensure that program resources are allocated to fully implement and support the HSP • Ensure that adequate training or safety briefing(s) are provided and completed • Communicate with the stakeholder(s) regarding any issues and/or incidents related to the TMRP and MFAC/BMP program HSP
Crew Leader	• Directly responsible for Field Staff health and safety • Report all health or safety issues to the Program Manager (PM) including any unsafe conditions or practices • Assist PM in HSP implementation • Inspect all field equipment before mobilization to ensure that all health and safety equipment is available on-site • Implement emergency procedures as needed • Conduct health and safety assessments as needed
Field Staff	• Be familiar with the TMRP HSP and related issues • Report all health and safety issues to the Crew Leader • Assist in HSP implementation • Ensure that HSP procedures are followed • Implement emergency procedures as needed • Conduct health and safety assessments and inform the Crew Leader of concerns

TMRP HSP REVIEW PROCEDURES

Prior to the initiation of any field activities, a thorough review of all documents (TMRP, HSP and any other identified safety oriented documents) should be conducted. All questions and/or concerns should be addressed prior to moving forward with any monitoring effort. All key staff should be included in this review process to ensure that all requirements of the TMRP are understood and the guidelines and procedures outlined in this HSP are clearly defined and understood. The following steps should be carried out by Key Staff identified above:

1. The Program Manager (PM) should review and be familiar with all TMRP and HSP requirements and procedures. The PM should be able to answer all questions that Field Staff and/or the County may have concerning any element of this effort. The PM will also be responsible for communication between Field Staff and the County.
2. The PM and Crew Leader(s) should thoroughly review the TMRP and HSP requirements and procedures in a meeting to take place prior to the required start date of the TMRP activities. The PM should ensure that the Crew Leader(s) is/are adequately trained and able to convey all requirements to Field Staff. All questions should be fully addressed by the PM prior to initiating any field monitoring. The PM should also review any additional items identified by the Crew Leader(s) that may not be a component of the HSP.
3. The Crew Leader(s) should review and ensure that all Field Staff understands the TMRP and HSP requirements and procedures. It is up to the Crew Leader(s) to conduct trainings and ensure that all Field Staff understand and comply with the procedures outlined in both the TMRP and HSP. The Crew Leader(s) will be responsible for ensuring all TMRP requirements are being met in the field, and Field Staff are complying with the HSP procedures.

It is up to every individual to perform and carry out all field activities in a safe manner. By adequately training and addressing all questions early in the process, all individuals should be prepared to conduct themselves in an appropriate manner. Both the PM and all field staff should continually review the HSP procedures and communicate with all participants to ensure the HSP is up to date and accurate.

MONITORING PREPARATION

After all individuals have reviewed and understand the components of the TMRP and HSP, Field Staff may begin preparations for the monitoring event. The following requirements detail what should be completed prior to any monitoring event.

Pre-monitoring Event Requirements

Prior to all monitoring events, the Crew Leader should contact the PM to coordinate all necessary activities. The PM must also contact the appropriate County and/or Agency contact prior to the monitoring event to ensure that the tentative monitoring dates do not conflict with any planned or anticipated activities that may inhibit the completion of the event. All pertinent contacts and contact information will be established at the initiation of this program and updated as necessary. The following should be addressed during this coordination effort:

1. Any hazards and/or activities that may be happening in the watershed that will inhibit the completion of the tentative monitoring event. This would include circumstances such as construction activities, closed roads, wildfires, possible rain/wind events, and/or special events.

2. A general monitoring event plan should be developed that includes the names of staff conducting the collection event, approximate start time, sites to be completed, and site schedule.
3. A review of all important contact information with revisions made as necessary.

The PM will be responsible for ensuring all appropriate contacts have been made and all of the above items have been addressed prior to any monitoring.

Critical Event Pre-monitoring Requirements

All of the pre-monitoring event requirements should be met prior to any critical event (rain or wind event) effort. Additionally, due to the potential increase of hazardous conditions during critical event monitoring, the PM will be responsible for ensuring that conditions are safe for the collection event. Depending upon the request of County, the PM may be required to contact state and/or local safety agencies for updates on environmental conditions. Again, the PM will be responsible for contacting all appropriate agencies prior to any critical monitoring event.

CRITICAL EVENT PROCEDURES

As described above, a portion of this effort potentially include monitoring of conditions prior to and after rain and wind events. The coordination of any critical event monitoring will be the responsibility of the PM. Prior to any critical event, the PM must monitor all available information outlets and ensure Field Staff has adequate time to complete the monitoring event in safe conditions. Examples of these outlets include:

- National Weather Service - http://www.weather.gov/
- Fox Weather - http://www.foxnews.com/weather/us/index.html
- AccuWeather - http://www.accuweather.com/
- Intellicast Weather - http://www.intellicast.com/

For monitoring post-critical monitoring events, the PM must ensure that conditions are deemed safe. It is assumed that safe conditions would be when channel flows have resumed to at or near base flow conditions.

At no time will staff be in the field during any rain event. If unexpected rain occurs during an event, Field Staff should cease all collection activities and note on the Trash Monitoring Worksheet (**Attachment D** to the TMRP) the time and location of the completed work.

MONITORING EVENT CONSIDERATIONS

The TMRP includes specific information pertaining to the SOPs for monitoring events. The **Monitoring Procedures** section of the TMRP details all procedures that must be followed during and after every monitoring event. As stated previously, it is up to every individual to ensure that they conduct themselves in a safe and cautious manner while in the field. During a monitoring event, all staff should consider the following while performing monitoring activities:

1. The Crew Leader(s) are responsible for the supervision of all activities. Field Staff are required to listen to and adhere to the directions of the Crew Leader(s).

2. A pre/post site safety meeting must be conducted at each site for all events. Many of the sites include shoreline/wet sand assessments, so crews should discuss tide and currents during the safety meeting.
3. Prior to starting a monitoring event, the Crew Leader should review the site information, including the site boundaries, potential hazards, and other important information that warrants review.
4. All staff should stay alert and aware of site conditions and their surroundings, including slippery surfaces, steep cliffs, and any other areas of concern. Where there are unsafe conditions cleanups, assessments, and evaluations will not occur.

The TMRP includes specific post-event activities. Again, the Crew Leader(s) should review all information, ensure all required procedures are complete, and all equipment and trash have been accounted for. The Crew Leader(s) will be required to contact the PM, who subsequently should contact the County to acknowledge the event has been completed.

Prohibited On-Site Activities

The following on-site activities are **prohibited** at all times:

- Entering any confined space[1] at any time
- Entering any private property without obtaining permission to enter
- Insubordination
- Any rough-housing and/or un-professional activities that may increase the risk for injury or decrease overall safety of the individual or crew
- Operating any heavy machinery or County owned vehicles and boats without authorization, adequate knowledge, or safety training
- Any site visit or monitoring activity that has not been cleared by the PM
- Smoking while on site or during working (non-break) hours
- Being under the influence of drugs or alcohol on site of during working hours
- Eating or drinking on-site or during working (non-break) hours, or without prior decontamination
- Any illegal activity
- Conducting any activity that has potential to harm oneself or other staff without first consulting the Crew Leader

This list may be modified and/or increased as this effort moves forward and more items are identified as prohibited activities.

[1] Confined Spaces includes storm drains, sewer areas, or any other space as defined by the County. The U.S. Occupational Safety and Health Administration (OSHA) classify storm sewers as confined spaces. Regulations for entry into confined spaces are provided in the OSHA Confined Space Standard (Title 29 Code of Federal Regulations [CFR] 1910.146) and in Section 5157 of CalOSHA CCR 8

General Health and Safety Requirements

Only Field Staff who have reviewed both the TMRP and HSP will be allowed to participate in trash monitoring efforts and/or related field visits. It will be the responsibility of both the PM and Crew Leader(s) to properly and adequately train all staff and ensure that enough staff are prepared to complete required monitoring events.

SITE SAFETY MEETINGS

All trained Field Staff members involved in monitoring activities will:

- Be involved in a pre/post site safety meeting and continually update the Crew Leader(s) of items that need to be addressed
- Continually be briefed on the specific safety requirements and program expectations
- Acknowledge and comply with terms and conditions of the HSP

INCIDENT REPORTING

Health and Safety incidents must be reported to the PM immediately in order to assess and diagnose current risks and eliminate future incidents.

Any incident involving the following must be reported immediately:

- Any illness, injury, or reaction caused by environmental or chemical exposure
- Any scale of physical injury, even if it does not require medical attention
- Any unnatural or notable occurrence such as fire, gaseous vapors, etc.
- Any property damage (including public or private), public complaints, or HSP violations

REPORTING PROCEDURES

Incident report forms can be obtained from the PM or County. This report is to be filled out by the incident victim and filed promptly for future use or investigation. Reports involving medical treatment must be completed by the PM within 24 hours of the incident.

HSP UPDATES

This HSP has been developed based upon previous experiences with similar monitoring efforts. While this report covers basic HSP items, it should continually be reviewed and updated as new items are identified and/or addressed. This document should be revised as necessary, but at least annually during the TMRP annual reporting efforts, to incorporate the lessons learned during the previous year. If updated, Regional Board staff must be notified and provided the revised HSP for their records.

Health and Safety Procedures

The **Health and Safety Procedures** section of this HSP includes specific procedures and information that must be considered prior to and during any monitoring activity. All staff should review and fully understand this section to ensure that safety procedures and considerations are being implemented. Again, it is up to the individual to conduct themselves in a safe and cautious manner during a monitoring event. As described in the **Special Circumstances for Safety Consideration** section of the TMRP, there are several potentially dangerous factors that exist within the Santa Monica Bay WMA. This section includes numerous items of concern (including those listed in the TMRP). This section should be reviewed periodically and updated as necessary.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Wearing appropriate attire can minimize the likelihood of injury or exposure. The following sections detail the various specifics regarding appropriate clothing and layering techniques that should be considered to avoid heat or cold stress. All Field Staff should wear appropriate field clothing, including proper footwear, dungarees and shirts for field work, gloves, eye protection, and head wear to protect from the sun. It will be the responsibility of the Crew Leader(s) to train all Field Staff in what is deemed proper clothing and footwear and ensure that Field Staff is dressed appropriately before a monitoring event. The individual will be prohibited from conducting any monitoring activities if an individual does not have the appropriate clothing.

A first aid kit will be present in each vehicle used for field work. It is the responsibility of the Crew Leader(s) to be sure their vehicles have a fully stocked first aid kit before entering the field. For a field crew consisting of approximately four members, the American Red Cross suggests the following items be included in a first aid kit:

- 2 absorbent compress dressings (5 x 9 inches)
- 25 adhesive bandages (assorted sizes)
- 1 adhesive cloth tape (10 yards x 1 inch)
- 5 antibiotic ointment packets (approximately 1 gram)
- 5 antiseptic wipe packets
- 2 packets of aspirin (81 mg each)
- 1 blanket (space blanket)
- 1 breathing barrier (with one-way valve)
- 1 instant cold compress
- 2 pair of non-latex gloves (size: large)
- 2 hydrocortisone ointment packets (approximately 1 gram each)
- Scissors
- 1 roller bandage (3 inches wide)
- 1 roller bandage (4 inches wide)

- 5 sterile gauze pads (3 x 3 inches)
- 5 sterile gauze pads (4 x 4 inches)
- Oral thermometer (non-mercury/non-glass)
- 2 triangular bandages
- Tweezers
- First aid instruction booklet

The PM and Crew Leader(s) should consider including specialized items such as an insect sting treatment kit for individuals who may not be aware of allergic reaction to bee stings. The following section regarding safety tips for wildlife encounters. Staff may modify and add as this effort moves forward.

HEAT STRESS

Heat Stress is a significant potential hazard associated with field efforts. When the body becomes overheated, a condition of heat stress exists. It can lead to a number of problems, including heat exhaustion, heat stroke, heat cramps, fainting, or heat rash. The use of protective equipment in hot weather environments can also accelerate heat stress related illnesses.

Heat cramps are brought about by prolonged exposure to heat. The signs and symptoms are as follows:

- Severe muscle cramps, usually in the legs or abdomen
- Exhaustion, often to the point of collapse
- Dizziness or periods of faintness

First aid treatment includes shade, rest and fluid replacement. Normally, the individual should recover within one-half hour. If the individual is not better within 30 minutes of treatment, transport the individual to the hospital for medical attention.

Heat exhaustion usually occurs in a healthy individual who has been exposed to excessive heat while working or exercising. The signs and symptoms of heat exhaustion are as follows:

- Rapid and shallow breathing
- Weak pulse
- Cold and clammy skin with heavy perspiration
- Skin appears pale
- Fatigue and weakness
- Dizziness
- Elevated body temperature

First aid treatment includes cooling the victim, elevating the feet, and replacing fluids. If the individual is not better within 30 minutes of treatment, transport the affected individual to the hospital for medical attention.

Heat stroke occurs when an individual is exposed to excessive heat and stops sweating. This condition is classified as a medical emergency, requiring immediate cooling of the patient and transport to a medical facility. The signs and symptoms of heat stroke are as follows:

- Dry, hot, red skin
- Body temperature approaching or above 105 degrees Fahrenheit
- Large (dilated) pupils
- Loss of consciousness; the individual may go into a coma.

Local weather conditions may produce situations which require restricted work schedules in order to protect personnel.

If at any time during trash monitoring efforts, any heat related illnesses occur, the PM must be contacted immediately and continually updated on the condition of the individual. If necessary, staff should call 911.

COLD STRESS

Staff may be required to work in cold environments, sometimes for extended periods. Cold stress is a common problem encountered in these types of situations. Four factors contribute to cold stress: cold air temperatures, high velocity air movement, dampness of the air, and contact with cold water or surfaces. A cold environment forces the body to work harder to maintain its temperature. Cold air, water, and snow all draw heat from the body. While it is obvious that below freezing conditions, combined with inadequate clothing, can bring about cold stress, it is also important to understand that it can be brought about by moderate temperatures coupled with rain and wind:

- Hypothermia, which means "low heat", is a potentially serious health condition. This occurs when body heat is lost faster than it can be replaced. When the core body temperature drops below the normal 98.6ºF to around 95ºF, the onset of symptoms normally begins. The person may begin to shiver and stomp their feet in order to generate heat. Additional symptoms of hypothermia include loss of coordination, slurred speech, and fumbling with items in the hand. The skin will likely be pale and cold. As the body temperature continues to fall, these symptoms will worsen and shivering will stop. Workers may be unable to walk or stand. Once the body temperature falls to around 85ºF, severe hypothermia will develop and the person may become unconscious, and at 78ºF, the person could die. Treatment depends on the severity of the hypothermia. For cases of mild hypothermia, move to a warm area and stay active. Remove wet clothes, replace with dry clothes or blankets, and cover the head. To promote metabolism and assist in raising internal core temperature, drink a warm (not hot), sugary drink. Avoid drinks with caffeine. For more severe cases, do all the above, plus contact emergency medical personnel (call 911 for an ambulance), cover all extremities completely, and place very warm objects, such as hot packs or water bottles, on the victim's head, neck, chest and groin. Arms and legs should be warmed last. In cases of severe hypothermia, treat the individual very gently and do not apply external heat to re-warm. Hospital treatment is required. Move all extremities as close to the torso as possible to conserve body heat.

- Frostbite occurs when the skin actually freezes and loses water. In severe cases, amputation of the frostbitten area may be required. While frostbite usually occurs when the temperatures are 30ºF or lower, wind chill factors can allow frostbite to occur in above freezing temperatures. Wind chill is the combination of air temperature and wind speed. Frostbite typically affects the extremities, particularly the feet and hands. The affected body part will be cold, tingling, stinging, or aching followed by numbness. Skin color turns red, then purple, then white, and is cold to the touch. There may be blisters in severe cases. Do not rub the area to warm it. Wrap the area in a soft cloth, move the worker to a warm area, and contact medical personnel. Do not leave the worker alone. If help is delayed, immerse in warm (maximum 105ºF), not hot, water. Do not pour water on affected part. **If there is a chance that the affected part will get cold again, do not warm. Warming and re-cooling will cause severe tissue damage.**
- Trench foot or immersion foot is caused by having feet immersed in cold water at temperatures above freezing for long periods of time. It is similar to frostbite, but considered less severe. Symptoms usually consist of tingling, itching or burning sensation. Blisters may be present. To treat trench foot, soak the individuals feet in warm water, then wrap with dry cloth bandages. Have the individual drink a warm, sugary beverage.

Wearing appropriate clothing and being aware of how your body is reacting to the cold are important to preventing cold stress. Although alcohol and smoking are prohibited at the sites, be aware that they may increase the risk of cold stress.

Anyone working in a cold environment may be at risk for cold stress. However, senior citizens may be at more risk than younger adults, since older people are not able to generate heat as quickly. Additionally, certain medications may prevent the body from generating heat normally. These include anti-depressants, sedatives, tranquilizers and others.

Protective clothing is the most important way to avoid cold stress. The type of fabric also makes a difference. Cotton loses its insulation value when it becomes wet. Wool, on the other hand, retains its insulation even when wet. The following are recommendations for working in cold environments:

- Wear at least three layers of clothing
  - An inner layer of cotton or synthetic weaves to allow ventilation
  - A middle layer of down or wool to absorb sweat and provide insulation even when wet
  - An outer layer to break the wind and allow some ventilation (like Gortex® or nylon)
- Wear a hat. Up to 40% of body heat can be lost when the head is left exposed
- Wear insulated boots or field appropriate footwear
- Keep a change of dry clothing available in case work clothes become wet
- Do not wear tight clothing. Wear loose clothing to allow better ventilation.

Drink plenty of liquids, avoiding caffeinated beverages. It is easy to become dehydrated in cold weather. If possible, heavy work should be scheduled during the warmer parts of the day. Take breaks out of the cold. Keep an eye on other crew members and watch for signs of cold stress. Exhaustion and fatigue are signs of low energy. Be conscious of your body's energy level since energy is needed to keep muscles warm. Take frequent breaks and consume warm, high calorie foods to maintain energy reserves.

Staff should watch for signs of cold or heat stress and allow workers to interrupt their work if they are extremely uncomfortable. The PM should also ensure that water or other beverages are available and that work schedules allow for appropriate rest periods. Staff should use appropriate personal protective equipment (PPE) and work practices to reduce the risk of cold stress.

If at any time during trash monitoring efforts, any cold related illnesses occur, the PM must be contacted immediately and updated on the condition of the individual. If necessary, staff should contact 911.

TRAFFIC AND VEHICLE SAFETY

Traffic hazards will be encountered when working at the side of or in a roadway. The primary threats associated with working in or alongside roadways are Field Staff being struck by passing vehicles or being involved in a vehicular collision. The risks associated with these threats are severe bodily injury and/or death.

Field Crews must never turn their back on traffic. When walking in a roadway either setting up or taking down traffic control, Field Crews must walk facing oncoming traffic. If Field Crew member must turn their back, a coworker shall watch oncoming traffic.

Vehicles, carts, bicycles, and heavy equipment may be present both outside and inside the work area. Field Staff will observe all speed limits for vehicles. Prior to operation of vehicles, staff will check tires, steering, and brakes for proper function. Defective or suspect equipment will not be used.

Be conscious of all vehicular traffic that may be present during monitoring efforts. Be careful when exiting the work area, especially when walking out from between parked vehicles to avoid vehicular traffic.

LIFTING

The potential for back strain exists due to lifting heavy items in the field. Correct manual lifting and handling of a load may prevent strain and reduce effort. The persistent use of bad lifting methods causes strains which may eventually become severe. When lifting a load always follow these principles:

- When possible, use mechanical equipment rather than lifting by hand.
- Never carry a load that cannot be seen over or around.
- When lifting a load:
    - Lift with the legs, not with the back
    - Keep the load close to the body
    - Use the most comfortable posture

- Lift slowly and evenly, do not jerk the load
    - Do not twist the back while lifting
    - Securely grip the load
- Do not lift an object or load suspected to be too heavy, oddly shaped, or awkward alone. GET HELP!
- Designate one staff member to lead when two or more people carry a load.

SLIPS AND FALLS

Slipping hazards may exist due to uneven terrain, wet surfaces, steep channels, leaking hydraulic fluid, or construction materials. Tripping hazards may be present from elevation changes, debris, or equipment. Falls are possible from elevated platforms, work areas, access ladders, and stairs. Prevention requires alertness, proper procedures, and appropriate protective equipment.

INVASIVE SPECIES

There is the potential for Field Staff to come in contact with invasive species found in the Santa Monica Bay WMA, including the New Zealand Mudsnail, giant reed (Arundo), castor bean, wild tree tobacco, crayfish, bullfrog, mosquito fish, and largemouth bass. Staff have the potential to further spread invasive species if proper precautions are not taken prior to, during, and after an event. Staff must follow procedures as outlined by the CA Department of Fish and Game, New Zealand Mudsnail Invasive Species Program (http://www.dfg.ca.gov/invasives/mudsnail/) and the United States Fish and Wildlife Service Invasive Species Program (http://www.fws.gov/invasives/what-you-can-do.html). Staff should consider developing a Hazard Analysis and Critical Control Points (HACCP) planning document specific to their monitoring sites.

DECONTAMINATION

Decontamination procedures shall be followed by Field Staff between sites, before eating, drinking, or smoking, and at the end of the monitoring event. Crew Leader(s) will ensure that monitoring vehicles are equipped with 2.5 - 5 gallon expandable water carriers with spigots, soap or similar liquid soap, and alcohol based instant hand sanitizer. The following decontamination procedures shall be followed:

- Wash hands, arms, face, and/or neck with water and soap, taking care to keep grey water away from storm drains and adjacent water bodies
- Dry all areas with disposable paper towels
- Thoroughly wet hands with instant hand sanitizer, then briskly rub together until dry.

ARUNDO AND POISON OAK

While unlikely, during trash monitoring there is the potential for contact with Arundo (*Arundo donax*) and Poison Oak (*Toxicodendron diversilobum*). Arundo can grow up to 10 meters in height and create extremely dense vegetated environments. Due to the size and density of Arundo habitats, there is the possibility of tripping and/or entanglement when entering a thicket of Arundo vegetation. **Trash will not be collected within any areas with Arundo vegetation**.

However; trash may be collected on the edge of the vegetation if safe and accessible. Poison Oak growing at or near assessment locations should be avoided if at all possible. Trash seen in the Poison Oak is not required for collection, but should be noted and photographed. Field Staff will be advised to put on Poison Oak protective lotion before entering any sites where the shrub is growing. Field Staff should also be aware that even when Poison Oak is dead, the oil can remain active for up to five years.

STEEP CLIFFS AND ACCESS TRAILS

Some of the assessment sites are located near or at the base of steep cliff sides and access trails. Commonly paired with crumbling earth, sharp rocks, and uneven terrain, the potential to slip and fall causing serious injury is possible at these locations, even during the driest of weather. Steep cliffs may also present the danger of landslides. Field Staff will need to ensure that all precautions are taken when sampling adjacent to environments exhibiting these conditions. Field Staff should avoid cliff sides and precarious trails, and identify safe routes to the designated sites. During assessment efforts, Field Staff should take caution when using dirt access trails and ensure that all procedures as outlined in the Health and Safety Plan are followed. Dangerous environments are deemed off limits during all assessment events.

OCEAN TIDES AND CURRENTS

The combination of ocean tides and rocky terrain often produce slippery surfaces. Especially when working in close proximity to the water, strong waves and/or rip currents may present additional dangers. Field Staff should be aware of their surroundings at all times, take precaution when walking on wet surfaces, and consider wearing a pack to keep their hands as free as possible.

CONFINED SPACES

At no time during the collection effort are Field Staff to enter any confined spaces (confined spaces are defined in footnote [1] on page 6), including storm drain outlets, freeway underpass tunnels, or any confined areas located at or near a collection location. Chemicals can accumulate in confined spaces creating dangerous pockets of gas and other potential hazards that Field Staff are not properly trained to address. If trash is accumulating within a confined space, the PM will be notified of the specific site location, and a brief narrative of the observations including the time and date of the observation will be provided.

SWIFT WATER/FLOOD CONDITIONS

Assessment and evaluation events will not be scheduled during wet weather. However, an unexpected storm may cause flash flood conditions. Under these conditions, the event will likely be abandoned. At no time are Field Staff to be in stream channels (engineered or natural) during swift water and/or high flow conditions, nor should staff be in any channels if a forecasted storm (of 20% or greater chance of precipitation) is predicted for that day. Monitoring for critical storm conditions must take place prior to any rainfall occurring. All activities must be suspended immediately if Field Staff are in the field and rainfall occurs. The extent of collection completed prior to rainfall will be noted on the assessment worksheet. After any rainfall event, staff are prohibited from re-entering stream channels until flow velocities have returned to base flow conditions and/or conditions are deemed safe by the PM or proper authorities.

WILDFIRES

Some of the assessment sites may be located within or near potential burn areas, particularly the sites in or around the Malibu area. All precautions should be taken to ensure no Field Staff, Crew Leader(s), or PM initiate any actions that could start a wildfire, nor hinder or interfere with any wildfire suppression activities. Subsequently, during any wildfire event that is taking place in the Watershed, all monitoring events will cease until the wildfire has been suppressed. After suppression of the wildfire, Crew Leader(s) will confirm with the PM that conditions are safe to reinitiate assessment efforts. If a wildfire begins during a collection event, staff must evacuate immediately, and then proceed to document the extent to which the event was complete. If any situation escalates to a perceived dangerous level, Field Staff must immediately leave the area and contact the PM and if necessary the appropriate authorities (via 911).

HOMELESS INDIVIDUALS AND PROPERTY

There is the potential for encounters and/or interactions with homeless individuals in the course of trash collection activities. The possibility of unknowingly collecting items which may be considered the property of a homeless individual may create the potential for a serious altercation. During any collection event, it is standard procedure for Field Staff to use discretion in all interactions with all individuals in the field and handle themselves in a professional and courteous manner. If at any time Field Staff feel uncomfortable or in danger, activities must immediately cease and all staff must return to a safe location. In the event this takes place, Field Staff must record the amount of collection that took place prior to the work stoppage, and note on the assessment worksheets the end point location and time. If any situation escalates to a perceived dangerous level, Field Staff must immediately leave the area and contact the appropriate authorities. As described above, in the event this takes place, the following actions should occur:

1. If any situation escalates to a perceived dangerous level, Field Staff must immediately leave the area and contact the PM and if necessary the appropriate authorities.
2. Record the amount of monitoring that took place prior to the work stoppage. This includes specifics like bank(s) or area(s) monitored, an estimate of the trash items not collected should be noted, and noting any intractable trash items visually identified upstream, yet not completely assessed .
3. Note on the Monitoring Worksheets the end point location and time.

The Crew Leader and Field Staff must assess the situation based upon multiple factors and the overall safety of the monitoring event. If possible and deemed safe, Field Staff will resume monitoring from the last area of collection as soon as possible that same day if and conditions are deemed safe. If the situation is not deemed safe, Field Staff must exit the location, the Crew Leader should contact the PM, and the PM must advise the County of the situation that the monitoring event is deemed complete.

In the event that trash items appear to be the property of a homeless individual, Field Staff should consider the items “intractable trash” and follow procedures outlined in the Hazardous Materials and Intractable Trash section of the HSP. As stated previously, if at any time during the collection event staff feels threatened or in danger, they must cease all activities and move to a more secure location. Preserving the safety of the field crew is the top priority during all monitoring events.

WILDLIFE

There is the potential to encounter various wildlife that may pose a threat, including but not limited to poisonous reptiles, and stinging insects. Additionally, rodents, raccoons, and opossum may be found in the proposed sites, these animals should be generally avoided due to concerns with rabies. Pets may be encountered during the events, crews are advised to avoid contact with any animal with which they are not familiar. Do not corner, entrap, or attempt to feed any animal. Prior to initiating the monitoring effort, Field Staff must be properly informed and trained on how to avoid encounters with threatening wildlife and how to handle any encounter or interaction in the field. Additionally, crews will avoid contact with protected species (e.g., least tern, snowy plover, and grunion) and any areas designated for protected species.

HAZARDOUS MATERIALS

There is potential that hazardous materials, both physical and chemical substances, may be encountered at the assessment sites. Hazardous gaseous, liquid, and/or solid contaminants may be present as the result of spills and/or illicit dumping. The presence of chemicals and/or chemical vapors may result in (but are not limited to) one or more of the following threats: toxic conditions, oxygen displacement and explosion, and/or fire. The risks associated with these threats include poisoning (acute and/or chronic), asphyxiation, and bodily injury.

The following procedures are recommended to help protect field personnel from the hazards associated with chemical substances:

- Do not inhale vapors
- Do not ingest chemical substances
- Avoid contact with skin, eyes, and clothes
- Wear protective clothing including gloves and proper footwear.

Chemicals can be hazardous if inhaled or ingested, or if they come into contact with the skin or eyes. PPE should be worn to avoid skin contact. Always wash your hands and face before eating, drinking, or smoking and before leaving the work site.

All hazardous materials identified during the monitoring event must be properly dealt with in a safe manner to protect the worker and the environment from further harm. Professionals with training in the removal of the waste material will do the actual collection. If hazardous materials are discovered at a collection site, the Crew Leader will notify the PM who will then coordinate with the County to initiate the extraction of such wastes.

INFECTIOUS AEROSOLS

The potential to encounter infectious aerosols is low. Various aerosols may contain a variety of infectious microorganisms. Skin contact and/or inhalation of aerosols should be avoided when encountered in the field. If infectious aerosols are suspected or a concern, PPE should be worn to facilitate avoidance of skin contact or inhalation. Field Staff must always wash your hands and face before eating and/or drinking and before leaving the work site or facility.

ATMOSPHERIC HAZARDS

The potential to encounter atmospheric hazards while conducting this effort is low. The hazards include atmospheres that are flammable, toxic, or oxygen deficient. These conditions are typical in “confined spaces” like a storm drain or sewer. The U.S. Occupational Safety and Health Administration (OSHA) classify storm sewers as confined spaces. Regulations for entry into confined spaces are provided in the OSHA Confined Space Standard (Title 29 Code of Federal Regulations (CFR) 1910.146) and in Section 5157 of CalOSHA CCR 8.

As previously stated, entry into enclosed spaces by Field Staff is prohibited in this Plan.

Hazardous Materials and Intractable Trash

HAZARDOUS MATERIALS

During the course of any collection event, hazardous materials that pose a health threat to Field Staff may be encountered. The following materials are an example of the types of materials that may be considered hazardous. This HSP is intended to address the most common hazards which are likely to be observed. It is not intended to be an exhaustive or all inclusive list, and only includes the general category for the types of materials that might be encountered. Field Staff should always take care to put personal safety first and contact the PM if they have any questions regarding questionable hazards or issues that may be encountered.

Hazardous Materials Include:

- Ignitable Wastes (including waste oil and used solvents)
- Corrosive Wastes (including spent battery acid)
- Reactive Wastes (including lithium-sulfur batteries and unused explosives)
- Toxic Wastes (including materials containing Mercury, Lead, and PCBs)

Further information on specifics on each type of waste and the hazards posed by each type can be found at the California Department of Toxic Substances Control (DTCS) webpage http://www.dtsc.ca.gov/HazardousWaste/#Hazardous_Waste_Identification.

As stated previously, all items deemed hazardous should be avoided and will require removal via a trained and/or certified professional.

POTENTIAL HAZARDOUS ITEMS

The following is a list of hazardous materials that may be encountered by Field Staff, sorted by general waste category.

Household Hazardous Wastes (HHW) are often dumped into and/or near channels. The types of items classified as HHW can vary greatly, but some items dumped can be dangerous and should be handled with care. For example, fluorescent light bulbs can contain hazardous materials impacting both the environment and staff, and if broken should be handled with care. HHW items can include:

- Abrasive Cleaners
- Air Fresheners
- Antifreeze
- Asbestos
- Bug Sprays
- Batteries/Car Batteries
- Disinfectants/Cleaners
- Drain Cleaners

- Drugs/Pharmaceuticals/Medicine
- Engine Cleaners/Automotive Fluids/Oil Filters
- Fertilizers
- Herbicides
- Pesticides
- Paint/Paint Thinner/Paint Removers
- Pool Chemicals
- Rodent/Pest Poison
- Rug/Upholstery Cleaner

Although not all Electronic Waste (EW) may be considered hazardous, items in poor condition (i.e. heavily damaged, weathered, or broken) may release hazardous materials into the environment and should be handled carefully. Examples of EW that may be considered hazardous include:

- Cell Phones
- Computers
- Electronic Games/Consoles
- Fax Machines
- Microwaves
- NiCad Batteries
- Printers
- Stereos
- Televisions/VCRs/DVD Players

It will be up to the Crew Leader to identify and properly handle any items deemed hazardous. Some items may be removed during the monitoring event, for example household batteries can be removed if disposed of in a proper fashion. Staff should take this list out in the field as a guide to what may or may not be deemed hazardous. This list should be updated during any HSP revision.

IDENTIFIED HAZARDOUS MATERIALS AND INTRACTABLE TRASH

Any material that is deemed "Hazardous" must be dealt with in the following manner:

1. Identify to the best extent possible what the object is and give a detailed description of the material/object on the Monitoring Worksheet. This description should include but is not limited to size estimates, if the material is buried in sediments or entangled in vegetation and number of items if a consolidated dumping area is identified.
2. Create a "Unique ID Number" for each item following this format below:

a. HM (Hazardous Material)

b. Site ID

c. Sequential number starting at 001 (e.g., HM_xxx_001)

3. Obtain GPS coordinates for the location of the material/object.
4. Take pictures of the material(s) and note any surrounding markings/landmarks so as to easily locate the material(s) in the future.
5. Post-event, fill out a new Hazardous Materials and Intractable Trash Log (**Attachment E** of the TMRP) if no Hazardous Materials or Intractable Trash have previously been found in the general location. If there is an existing log for the location, add an entry to the running log for the affected site.
6. The Crew Leader(s) must notify the PM that hazardous materials have been identified and send a copy of the log to the County.
7. The Crew Leader(s) should maintain a Hazardous Materials and Intractable Trash Log that can be referenced from event to event and reviewed when encountering hazardous materials. If an item is still in place, the Crew Leader(s) should notify the PM that the material is still in the site and needs to be removed.

Intractable Trash is defined as items that may not be considered "hazardous" but are too large to remove by Field Staff. These items can vary in size, material, condition, but all pose a threat to safety if attempted to move without proper equipment and/or training of removal procedures. These items must still be addressed, and will follow a similar documentation protocol as hazardous materials. Procedures are as follows:

1. Identify to the best extent possible what the object is and describe the material/object on the data sheet.
2. Create a "Unique ID Number" for each item following this format below:
    a. IT (Intractable Trash)
    b. Site ID
    c. Sequential number starting at 001 (e.g., IT_xxx_001)
3. Obtain GPS coordinates for the location of the material.
4. Take pictures of the material(s) and any surrounding markings that may help for future locating of the material.
5. Post-event, fill out a new Hazardous Materials and Intractable Trash Log for the site if no Hazardous Materials or Intractable Trash have previously been found at the general location. If there is an existing log for the location, add an entry to the running log for the affected site.
6. The Crew Leader(s) will notify the PM that intractable trash has been identified and send a copy of the list to notify the County.

7. The Crew Leader(s) should maintain a Hazardous Materials and Intractable Trash Log that can be referenced from event to event and reviewed when encountering intractable materials. If an item is still in place, the Crew Leader(s) should notify the PM that the material is still in the site and needs to be removed.

Additional Trainings

It is not a requirement of this HSP that individuals obtain training in other safety areas but it is highly recommended that Crew Leaders and Field Staff be trained in basic safety classes including:

- CPR Training
- General First Aid Training
- 8 hr/24 hr HazWORP Training
- First Responder Training

It may be cost effective to only train Crew Leaders in the more advanced first aid training, but overall, it would be in the best interest to train all staff to ensure if any incidents take place in the field, staff will be properly trained and prepared to deal with the situation.

HSP Certification

As stated in the **SOP** section of this document, all staff should thoroughly review this HSP prior monitoring activates. Once all Field Staff have reviewed HSP procedures including proper training in all health and safety aspects of this plan, staff should sign the attached HSP Release form. This form can be used for annual trainings and continued certification efforts. The completed forms should be stored for future reference and held by the PM.

Conclusion

This HSP has been developed to assist all staff participating in field monitoring efforts. Again, this is not an all-encompassing safety guide or manual, it is up to the individual to ensure they follow the procedures outlined in this plan and use common sense when in the field. This plan should be continually reviewed and updated as necessary to ensure procedures are up to date and reflect true conditions encountered in the field. If procedures are followed and common sense is utilized, staff should complete the monitoring safely, efficiently, and effectively ensuring that the ultimate goals of meeting regulatory requirements are achieved.

MCW HSP TRAINING CERTIFICATION

HEALTH AND SAFETY PLAN

FIELD PERSONNEL CERTIFICATION/RELEASE FORM

I, ______________________ hereby confirm that I have read and understand the Health and Safety Plan. I agree to follow this plan and to make every effort to make the workplace safe. I will report any health or safety hazard that I observe to the Project Manager.

I do agree to defend, indemnify, and hold harmless_________________________, its owners, employees, representatives, clients, and the property owner for any accidents, sickness, or injuries resulting from the violation or non-compliance of this Health and Safety Plan.

*Name:*____________________________________ *Title:*_______________________________

*Signature:*_________________________________ *Date:* ______________________________

Contact Sheet

Los Angeles County

Bruce Hamamoto, Los Angeles County Department of Public Works (LACDPW)

Phone: (626) 458-5918

E-mail: BHAMAMO@dpw.lacounty.gov

Address: 900 S. Fremont Ave., Alhambra, CA 91803

Example Trash Monitoring Worksheet

Basic Info

Monitoring Type (Circle one): Assessment / Evaluation

Date:____________________

Location Name and Type (Beach, Harbor, etc.):____________________

Names of Field Crew Members:

Hand Crew:____________________

Skimmer Boat Crew:____________________

Pre-Event

Starting Site Description (Reference street names, buildings, other structures, etc.):

Site Sketch (Number site corners and label shoreline, if applicable):

Starting Site Boundaries:

Lat, Long (e.g., 34.00000, -118.90000):

1:____________________

2:____________________

Event **START Time** (e.g., 14:00):____________________

During

Monitoring Observations (Trash types, relative proportion of trash types, spatial/temporal trash patterns, possible sources, etc.):

Event **STOP Time** (e.g., 14:00):____________________

Post-Event

Ending Site Description (Reference street names, buildings, other structures, etc.):

Ending Site Boundaries:

Lat, Long (e.g., 34.00000, -118.90000):

3:____________________

4:____________________

(Return to Pre-Event section to complete Site Sketch)

Time Spent Monitoring:

Total (Stop time – Start time):____________________

Cumulative (Total Time * Number of Field Crew Members):____________________

Weight of Trash (lbs.):

Standard (excludes Hazardous Material/Intractable Trash):____________________

Hazardous Material/ Intractable Trash:____________________

Additional Notes (Current/recent weather conditions, etc.):

Example Hazardous Material/ Intractable Trash Log

Location Name and Type:____

Trash ID Number	Date/Time Found (00/00/00 00:00)	Description and Notes	GPS Coordinates

COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

"To Enrich Lives Through Effective and Caring Service"

900 SOUTH FREMONT AVENUE
ALHAMBRA, CALIFORNIA 91803-1331
Telephone: (626) 458-5100
http://dpw.lacounty.gov

GAIL FARBER, Director

ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1460
ALHAMBRA, CALIFORNIA 91802-1460

September 19, 2013

IN REPLY PLEASE
REFER TO FILE: WM-7

Mr. Samuel Unger, P.E., Executive Officer
California Regional Water Quality
Control Board – Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, CA 90013-2343

Attention Ms. Jenny Newman

Dear Mr. Unger:

**PLASTIC PELLET MONITORING AND REPORTING PLAN
UNINCORPORATED AREAS OF THE COUNTY OF LOS ANGELES
SANTA MONICA BAY WATERSHED MANAGEMENT AREA
SANTA MONICA BAY NEARSHORE AND OFFSHORE DEBRIS
TOTAL MAXIMUM DAILY LOAD**

On behalf of the County of Los Angeles, we are submitting the enclosed Plastic Pellet Monitoring and Reporting Plan for the Santa Monica Bay Nearshore and Offshore Debris Total Maximum Daily Load in accordance with the California Regional Water Quality Control Board, Los Angeles Region, Resolution No. R10-010. The enclosed Plastic Pellet Monitoring and Reporting Plan for areas under the County of Los Angeles' jurisdiction within the Santa Monica Bay Watershed Management Area includes: 1) a Plastic Pellet Monitoring Program to quantify plastic pellet discharges from the Municipal Separate Storm Sewer System outfalls and establish triggers for additional industrial facility inspections and 2) a Spill Response Plan to address the containment of spilled plastic pellets.

If you have any questions, please contact me at (626) 458-4300 or ghildeb@dpw.lacounty.gov or your staff may contact Ms. Angela George at (626) 458-4325 or ageorge@dpw.lacounty.gov.

Very truly yours,

GAIL FARBER
Director of Public Works

Gary Hildebrand

GARY HILDEBRAND
Assistant Deputy Director
Watershed Management Division

DD:jht
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Enc.

S E P T E M B E R 2 0 , 2 0 1 3

Santa Monica Bay Watershed Management Area (WMA)

Plastic Pellet Monitoring and Reporting Plan (PMRP)

Submitted on behalf of:

THE COUNTY OF LOS ANGELES

LARRY WALKER ASSOCIATES

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List of Acronyms

BMP	Best Management Practice
BPA	Basin Plan Amendment
DPW	Los Angeles County Department of Public Works
IGP	Waste Discharge Requirements for Discharges of Storm Water Associated with Industrial Activity
LACFCD	Los Angeles County Flood Control District
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
OES	California Office of Emergency Services
SIC	Standard Industrial Classification
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
PMRP	Plastic Pellet Monitoring and Reporting Plan
WLA	Waste Load Allocation

Overview

The purpose of this document is to detail a Plastic Pellet Monitoring and Reporting Plan (PMRP) to implement the Santa Monica Bay Nearshore and Offshore Debris Total Maximum Daily Load (TMDL), effective March 20, 2012. The implementation of the TMDL covers the entire Santa Monica Bay Watershed Management Area (WMA). The Basin Plan Amendment[1] (BPA) implementing the TMDL lists the requirements for the PMRP. The following describes the PMRP developed for the unincorporated area of the County of Los Angeles (County) within the Santa Monica Bay WMA.

Monitoring procedures to quantify plastic pellets discharges from municipal separate storm sewer system (MS4) outfalls, levels of plastic pellets triggering additional inspections, protocols for a spill response to address containment of plastic pellets are included in the PMRP.

Future implementation efforts will warrant changes based upon outcomes of subsequent studies and findings. Significant modifications to the PMRP will be outlined in annual reporting and submitted to the Los Angeles Regional Water Quality Control Board (Regional Board).

PLASTIC PELLET DEFINITION

For the purposes of the PMRP, a plastic pellet is a piece of pre-production plastic that is typically formed into a spherical or cylindrical shape measuring less than five millimeters in diameter or length. Varying widely in composition, plastic pellets often incorporate different types of plastic as well as colorants and other additives. Plastic pellets are the base material used in manufacturing plastic products.

PMRP REQUIREMENTS

For the County, the PMRP requirements apply to areas within County jurisdiction, in particular, MS4 outfalls connected to sites associated with industrial facilities that are related to the manufacturing, handling, or transportation of plastic pellets. As defined in the TMDL, the waste load allocation (WLA) for plastic pellets is zero. Facilities associated with plastic pellets include but are not limited to Standard Industry Classification (SIC) codes 282X, 305X, 308X, 39XX, 25XX, 3261, 3357, 373X, and 2893. Additionally, industrial facilities with the term “plastic” in the facility or operator name will be subject to the WLA for plastic pellets. For the County, meeting the WLA will be achieved through implementing the PMRP. For plastic pellet-related facilities within the jurisdiction of the County, meeting the WLA will be achieved through applicable permits and orders[2].The PMRP is designed to address the following requirements:

- Monitoring the amount of plastic pellets being discharged from the MS4 where relevant industrial facilities are identified

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[1] Attachment A to Resolution No. R10-010, Proposed Amendments to the Water Quality Control Plan – Los Angeles Region for the Santa Monica Bay Nearshore and Offshore Debris TMDL (http://63.199.216.6/larwqcb_new/bpa/docs/R10-010/R10-010_RB_BPA.pdf)

[2] The Industrial General Permit, other general permits, individual industrial stormwater permits, or other Regional Board orders, consistent with California Water Code § 13367 and 40 CFR 122.26(b) (12)

- Establishing triggers for increased industrial facility inspections and enforcement of Stormwater Pollution Prevention Plan (SWPPP) requirements
- Spill Response Plan.

In County jurisdictional areas with potential plastic pellet-related industrial facilities, the following proposed procedures will be used for the PMRP plastic pellet monitoring program:

- Inspect the industrial facilities where potential plastic pellet use has been identified
- Monitor the amount of plastic pellets discharged from facility areas draining to the MS4 if plastic pellets are found during an industrial facility inspection. Dispose of any captured plastic pellets in accordance with all applicable laws and regulations
- Prepare and submit annual reports to the Regional Board.

Any changes and revisions to the monitoring program will be included with subsequent annual reports.

GENERAL APPROACH

The County does not use or transport plastic pellets. Entities within County jurisdiction that use plastic pellets are presumed to be subject to the Industrial General Permit (IGP) and required to implement BMPs to prevent the discharge of plastic pellets per their SWPPPs developed specifically to address the pellet use by the entity. Discharge of plastic pellets to the MS4 system would occur through entities in violation of their IGPs or through spill during transport. The County PMRP procedures for meeting the TMDL requirements to identify entities discharging plastic pellets include the following:

1. Conduct industrial facility inspections and if relevant, plastic pellet monitoring
2. In the event of a spill, implement Spill Response Plan and notify the Regional Board within 24 hours of the County, responsible agency, or jurisdiction becoming aware of the spill
3. Submit a monitoring report twenty months from the receipt of the letter of approval for the PMRP from a Regional Board Executive Officer, and annually thereafter, that provides the following information:
    a. Summary of all industrial facility inspection and monitoring efforts
    b. Results of any plastic pellet monitoring, and whether additional inspections were triggered
    c. Results, including enforcement actions, from additional inspections triggered through monitoring
    d. If necessary, proposed revisions to the PMRP, including:
        i. Inspection triggers
        ii. Monitoring frequency, procedures, or site revisions
        iii. Spill response protocol revisions
        iv. Description of additional MS4 outfalls and/or industrial facilities to be addressed the following year.

The above proposed procedures comprise a tentative list that will be modified after monitoring efforts begin. Any major deviations will warrant Regional Board notification. The annual reports will incorporate results from activities outlined in the PMRP and a description of components and/or elements added or modified by the County.

PMRP COVERAGE

The BPA lists numerous responsible parties for plastic pellets in the Santa Monica Bay WMA. The County is assuming that all other parties will implement their own plastic pellet plans and the Regional Board will enforce all requirements associated with BPA milestones and requirements in an equitable manner to ensure that the plastic pellets are addressed in all listed areas.

The PMRP was developed to prevent and, in the case of a release during transport, oversee the capture of plastic pellets in areas under the County jurisdiction within the Santa Monica Bay WMA. As subsequent implementation efforts take place, other parties within the watershed will agree to join this implementation effort, whereupon modified procedures (e.g., notification to the Regional Board of party joining the effort, and increased monitoring requirements covered under the joint effort) will be followed. There is no plastic pellet usage by any County facilities.

Monitoring Approach

The TMDL presents a WLA of zero plastic pellets. Zero is defined as no discharge of plastic pellets from the premises of industrial facilities that import, manufacture, process, transport, store, recycle, or otherwise handle plastic pellets. To ensure compliance with the WLA of zero plastic pellets, MS4 outfalls receiving discharges from industrial facilities with confirmed plastic pellet usage, transfer, or other handling within the Santa Monica Bay WMA that are within County jurisdiction will be monitored for plastic pellets. In the event that plastic pellets are found on-site during facility inspections (see the **Industrial Facility Inspections Section**), plastic pellet monitoring will be conducted at critical locations and times including: once during the wet season and once during the dry season.

The WLA is assigned to the County and to permittees of the statewide Waste Discharge Requirements for Discharges of Storm Water Associated with Industrial Activity (NPDES Permit No. CAS00001) (Industrial General Permit or IGP) and other permitted facilities relevant to plastic pellets that are within County jurisdiction in the Santa Monica Bay WMA. At present, only three facilities that are relevant to, or have the potential to be relevant to plastic pellet manufacturing, handling, or transportation are located within the Santa Monica Bay WMA, specifically in the Marina del Rey watershed, and are included in **Figure 1**.

In addition to monitoring at the three identified facilities, any new or retrofit facilities to be located within the County jurisdiction will be responsible for assisting the County in identifying downstream MS4 outfalls and determining monitoring procedures appropriate for the outfall locations. Example monitoring procedures are included in Attachment A. New facilities will also be expected to implement industrial best management practices (BMPs) for plastic pellets (e.g., install storm drain screens with mesh smaller than the smallest pellet handled at the facility, equip loading areas with vacuums or brooms and dust pans, and provide catch trays for use at all vehicle unloading valves).[3]

[3] These example BMPs and additional examples can be found in the Operation Clean Sweep Manual

Figure 1. Proposed PMRP Monitoring Locations in Marina del Rey

PROPOSED MONITORING LOCATIONS

We propose to conduct plastic pellet monitoring at the catch basin inlets of any facility found to have plastic pellets during on site facility inspections (see the **Industrial Facility Inspections Section)**. The three facilities shown in the following subsections have the potential to manufacture, handle, or transport plastic pellets, however, the County is not aware of any current or recent activities at these facilities involving plastic pellets.

Windward Yacht and Repair and The BoatYard

Windward Yacht and Repair, Inc. and The BoatYard are neighboring businesses that have Standard Industrial Classification (SIC) codes for boat building and repairing[4], and industrial facilities that are adjacent to the Marina del Ray Harbor (see **Figure 2**). Windward Yacht and Repair currently provides boat repair services (e.g., fiberglass hull repair, electrical work, and mechanical work), space for customers to perform their own boat work, dry locations for storing boats and supplies, and a store room for purchasing supplies. Comparable services and amenities are provided at The BoatYard. Stormwater outfalls for both of the facilities emanate from the seawall forming the basin and are periodically submerged by the ocean tides. An example outfall is pictured in **Figure 3**. Windward Yacht Repair employs curb-like structures to decrease the amount of runoff leaving facility grounds. The water is ponded by the curb-like structures resulting in settling of materials from the water column. These materials are collected and properly disposed of as the water is removed. Any runoff that will flow over the curb-like structures onto the walkway is collected by catch basins that are stenciled with “No Dumping” and contain filter media. The curb-like detention BMP at the Windward facility is presented in **Figure 4**. A walkway catch basin is illustrated in **Figure 5**, highlighting the stenciling.

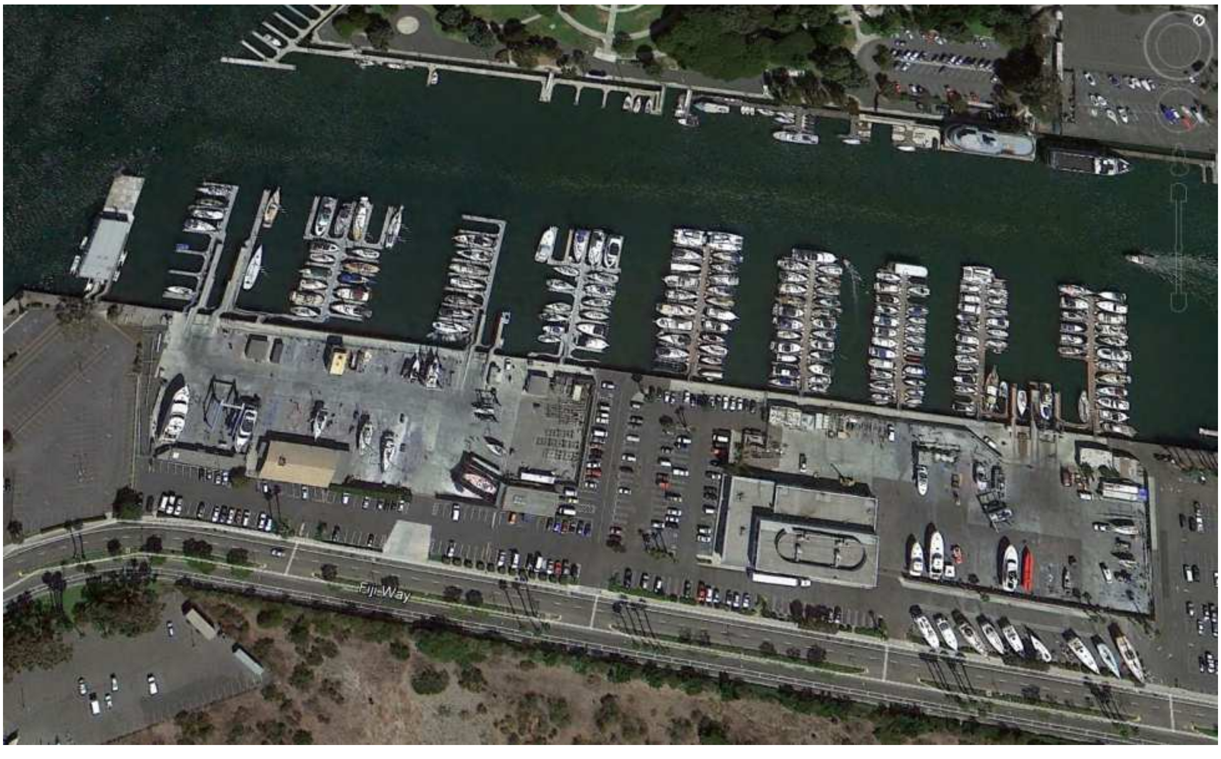

Figure 2. Windward Yacht and Repair, and The BoatYard

[4] SIC code 3732

Figure 3. Example Outfall at Windward

Figure 4. Flow Detention at Windward

Figure 5. Windward Catch Basin Stenciling

The BoatYard utilizes sandbags to reduce the amount of runoff leaving facility grounds. Settling of materials occurs where the water is ponded by the sandbags. These materials are collected and properly disposed of as the water is removed. Any runoff that will flow over the sandbags onto the walkway is collected by catch basins in the walkway and stored in three settling tanks before being discharged into the marina. In addition, water discharging from the roof of the facility is directed towards the walkway, collected by catch basins in the walkway, and stored and treated within a series of three settling tanks before being discharged into the marina. The BoatYard facility is pictured in **Figure 6**. An example outfall at low tide is presented in **Figure 7**. Example catch basins at The BoatYard are presented in **Figures 8** and **9**. The settling tanks at The BoatYard are presented in **Figure 10**. An overview of plastic pellet-related outdoor BMPs at proposed facilities to be monitored is presented in **Table 1**.

Figure 6. The BoatYard

Figure 7. Outfall Adjacent to The BoatYard

Figure 8. Catch Basin at The BoatYard

Figure 9. Example Catch Basin at The BoatYard

Figure 10. Settling Tanks at The BoatYard

Seamark Marine

The Seamark Marine facility is located on the Marina del Rey waterfront as illustrated in **Figure 11**. Similar to Windward and The BoatYard, Seamark is a boat yard that provides general boat repairs including fiberglass, electric, and engine work. As such, Seamark has a SIC code for ship building and repairing.[5] Seamark utilizes oil-absorbing booms placed in a circle around any boat that is being repaired, which impound all water and materials within their area. The impounded water and materials are collected and disposed of in the sanitary sewer. The booms

[5] SIC code 3731

are used during dry and wet weather. Seamark also has catch basins that collect runoff from the facility, which are connected to outfalls along the seawall. An example outfall is pictured in **Figures 12** and **13** at low and high tides, respectively. An example catch basin is presented in **Figure 14**.

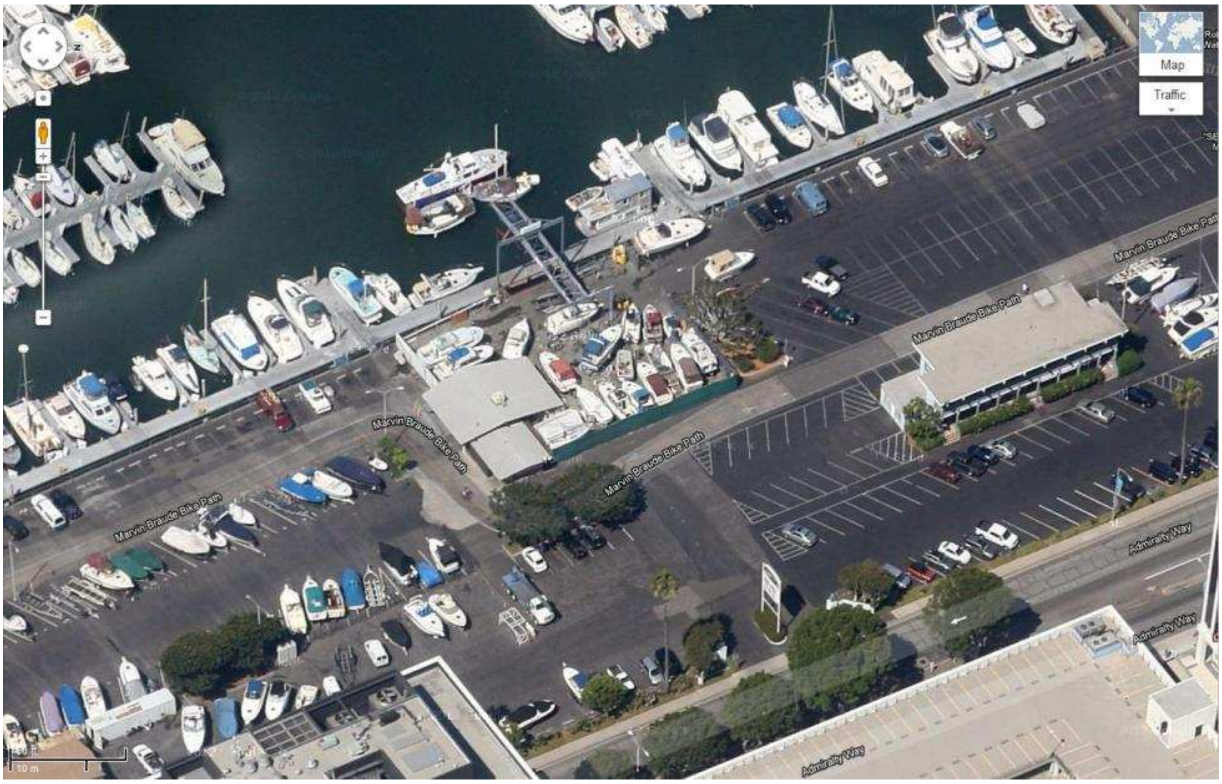

Figure 11. Seamark Facility

Figure 12. Example Seamark Outfall at Low Tide

Figure 13. Example Seamark Outfall Submerged by Tide

Figure 14. Example Catch Basin at Seamark

An overview of proposed PMRP monitoring locations and plastic pellet-related BMPs at each site is presented in **Table 1**.

Table 1. Overview of Plastic Pellet-Related Outdoor BMPs at Proposed Facilities To Be Monitored

Facility Name(s)	Address	On-site BMPs
Windward Yacht and Repair, Inc.	13645 Fiji Way, Marina Del Rey, CA 90202	• Curb-like structures for stormwater runoff retention and debris capture (**Figure 4**) • Manual collection and disposal of materials accumulated by curb-like structures • Catch basin stenciling (**Figure 5**) • Filter media installed in catch basin.
The BoatYard	13555 Fiji Way, Marina Del Rey, CA 90202	• Sandbags to retain stormwater runoff • Manual collection and disposal of materials that accumulate from sandbagging • Catch basins set in walkway to capture excess stormwater runoff not retained by sandbags • Series of settling tanks that walkway catch basin flow is directed to for storage and treatment before discharge to the marina (**Figure 10**).
Seamark Marine	13441 Mindanao Way, Marina Del Rey, CA 90292	• Booms used to impound all water and materials around boats undergoing repair • Manual Collection and disposal of water and materials accumulated within booms.

Proposed Monitoring Locations and Frequencies

MONITORING LOCATIONS

Plastic pellets will be monitored at selected MS4 outfalls downstream of the potential plastic pellet-related industrial facilities detailed in **Figure 1** or catch basins located on the facility grounds if plastic pellets are found on-site during facility inspections (see the **Industrial Facility Inspections Section**). If no plastic pellets, or no evidence of plastic pellet use, are found on-site during the routine annual inspection, and interview of the operator confirms no plastic pellet use, no monitoring will be conducted. Instead, documentation showing the lack of activities related to the manufacturing, handling, and transportation of plastic pellets will be recorded and included in subsequent annual reports. Operators of any new facilities located within the unincorporated County areas will coordinate with the County to develop appropriate extensions to the PMRPs as necessary, by identifying additional proposed monitoring locations and schedules. A model framework to develop programs for new facilities is provided in Attachment A.

MONITORING FREQUENCY

The frequency of required monitoring for MS4 outfalls downstream of locations where plastic pellets are found during facility inspections (see the **Industrial Facility Inspections Section**), is at least once in the rainy season[6] and once in the dry season each year. An overview of the initial proposed frequency of potential monitoring events is presented in **Table 2**.

Table 2. Proposed PMRP Monitoring Events in the Santa Monica WMA

Location	Monitoring Event Frequency
Windward	Semi-annually*
BoatYard	Semi-annually*
Seamark	Semi-annually*

* To be determined after on-site inspection as described above

MONITORING EVENT PREPARATION

Monitoring events will only be conducted during safe weather conditions. As such, the weather forecast will be checked immediately prior to heading out for monitoring field work. Precipitation events within the WMA can cause elevated water levels and unsafe conditions. If at any time during a monitoring event, field personnel feel that site conditions are unsafe for any reason, the event will be abandoned and the project manager notified of the situation.

Prior to mobilization for each monitoring event, field personnel will prepare the equipment necessary to conduct the monitoring event. Equipment will include but is not limited to the equipment listed in **Table 3**.

[6] The rainy season is defined as the period from October 15 to April 15.

Table 3. Equipment Checklist

Plastic Pellet Monitoring Items	
☐ First Aid Kit	☐ Copy of PMRP document
☐ Cellular Telephone	☐ Digital Camera
☐ Life Jackets	☐ Timepiece
☐ Work Gloves/Laboratory Gloves	☐ Notebook and Pen
☐ Trash Bags	

Additionally, any necessary permits required for access to restricted areas and/or plastic pellet removal will be obtained prior to the monitoring event.

MONITORING PROCEDURE

Where necessary, the sampling crew will conduct monitoring for plastic pellets using a two stage mesh. The first stage mesh will be of 5 mm opening to collect trash. The second stage will be a fine screen or cloth 1 mm or finer. The mesh system will be temporarily affixed to the outlet, or within the drop-inlet or catch basin. The volume of the collected plastic pellets will be recorded.

Where there is no flow at the time of sampling, the sampling crew will conduct a visual assessment of the outfall and collect all plastic pellets found in the vicinity of the outfall. Where accessible, the sampling crew will open and visually assess the drop-inlet/catch basin closest to the identified facility. Plastic pellets found in the drop-inlet or catch basin will be collected if accessible. If found in the drop-inlet or catch basin, the facility will be subject to increased inspection.

Industrial Facility Inspections

For industrial facilities, the TMDL WLA will be implemented primarily through the requirements of the IGP, other general permits, individual industrial stormwater permits, or other Regional Board orders. The discharge of plastic pellets from industrial facilities is prohibited. However, if industrial facilities release plastic pellets into the County MS4, facility inspections and enforcement of IGP SWPPP requirements will be used to further control and prevent the release of plastic pellets into the natural environment.

TRIGGERS FOR INSPECTION AND SWPPP ENFORCEMENT

All potentially plastic pellet-related facilities under County jurisdiction, including facilities identified in the **PROPOSED Monitoring Section** (also see **Figure 1**) and new facilities that will emerge, will undergo at least one routine annual inspection. Additional facilities using plastic pellets identified through routine inspections, hotline reporting, or other means will be added into the annual inspection and monitoring will be performed as warranted.

Following a routine facility inspection where plastic pellets are found on-site, plastic pellet monitoring will be conducted on a semi-annual basis developed according to the framework outlined in Appendix A. The data collected from monitoring will be used to trigger enforcement of plastic pellet-related SWPPP requirements. For example, if the volume of plastic pellets captured from facility discharge to the MS4 exceeds 50 mL, the County will conduct a follow-up inspection within four weeks from the completion of the monitoring event. Similarly, in the event that the County determines, based on a routine annual inspection or illicit discharge/spill investigation conducted, that a facility has failed to adequately implement all necessary plastic pellet BMPs, the County will include a follow-up inspection within four weeks from the date of the initial inspection and/or investigation.

After the follow-up inspection, the County will determine if the facility has made progress in implementing required BMPs identified in the initial site inspection and/or monitoring. If the potential problem is not resolved, the County will decide whether there is enough progress to warrant a second follow-up inspection to allow the facility owner/operator more time to meet the requirements, to initiate enforcement actions, or to refer the facility to Regional Board for further actions. The County representatives will follow the legal authority established in the municipal code and ordinances.

ENFORCEMENT OF SWPPP REQUIREMENTS

If during facility inspections, the plastic pellet-related BMPs specified in the SWPPP, and any applicable source control BMPs and any additional BMPs required for compliance with municipal ordinances, are not adequately protective of water quality standards (e.g., at preventing illicit discharges into the MS4 and receiving waters), the County will require additional site-specific controls.

In the event that the County determines that a facility has failed to adequately implement BMPs after a follow-up inspection and has demonstrated a good faith effort to bring the facility into compliance, the County will take enforcement action as established through authority in its municipal code and ordinances or through the judicial system. For those facilities subject to the IGP and in violation of municipal storm water ordinances, the County will escalate referral of a violation of its municipal storm water ordinances and/or California Water Code §13260 to the Regional Water Board (promptly via telephone or electronically) after conducting a minimum of one follow-up inspection and submitting a minimum of one written notice of violation to the facility or site operator regarding the violation. For facilities not subject to the IGP that are in violation of municipal storm water ordinances, the County will refer such a violation to the Regional Water Board after conducting a minimum of two follow-up inspections and submitting a minimum of two warning letters or notices of violation to the facility or site operator regarding the violation.

Emergency Spills

Accidental spills during transfer and transportation contribute to plastic pellets entering storm drains and, ultimately, the Santa Monica Bay. Included below, are protocols for a timely and appropriate response to possible plastic pellet spills within County jurisdiction to address containment of spilled plastic pellets (see **Figure 15**). Railroads do not cross the areas of County jurisdiction within the Santa Monica Bay WMA.

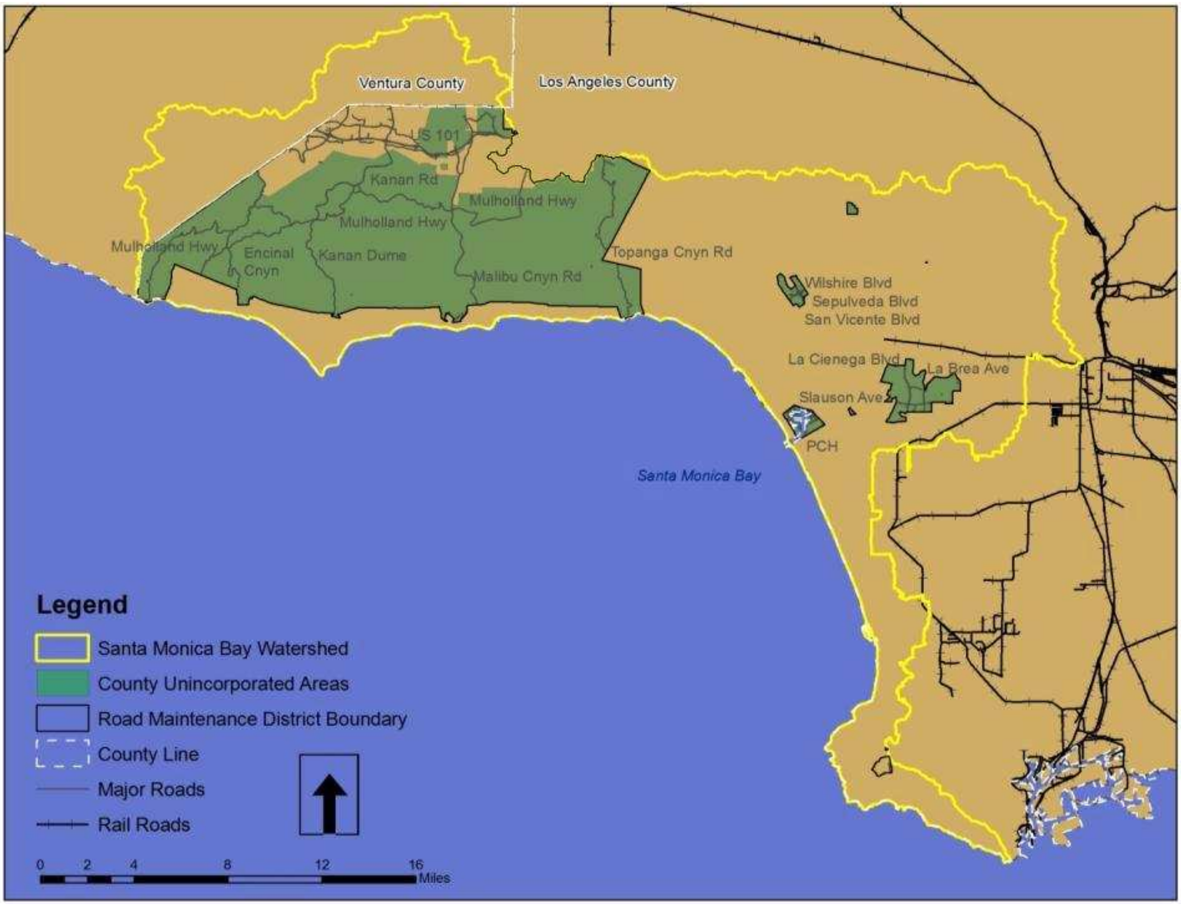

Figure 15. Major Thoroughfares Crossing Areas of County Jurisdiction

SPILL RESPONSE PLAN

The general procedures for the spill response plan are outlined below:

1. Calls come in to our Dispatch Center (e.g., through 24-hour illegal dumping/discharge hotlines) from the general public or responding crew to report spills and other illegal dumping/discharge incidents. Calls or faxes regarding spills, discharges, or dumping information affecting the County can also come in from the California Office of Emergency Services.

   The dispatcher will obtain as much information as possible about the location (e.g., on street, in gutter, or entered waterway such as catch basin or storm drain) and take the following steps:

a. If the spill, discharge, or dumping is on County jurisdiction, the dispatcher will contact the Los Angeles County Department of Public Works' (Public Works) Road Maintenance Division (RMD) and provide them the information.

b. If the spill, discharge, or dumping has entered an Los Angeles County Flood Control District (LACFCD) waterway, storm drain, or catch basin, the dispatcher will contact them and provide them the information

c. If the dumping, discharge, or spill is on a City street or property not contracted with the County, Dispatcher will provide the reporting party (RP) with the telephone number for the appropriate City and/or handling agency. Dispatcher will also transfer RP to the correct agency.

Under the County Spill Response Plan, Public Works' RMD will respond by mobilizing the field crew closest to the spill to investigate and identify the source of the spill. The County and/or the responsible party will either perform the spill cleanup or appoint a third-party emergency response service to perform the spill clean-up. The responding field crew will ask Dispatch Center to contact the local authorities to handle traffic control, if needed.

2. The Regional Board will be notified within 24 hours of the County, other responsible agency, or jurisdiction becoming aware of the spill.
    a. The County staff will call the Regional Board's front desk at (213) 576-6600.

        The County staff handling the spill report will notify the Regional Board's front desk staff that he/she is calling regarding the Santa Monica Bay Debris TMDL and ask to be transferred to the correct staff. If it is on a weekend, the County staff will leave a message including: a statement that it is regarding the Santa Monica Bay Debris TMDL, time, date, responsible jurisdiction, details of spill, and contact info.

    b. The County staff will send a notification e-mail to the Regional Board at losangeles@waterboards.ca.gov.

        The e-mail subject line will be "Santa Monica Bay Debris TMDL". The body of the e-mail will include a statement that it is regarding the Santa Monica Bay Debris TMDL, time, date, responsible jurisdiction, details of spill, and contact info.

The general flow of communication and responsibility that will occur during spill response is illustrated in **Figure 16**. Additionally, a listing of relevant contact information is included in Attachment B. In identifying the responsible party for the spill, the origin and destination of the plastic pellet shipment will be ascertained to determine if a new plastic pellet industry should be included in the program.

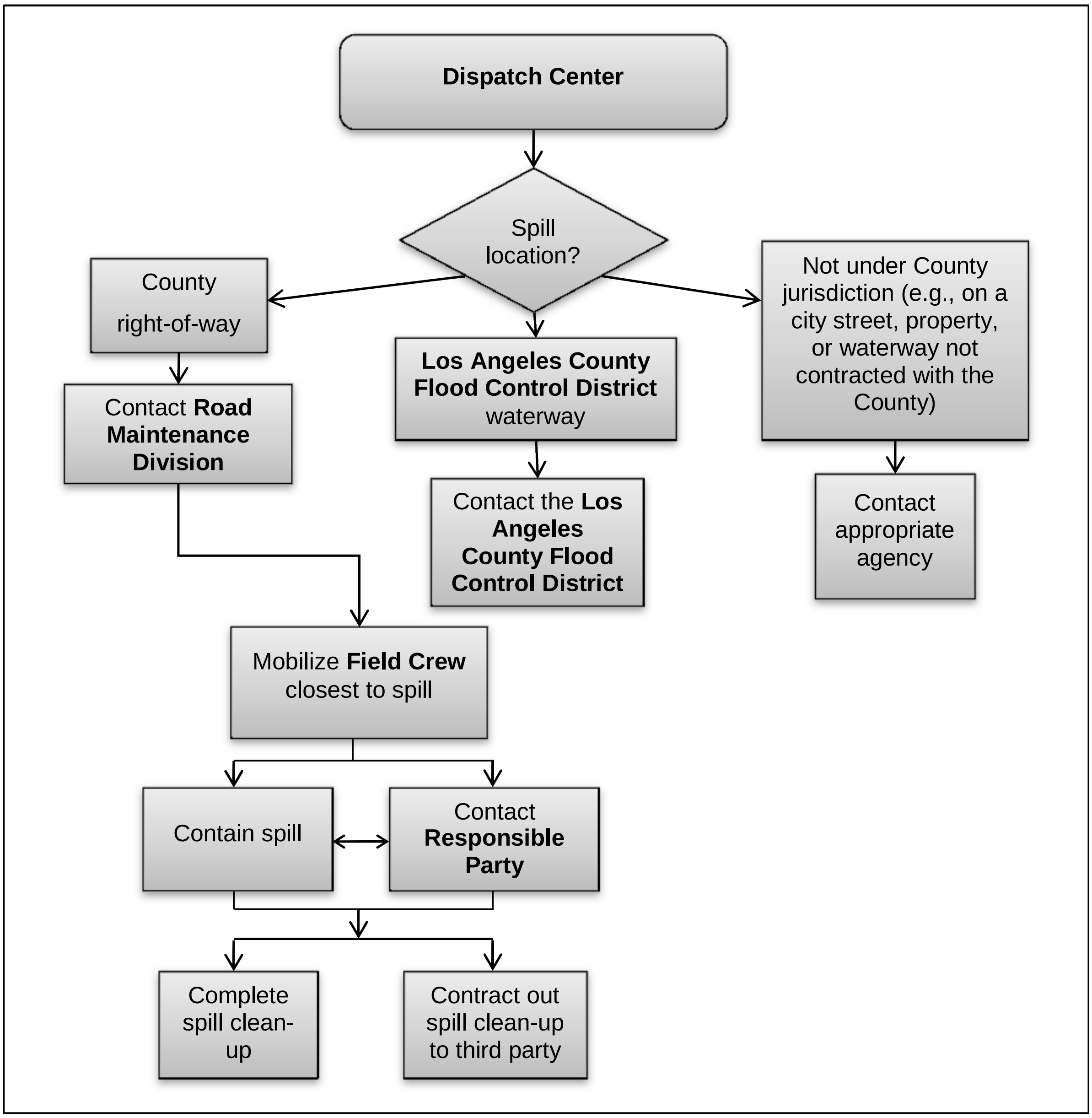

Figure 16. General Flow of Communication and Responsibility for Plastic Pellet Spill Response

COMPREHENSIVE PLAN

To ensure containment of plastic pellets released within County jurisdiction, the County will implement the given Spill Response Plan and uphold the facility inspection, monitoring, and SWPPP enforcement protocols proposed in the PMRP.

For any spill or illicit discharge, Public Works' Environmental Programs Division will provide support by mobilizing personnel to investigate the details of the occurrence. Such investigations will include visual inspections, interviews, sampling, and documentation of findings (e.g., violations of industrial permits and/or city codes). If applicable, documented findings will be used by the County to trigger enforcement activities and/or facility inspections (detailed in the **Industrial Facility Inspections** Section).

The County has standby field and in-office staff available at all times for spill response, and will coordinate with spill response teams throughout all appropriate divisions, programs, and agencies so that maximum water quality protection is provided. Additionally, the County will respond to spills that occur on the boundaries of County jurisdiction and take steps to contain the spill. The County will then coordinate with the responsible party to make sure that all captured plastic pellets are disposed of properly at a landfill.

Special Circumstances for Safety Consideration

In this section, we would like to make the Regional Board aware of the County Health and Safety Protocols when it relates to plastic pellets. Preserving the safety of our field crew is the top priority during all monitoring events. As such we advise our staff that within the Santa Monica WMA there are several potentially hazardous factors that will exist over the course of a sampling event. A sampling crew composed of County employees shall follow the general guidelines of the County Health and Safety Protocols and modified as necessary for the specific site conditions encountered. Contracted sampling teams shall provide their own Health and Safety Plan demonstrating equivalency with the County plan and subject to County approval. One of these is the potential to encounter unsafe environmental conditions. Other factors include traffic and vehicle safety, as well as hazardous materials. The potential for these special circumstances are discussed below. In general, however, if the field crew believes that conditions are unsafe, the project manager shall be notified and monitoring will not commence as planned.

PERSONAL PROTECTIVE EQUIPMENT

Wearing appropriate attire can minimize the likelihood of injury, heat stress, or cold stress. As such, all field staff shall wear appropriate field clothing, including proper footwear, dungarees and shirts for field work, gloves, eye protection, and head wear to protect from the sun. Individuals without appropriate clothing will not participate in conducting any monitoring activities.

A first aid kit will be present in each vehicle used for field work. The field crew leader(s) to be sure their vehicles have a fully stocked first aid kit before entering the field. Crew leader(s) will consider including specialized items such as an insect sting treatment kit for individuals who will not be aware of allergic reaction to bee stings.

HEAT STRESS

Heat stress is a significant potential hazard associated with field efforts. When the body becomes overheated, a condition of heat stress exists. It can lead to a number of problems, including heat exhaustion, heat stroke, heat cramps, fainting, or heat rash. The use of protective equipment in hot weather environments can also accelerate heat stress related illnesses. Local weather conditions will produce situations which require restricted work schedules in order to protect personnel. During field activities, staff will watch for signs of heat related illness and keep the project manager updated on the condition of the individual. Signs of heat related illness include, but are not limited to, elevated body temperature; dizziness or faintness; exhaustion; and dry, hot, red skin or cold and clammy skin with heavy perspiration. If appropriate, staff shall immediately contact emergency personnel (e.g., call 911 for an ambulance).

COLD STRESS

Staff will be required to work in cold environments, sometimes for extended periods. Cold stress is a common problem encountered in these types of situations. Four factors contribute to cold stress: cold air temperatures, high velocity air movement, dampness of the air, and contact with cold water or surfaces. A cold environment forces the body to work harder to maintain its temperature. Cold air, water, and snow all draw heat from the body. While it is obvious that below freezing conditions, combined with inadequate clothing, can bring about cold stress, it is also important to understand that it can be brought about by moderate temperatures coupled with rain and wind. Wearing appropriate clothing and being aware of how your body is reacting to the cold are important to preventing cold stress. Staff will watch for signs of cold stress and keep the project manager updated on the condition of the individual. Signs of cold stress include, but are not limited to, pale and cold skin, numbness, loss of coordination, and slurred speech. If appropriate, staff shall immediately contact emergency personnel (e.g., call 911 for an ambulance).

TRAFFIC AND VEHICLE SAFETY

Traffic hazards will be encountered when working at the side of or in a roadway. The primary threats associated with working in or alongside roadways are field staff being struck by passing vehicles or being involved in a vehicular collision. The risks associated with these threats are severe bodily injury and/or death. Field crews will not turn their back(s) on oncoming traffic. If a crew member must turn their back on oncoming traffic, a coworker will watch out for their safety. Field staff will be conscious of all vehicular traffic that will be present during field events. Field staff will also be careful when exiting the work area, especially when walking out from between parked vehicles to avoid vehicular traffic.

OCEAN TIDES AND CURRENTS

The combination of ocean tides and rocky terrain often produce slippery surfaces. Especially when working in close proximity to the water, strong waves and/or rip currents will present additional dangers. Field staff will be aware of their surroundings at all times, take precaution when walking on wet surfaces, and consider wearing a pack to keep their hands as free as possible.

SLIPS AND FALLS

Slipping hazards will exist due to uneven terrain, wet surfaces, steep channels, leaking hydraulic fluid, or construction materials. Tripping hazards will be present from elevation changes, debris, or equipment. Falls are possible from elevated platforms, work areas, access ladders, and stairs. Prevention requires alertness, proper procedures, and appropriate protective equipment.

SWIFT WATER/FLOOD CONDITIONS

Though weather reports will be checked prior to mobilizing for a field event, an unexpected storm will cause flash flood conditions. Under these conditions, the event will likely be abandoned. At no time will field staff be in stream channels (engineered or natural) during swift water and/or high flow conditions, nor will staff be in any channels if a forecasted storm (of 20% or greater chance of precipitation) is predicted for that day. Monitoring-related field activities for critical storm conditions will take place prior to any rainfall occurring. All activities will be suspended immediately if field staff are in the field and rainfall occurs. After any rainfall event, field staff will not re-enter stream channels until flow velocities have returned to base flow conditions and/or conditions are deemed safe by the project manager or proper authorities.

HAZARDOUS MATERIALS

There is potential that hazardous materials, both physical and chemical substances, will be encountered at the monitoring sites. Hazardous gaseous, liquid, and/or solid contaminants will be present as the result of spills and/or illicit dumping. The presence of chemicals and/or chemical vapors will result in (but are not limited to) one or more of the following threats: toxic conditions, oxygen displacement and explosion, and/or fire. The risks associated with these threats include poisoning (acute and/or chronic), asphyxiation, and bodily injury. Field staff will avoid all suspected hazardous materials and notify the project manager, if appropriate.

CONFINED SPACES

Unless deemed necessary by the project manager and conducted according to the California Department of Industrial Relations, Division of Occupational Safety and Health (Cal/OSHA) guidelines[7] by adequately trained (and if appropriate, permitted) individuals, field staff will not enter any confined spaces, including storm drain outlets, freeway underpass tunnels, or any confined areas located at or near a monitoring location. Chemicals can accumulate in confined spaces, creating dangerous pockets of gas and other potential hazards.

HOMELESS INDIVIDUALS

There some potential for encounters and/or interactions with homeless individuals during monitoring-related field activities. During such activities, field staff will use discretion in all interactions with all individuals in the field and handle themselves in a professional and courteous manner. If at any time field staff feel uncomfortable or in danger, activities will immediately cease and all staff will return to a safe location. The field crew will discuss the situation with the project manager and, if appropriate, contact the appropriate authorities.

WILDLIFE

There is the potential to encounter various wildlife that will pose a threat, including but not limited to poisonous reptiles and stinging insects. Additionally, rodents, raccoons, and opossum will be found near monitoring sites, and will be generally avoided due to concerns with rabies. Stray animals or pets will also be encountered during the events. Field staff are advised to avoid contact with any animal with which they are not familiar. As such, field staff will not corner, entrap, or attempt to feed any animal.

[7] http://www.dir.ca.gov/dosh/Confined_Space_Emphasis_Program.html

Reporting Requirements

ANNUAL REPORT

Each year, an annual report will be submitted to the Regional Board. The annual report will review the results of implementing the PMRP and propose implementation of other measures to attain the required plastic pellet reduction. Additionally, the annual report will include a summary of monitoring results.

PMRP REVISION

All proposed revisions the County determines to be necessary to the PMRP will be outlined in the subsequent annual report. Revisions will include procedural modifications, changes to the facility inspection triggers, updates to the list of relevant facilities, and other PMRP additions.

Attachment A - Model Plastic Pellet Monitoring Program

As an extension to the County of Los Angeles (County) Santa Monica Bay Plastic Pellet Monitoring and Reporting Plan (PMRP), industrial facilities within County jurisdiction that manufacture, handle, or transport plastic pellets[8] are required to develop a Plastic Pellet Monitoring Program. Facilities associated with plastic pellets include but are not limited to Standard Industry Classification (SIC) codes 282X, 305X, 308X, 39XX, 25XX, 3261, 3357, 373X, and 2893. Additionally, industrial facilities with the term “plastic” in the facility or operator name will be subject to the waste load allocation (WLA) for plastic pellets. Identified facilities necessitate the development of a PMRP. Information on plastic pellet monitoring is presented in the PMRP **Monitoring Approach Section** and **Potential Monitoring Locations and Frequencies Section**. Plastic Pellet Monitoring Programs will be subject to County approval.

SITE SELECTION

Potential monitoring sites include all Municipal Separate Storm Sewer System (MS4) outfalls to which the industrial facility will discharge and/or any catch basins/swales/area drains located on the facility grounds. Operators of industrial facilities will work with the County to identify the locations and characteristics of such potential monitoring sites.

MONITORING FREQUENCY

Using the Basin Plan Amendment (BPA) as a reference, industrial facilities will draft a table for the monitoring frequency that will occur at the identified monitoring sites. For example, the minimum frequency per the BPA consists of monitoring once during the wet season, which is defined as the period from October 15 to April 15, and once in the dry season.

While the County will be responsible for conducting the monitoring, industrial facilities are responsible for providing access to facility grounds prior to and/or during a monitoring event.

REPORTING

As provided in the PMRP **Reporting Requirements Section**, the County will submit to the Regional Board annual reports summarizing the results of monitoring at selected and approved monitoring sites . Annual reports will encompass monitoring data collected and whether increased facility inspections (see PMRP **Industrial Facility Inspections Section**) were triggered.

MONITORING PLAN

The approach that has been selected for the PMRP monitoring procedure is to record the volume of plastic pellets collected. As such, example procedures for monitoring plastic pellets are presented in the **Example Monitoring Procedures Section**. Prior to mobilizing for each monitoring event, however, field personnel will prepare necessary equipment and ensure safe

[8] Other industrial facilities will be subject to PMRP requirements, per the Plastic Pellets subsection within the Waste Load Allocations (for point sources) section of the Basin Plan Amendment (Attachment A to Resolution No. R10-010, Proposed Amendments to the Water Quality Control Plan – Los Angeles Region for the Santa Monica Bay Nearshore and Offshore Debris TMDL)

working conditions and sufficient daylight (to the extent possible). Field personnel will also review the procedures presented in **Example Monitoring Procedures Section** below.

Example Monitoring Procedures

Where necessary, the monitoring for plastic pellets generally will be conducted using a two-stage mesh. The first stage mesh will be of 5 mm opening to collect trash. The second stage will be a fine screen or cloth of 1 mm mesh or finer. The mesh system will be temporarily affixed to an MS4 outlet. The volume of the collected plastic pellets will be recorded.

Where there is no flow at the time of sampling, a visual assessment of the outfall will be conducted. Plastic pellets found in the vicinity of the outfall will be collected and weighed. Where accessible, the sampling crew will open and visually assess the drop-inlet/catch basin closest to the identified facility. Plastic pellets found in the drop-inlet or catch basin will be collected if accessible. If found in the drop-inlet or catch basin, the facility will be subject to increased inspection.

Once all field personnel and necessary equipment are properly prepared for the pending monitoring event, mobilization will occur and the monitoring event will proceed as follows:

1. Fit and/or install an end-of-pipe device on the MS4 outfalls to be monitored
2. Record event start time and date
3. Keep device in place for a designated monitoring period (e.g., one week)
4. Remove device at the end of the monitoring period, as the water level, weather conditions, and daylight hours permit
5. Record event stop time and date
6. Collect plastic pellets and sort out any other debris
7. Rinse plastic pellets, if necessary
8. Photograph the plastic pellets
9. Measure the approximate volume of the plastic pellets in milliliters (e.g. using a beaker)
10. Record volume
11. Properly dispose of plastic pellets, in accordance with all applicable laws and regulations.

Field personnel will wish to test and ensure the fit of an end-of-pipe device prior to the first scheduled monitoring event. The end-of-pipe device will consist of a series of screens[9] that trap all particles retained by a 1 mm mesh screen, and will have a design treatment capacity of at least the peak flow rate resulting from a one-year, one-hour storm in the drainage area. Such a device will include appropriate hardware (e.g., a metal collar, wall anchors) to ensure a secure connection with the outfall, metal screens or netting to capture the debris, and compartments to hold the debris. Each location is expected to be a custom installation. If it is not safe or otherwise feasible to attach an end-of-pipe device to the outfall (e.g., due to tidal submersion), a similar device will be installed in-pipe immediately downstream of the last catch basin located before

[9] Minimum of two screens, one to exclude possible trash and another to capture plastic pellets

the MS4 outfall. Field personnel will be required to implement the County Health and Safety Plan or an equivalent health and safety plan customized by location.

Example Monitoring Scenarios

Example monitoring procedures for possible facility/outfall scenarios are detailed below.

Scenario A. Facility within County island that discharges to an identifiable County MS4 outfall:

1. Install end-of-pipe device on outfall
2. Keep device in place for designated period (e.g., one week)
3. Remove device, taking care not to spill contents
4. If the compartment(s) preceding the plastic pellet compartment contains debris, gently shake device from side to side to dislodge plastic pellets that will be caught within the debris
5. Check end compartment for plastic pellets.

Scenario B. Facility discharging directly to a harbor wall with MS4 outfalls either completely or periodically submerged, with no flow during dry weather:

1. Locate catch basin(s) directly upstream of outfalls
2. Lift catch basin grating and any BMP-related installations
6. Check for pellets
7. Optional- if pellets are found, temporarily install and secure a permeable apron (e.g., 1 mm mesh) beneath the grating and beneath any existing installations, or an in-pipe device immediately downstream of the catch basin opening, to capture pellets
    a. Keep installation in place for designated period (e.g., one week)
    b. Remove installation, taking care not to spill contents
    c. Check for pellets.

Scenario C. Facility within County island that discharges to an identifiable County MS4 outfall that is miles downstream, where there is a risk for false positives from other industrial discharges that will occur between the facility in question and the outfall:

1. Install end-of-pipe device on outfall
2. Keep device in place for designated time period (e.g. one week)
3. Remove device, taking care not to spill contents
4. If the compartment(s) preceding the plastic pellet compartment contains debris, gently shake device from side to side to dislodge pellets that will be caught within the debris
5. Check end compartment for pellets
6. If plastic pellets are found, note the presence of any other relevant facilities discharging to the same outfall.

Alternatively, conduct on-site monitoring:

1. Have the facility install a flow detention vault, other stormwater detention structure (e.g., series of above-ground settling drums), or trench drain
2. Clean any contents out of structure
3. Direct facility discharge into the structure (e.g., using a pump)
4. After one week, clean any contents out of structure
5. Check for pellets, sieving contents if necessary

Aside from the considerations presented in the above monitoring scenarios, other site-specific considerations will be necessary due to the wide variation in location/general accessibility, flow rate, and size/shape of MS4 outfalls.

Attachment B - County Plastic Pellet TMDL Contact Sheet

PLASTIC PELLET SPILLS AND ILLEGAL DUMPING/DISCHARGES

Los Angeles County Department of Public Works (Public Works)

Dispatch Center (24-hour hotline)

Phone: (626) 458-4357

Public Works, Dispatch Center (24-hour public hotline)

Call to report illegal dumping/discharges into the storm drain system anywhere in Los Angeles County

Phone: 1(888) 253-2652, or 1(888) CLEAN LA

Public Works, Road Maintenance Division Headquarter

Phone: (626) 458-5954

Public Works, Environmental Programs Division Headquarters

Phone: (626) 458-3517

COUNTY OF LOS ANGELES PMPR CONTACT

Bruce Hamamoto, Public Works, Watershed Management Division

Phone: (626) 458-5918 or (626) 458-4301

E-mail: BHAMAMO@dpw.lacounty.gov

Address: 900 S. Fremont Ave., Alhambra, CA 91803

COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

"To Enrich Lives Through Effective and Caring Service"

900 SOUTH FREMONT AVENUE
ALHAMBRA, CALIFORNIA 91803-1331
Telephone: (626) 458-5100
http://dpw.lacounty.gov

GAIL FARBER, Director

ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1460
ALHAMBRA, CALIFORNIA 91802-1460

September 19, 2013

IN REPLY PLEASE
REFER TO FILE: WM-7

Mr. Samuel Unger, P.E., Executive Officer
California Regional Water Quality
Control Board – Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, CA 90013-2343

Attention Ms. Jenny Newman

Dear Mr. Unger:

PLASTIC PELLET MONITORING AND REPORTING PLAN
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT
SANTA MONICA BAY WATERSHED MANAGEMENT AREA
SANTA MONICA BAY NEARSHORE AND OFFSHORE DEBRIS
TOTAL MAXIMUM DAILY LOAD

On behalf of the Los Angeles County Flood Control District (LACFCD), we are submitting the enclosed Plastic Pellet Monitoring and Reporting Plan (PMRP) for the Santa Monica Bay Nearshore and Offshore Debris Total Maximum Daily Load in accordance with the California Regional Water Quality Control Board, Los Angeles Region, Resolution No. R10-010. The enclosed PMRP includes a Spill Response Plan to address the containment of spilled plastic pellets in areas under the LACFCD's jurisdiction within the Santa Monica Bay Watershed Management Area.

If you have any questions, please contact me at (626) 458-4300 or ghildeb@dpw.lacounty.gov or your staff may contact Ms. Terri Grant at (626) 458-4309 or tgrant@dpw.lacounty.gov.

Very truly yours,

GAIL FARBER
Director of Public Works

Gary Hildebrand

GARY HILDEBRAND
Assistant Deputy Director
Watershed Management Division

DD:jht
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Enc.

SEPTEMBER 20, 2013

Santa Monica Bay Watershed Management Area (WMA)

Plastic Pellet Monitoring and Reporting Plan (PMRP)

Submitted on behalf of:

THE LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

Overview

The purpose of this document is to detail a Plastic Pellet Monitoring and Reporting Plan (PMRP) to implement the Santa Monica Bay Nearshore and Offshore Debris Total Maximum Daily Load (TMDL), effective March 20, 2012. The implementation of the TMDL covers the entire Santa Monica Bay Watershed Management Area (WMA). The Basin Plan Amendment[1] (BPA) implementing the TMDL lists the requirements for the PMRP. The following describes the PMRP developed for any areas within the Santa Monica Bay WMA that are under the Los Angeles County Flood Control District's (LACFCD's) ownership, including the Municipal Separate Storm Sewer System (MS4) physical infrastructures that are under its authority.

PLASTIC PELLET DEFINITION

For the purposes of the PMRP, a plastic pellet is a piece of preproduction plastic that is typically formed into a spherical or cylindrical shape measuring less than five millimeters in diameter or length. Varying widely in composition, plastic pellets often incorporate different types of plastic as well as colorants and other additives. Plastic pellets are the base material used in manufacturing plastic products.

PMRP REQUIREMENTS

Per the BPA for the Santa Monica Bay Nearshore and Offshore Debris TMDL, the LACFCD is named as a responsible jurisdiction. However, the TMDL states:

> "Responsible jurisdictions that have no industrial facilities or activities related to the manufacturing, handling, or transportation of plastic pellets, may not be required to conduct monitoring at MS4 outfalls, but shall be required to include a response plan in the PMRP."

The LACFCD PMRP details protocols for a spill response to address containment of spilled plastic pellets since it does not have any industrial facilities utilizing plastic pellets and has no activities related to the manufacturing, handling, or transportation of plastic pellets within its MS4 right-of-way.

PMRP COVERAGE

The BPA lists numerous responsible parties for plastic pellets in the Santa Monica Bay WMA. The LACFCD is assuming that all other parties will implement their own plastic pellet plans and the California Regional Water Quality Control Board, Los Angeles Region (Regional Board), will enforce all requirements associated with BPA milestones and requirements in an equitable manner to ensure that the plastic pellets are addressed in all listed areas. The LACFCD will assist other responsible parties in addressing PMRP responsibilities for areas within or adjacent to LACFCD's right of way. The LACFCD's efforts will include:

[1] Attachment A to Resolution No. R10-010, proposed amendments to the Water Quality Control Plan – Los Angeles Region, for the Santa Monica Bay Nearshore and Offshore Debris TMDL. (http://63.199.216.6/larwqcb_new/bpa/docs/R10-010/R10-010_RB_BPA.pdf)

- Allowing other responsible jurisdictions, such as the County of Los Angeles and cities, to install and maintain approved devices for capturing plastic pellets for the purposes of this TMDL in parts of the MS4 physical infrastructures that are under its authority through the permitting process (i.e., LACFCD Flood Permit); and

- Addressing spillage of plastic pellets and fugitive plastic pellets that have been transported/deposited into the MS4 physical infrastructures that are under the LACFCD’s authority, either illegally or through rain/wind transport by visually monitoring and removing plastic pellets from all MS4 drainage structures under the LACFCD’s ownership; and

- Identifying and prioritizing illicit discharge problem areas within the MS4 physical infrastructures under the LACFCD’s authority; and

- Participating in the response and mobilization of the appropriate field crews to contain plastic pellet spills as outlined in the PMRP spill response plan.

Emergency Spills

Accidental spills during transfer and transportation contribute to plastic pellets entering storm drains and, ultimately, the Santa Monica Bay. Included below are protocols for a timely and appropriate response to possible plastic pellet spills to address containment of spilled plastic pellets in areas within or adjacent to LACFCD's right of way within the Santa Monica Bay WMA (see **Figure 1**), including the MS4 physical infrastructures that are under its authority.

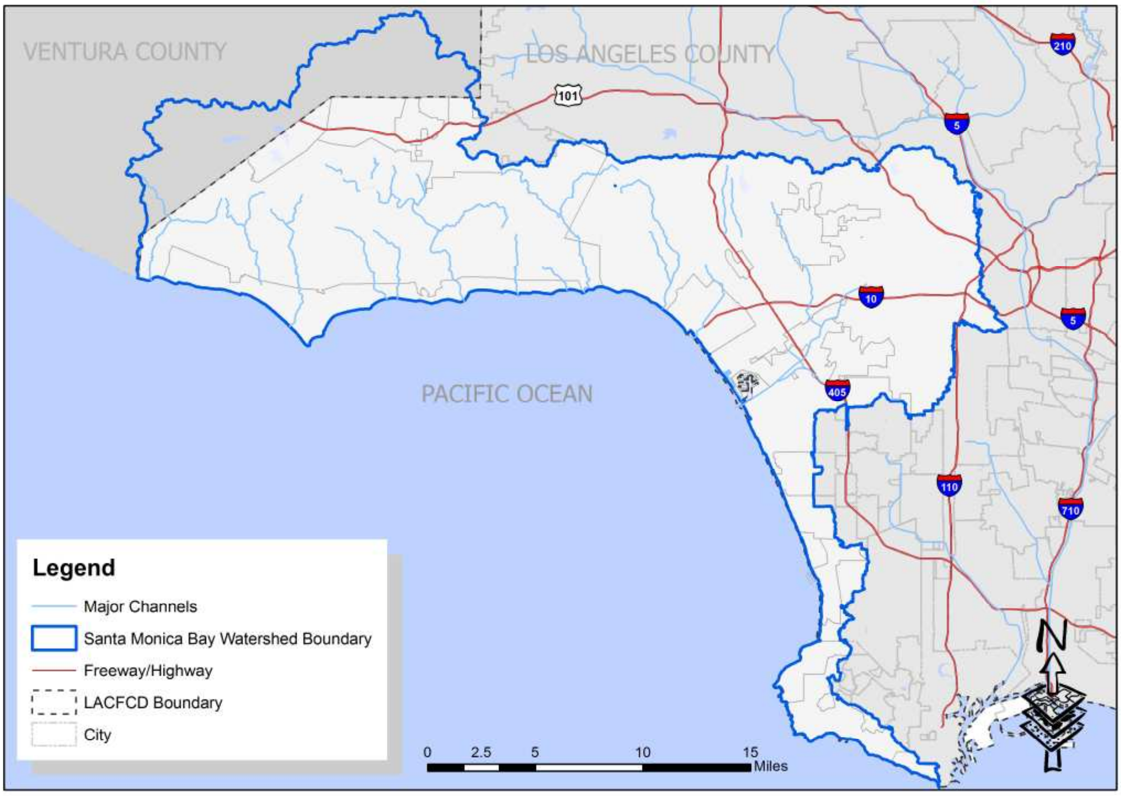


Figure 1. Santa Monica Bay Watershed Management Area

SPILL RESPONSE PLAN

The general procedures for the spill response plan are outlined below:

1. Calls come in to the Dispatch Center (e.g., through 24-hour illegal dumping/discharge hotlines) from the general public or responding crew to report spills and other illegal dumping/discharge incidents. Calls or faxes regarding spills, discharges, or dumping information affecting the LACFCD can also come in from the California Office of Emergency Services.

   The dispatcher will obtain as much information as possible about the location and facilities impacted (e.g., on street, in gutter, or entered waterway such as catch basin or storm drain). If LACFCD waterways, catch basins, and storm drains are not impacted, the dispatcher would contact the other responsible entities for the first response and provide the reporting party with the telephone number for the appropriate city and/or handling agency. The dispatcher will also transfer the reporting party to the correct agency.

If the incident occurred in an area within the LACFCD's jurisdiction, the dispatcher will contact the County of Los Angeles Department of Public Works' (Public Works) Flood Maintenance Division, and provide them the information.

The responding field crew may ask Dispatch Center to contact the local authorities to handle traffic control.

2. The Regional Board will be notified within 24 hours of the LACFCD's becoming aware of the spill.

    a. The LACFCD staff will call the Regional Board's front desk at (213) 576-6600.

       The person reporting the spill will notify the front desk staff that he/she is calling regarding the Santa Monica Bay Debris TMDL and ask to be transferred to the correct staff. If it is on a weekend, the LACFCD staff will leave a message including a statement that it is regarding the Santa Monica Bay Debris TMDL, time, date, responsible jurisdiction, details of spill, and contact information.

    b. The LACFCD staff will send a notification e-mail to the Regional Board at losangeles@waterboards.ca.gov.

       The e-mail subject line will be "Santa Monica Bay Debris TMDL." The body of the e-mail will include a statement that it is regarding the Santa Monica Bay Debris TMDL, time, date, responsible jurisdiction, details of spill, and contact information.

3. The LACFCD will assist with spill response throughout the Santa Monica Bay WMA when LACFCD facilities are involved.

Under the Spill Response Plan, Public Works' FMD, will respond immediately by mobilizing the field crew closest to the spill to investigate and identify the source of the spill. If a responsible party is identified, the identified responsible party will be given an emergency permit to go into the LACFCD system to clean up the pellets. The LACFCD and/or the responsible party will either perform the spill cleanup or appoint a third-party response service to perform containment and cleanup. All plastic pellets captured will be securely contained and disposed of at a landfill. The general flow of communication and responsibility that will occur during spill response is illustrated in **Figure 2**.

Public Works has stand-by field and in-office staff available at all times for a spill response and will coordinate with spill response teams throughout all appropriate divisions, programs, and agencies so that maximum water quality protection is provided. A list of relevant contact information is included as Attachment A.

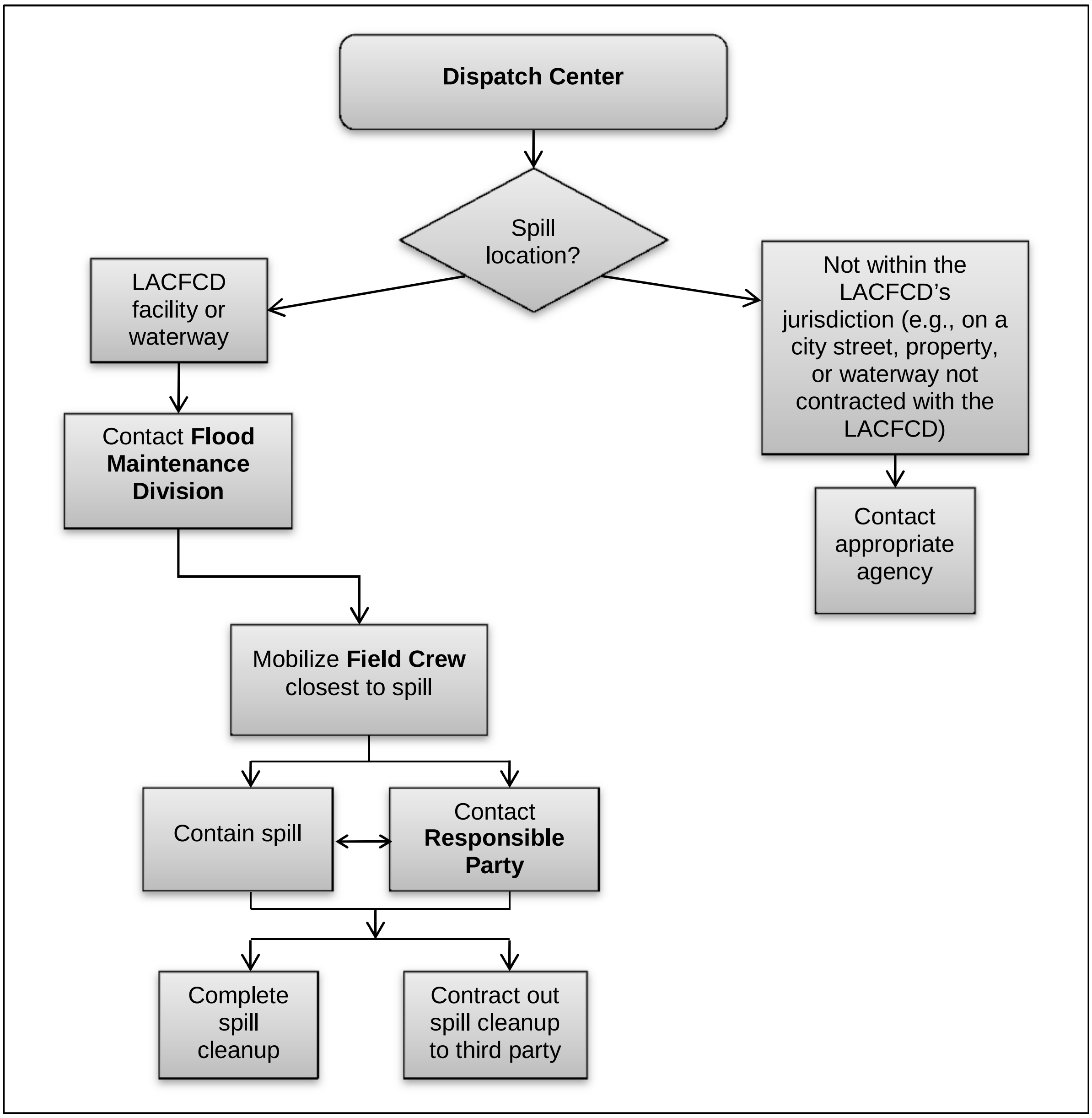


Figure 2. General Flow of Communication and Responsibility for Plastic Pellet Spill Response

Attachment A – LACFCD Plastic Pellet TMDL Contact Sheet

PLASTIC PELLET SPILLS AND ILLEGAL DUMPING/DISCHARGES

Public Works, Dispatch Center (24-hour hotline)

Phone: (626) 458-4357

Public Works, Dispatch Center (24-hour public hotline)

Call to report illegal dumping/discharges into the storm drain system anywhere in Los Angeles County

Phone: 1(888) 253-2652, or 1(888) CLEAN LA

Public Works, Flood Maintenance Division Headquarter

Phone: (626) 458-4146

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PMRP CONTACT

Bruce Hamamoto, Public Works, Watershed Management Division

Phone: (626) 458-5918 or (626) 458-4301

E-mail: BHAMAMO@dpw.lacounty.gov

Address: 900 South Fremont Avenue, Alhambra, CA 91803

Culver CITY

CULVER CITY excellence PUBLIC WORKS

Environmental Programs
& Operation Division

PLASTIC PELLET MONITORING AND REPORTING PLAN (PMRP)

in compliance with

Water Quality Control Plan – Los Angeles Region
Santa Monica Bay Nearshore and Offshore Debris TMDL
Basin Plan Amendment, Resolution No. R10-010

June 2012

1st Revision, March 2014
2nd Revision, June 2015

Table of Contents

PROBLEM STATEMENT

Discharges of debris, including trash and plastic pellets, into Santa Monica Bay violate water quality objectives, impair beneficial uses, and cause pollution and nuisance. Nearshore and offshore areas of the Santa Monica Bay were listed on the 1998, 2002, and 2006 Federal Clean Water Action Section 303(d) lists of impaired waterbodies for debris.

The water quality objectives applicable to debris include "Floating Materials" in Chapter 3, and "Floating Particulates" in the California Ocean Plan (2005). The following designated beneficial uses of Santa Monica Bay are impaired by debris:

- Industrial service supply (IND),
- Navigation (NAV),
- Water contact recreation (REC-1),
- Non-contact water recreation (REC-2),
- Commercial and sport fishing (COMM),
- Estuarine habitat (EST),
- Marine habitat (MAR),
- Preservation of biological habitats (BIOL),
- Migration of aquatic organisms (MIGR),
- Wildlife habitat (WILD),
- Rare, threatened, or endangered species (RARE),
- Spawning, reproduction, and/or early development (SPWN),
- Shellfish harvesting (SHELL), and
- Wetland habitat (WET)

1.0 NUMERIC TARGET

Interpretation of the narrative water quality objectives for floating materials/particulates, and solid, suspended, or settleable materials, used to calculate the load allocations.

Trash: **ZERO** trash in Santa Monica Bay
Plastic pellets: **ZERO** plastic pellets in Santa Monica Bay

2.0 SOURCE ANALYSIS

Along the West Coast, land-based debris comprises more than half of the debris observed in the marine environment, undetermined sources of debris comprise less than half of the debris observed in the marine environment, and ocean-based debris comprises only approximately one-tenth of the debris observed in the marine environment.

Most of the land-based debris is discharged to the marine environment through storm drains. The primary sources of debris discharged from storm drains include litter, debris from commercial establishments and public venues, industrial discharges, garbage transportation, landfills, and construction debris.

The principal source of plastic pellets is point source discharges through storm drains from industry that imports, manufactures, processes, transports, stores, recycles or otherwise handles plastic pellets. Accidental spills during transfer and transportation also contribute to plastic pellets entering storm drains and, ultimately, the Santa Monica Bay.

Land-based nonpoint sources of debris include inappropriate disposal of debris at land areas such as beaches and marinas adjacent to Santa Monica Bay or waterbodies within the Santa Monica Bay Watershed Management Area. Other nonpoint sources of debris include direct deposition and dumping.

Marine-based sources of trash include boats and vessels.

3.0 LOADING CAPACITY & MARGIN OF SAFETY

Zero for both trash and plastic pellets, as defined in the Numeric Target. Zero is a conservative numeric target for both trash and plastic pellets, which contains an implicit margin of safety.

4.0 SEASONAL VARIATIONS AND CRITICAL CONDITIONS

Discharge of trash and plastic pellets from storm drains and open channels occurs primarily during or shortly after a major rain event. Discharge of trash from nonpoint sources occurs during all seasons, but can increase during high wind events, which are defined as periods of wind advisories issued by the National Weather Service. Additionally, weekends and holidays, particularly those between April 15 through October 15, result in a substantial increase of trash littered on beaches, open space and parks.

5.0 WASTE LOAD ALLOCATIONS (for point sources)

Trash

The WLA is zero trash. Zero trash is defined as no trash discharged into waterbodies within the Santa Monica Bay Watershed Management Area (WMA) and then into Santa Monica Bay or on the shoreline of Santa Monica Bay.

Responsible agencies and jurisdictions covered by the Ballona Creek Watershed Trash TMDL including Caltrans, County of Los Angeles, and the Cities of Beverly Hills, Culver City, Inglewood, Los Angeles, Santa Monica, and West Hollywood, and responsible agencies and jurisdictions identified in the Malibu Creek Trash TMDL including Caltrans, Los Angeles County, Ventura County, Ventura County Watershed Protection District, and the Cities of Agoura Hills, Calabasas, Hidden Hills, Malibu, Thousand Oaks, and Westlake Village are also responsible for point source discharges of trash into the Santa Monica Bay via open channels and storm drains. **The WLA applicable to MS4 Permittees that is established herein, and the associated requirements for these responsible agencies and jurisdictions shall be complied with through the Ballona Creek Trash TMDL (Regional Board Resolution No. R01-014 and any amendments thereto)** and the Malibu Creek Trash TMDL (Regional Board Resolution No. R08-007 and any amendments thereto).

Each responsible jurisdiction and agency, identified above, shall comply with the interim or final Waste Load Allocations for trash assigned to it and, therefore, should utilize all compliance strategies within its authority to achieve these allocations. If these strategies include installation of full or partial capture systems in the infrastructure of a flood control district, the jurisdiction is responsible for obtaining all necessary permits to do so.

Plastic Pellets

The WLA for plastic pellets is zero. Zero plastic pellets is defined as no discharge of plastic pellets from the premises of industrial facilities that import, manufacture, process, transport, store, recycle or otherwise handle plastic pellets. The WLA is consistent with Cal. Water Code § 13367 and 40 CFR 122.26(b)(12).

WLAs for plastic pellets are assigned to permittees of the Industrial Storm Water General Permit (Order No. 97-03-DWQ, and NPDES Permit No. CAS 000001) within the Santa Monica Bay WMA. The Standard Industry Classification (SIC) codes associated with industrial activities involving plastic pellets may include, but are not limited to, 282X, 305X, 308X, 39XX, 25XX, 3261, 3357, 373X, and 2893. Additionally, industrial facilities with the term “plastic” in the facility or operator name, regardless of the SIC code, may be subject to the WLA for plastic pellets. Other industrial permittees within the Santa Monica Bay WMA that fall within the above categories, but are regulated through other general permits and/or individual industrial storm water permits are also required to comply with the WLA for plastic pellets.

6.0 IMPLEMENTATION – Point Sources

Trash

WLAs for trash shall be implemented through municipal separate storm sewer system (MS4) permits and via the authority vested in the Executive Officer by California Water Code sections 13267 and/or 13383. Dischargers may comply with the WLA in any lawful manner, including the use of full capture systems; partial capture systems; and/or institutional controls.

(1) Compliance with the final WLA may be achieved through an adequately sized and maintained full capture system, once the Executive Officer has certified that the system meets the following minimum criteria. A full capture system, at a minimum, consists of any device or series of devices that traps all particles retained by a 5 mm mesh screen and has a design treatment capacity of not less than the peak flow rate (Q) resulting from a one-year, one-hour, storm in the subdrainage area. The rational equation is used to compute the peak flow rate: $Q = C \times I \times A$, where

Q = design flow rate (cubic feet per second, cfs);
C = runoff coefficient (dimensionless);
I = design rainfall intensity (inches per hour); and
A= subdrainage area (acres).

Point source discharges that choose to comply using full capture systems must demonstrate a phased implementation of full capture devices over an 8-year period until the final WLA of zero is attained. Zero will be deemed to have been met if full capture systems have been installed on all conveyances discharging to the waterbodies within the Santa Monica Bay WMA and the Santa Monica Bay.

(2) Responsible agencies and jurisdictions may achieve compliance by using partial capture systems and/or institutional controls. Point source dischargers that elect to use partial capture systems or institutional controls shall use a mass balance approach based on the trash Daily Generation Rate (DGR), to demonstrate compliance.

Plastic Pellets

The WLA of no discharge of plastic pellets shall be implemented through the statewide Waste Discharge Requirements for Discharges of Storm Water Associated with Industrial Activity (NPDES Permit No. CAS00001) (IGP), other general permits, individual industrial stormwater permits, or other Regional Board orders, consistent with California Water Code § 13367 and 40 CFR 122.26(b)(12).

Jurisdictions and agencies identified as responsible jurisdictions for point sources of trash in this Santa Monica Bay Debris TMDL and in the existing Malibu Creek and Ballona Creek Trash TMDLs, including the Los Angeles County Flood Control District and the Ventura County Watershed Protection District, shall either prepare a Plastic Pellet Monitoring and Reporting Plan (PMRP), or demonstrate that a PMRP is not required under certain circumstances, as follows:

(1) Responsible jurisdictions that have industrial facilities or activities related to the manufacturing, handling, or transportation of plastic pellets within their jurisdiction shall prepare a PMRP to (i) monitor the amount of plastic pellets being discharged from the MS4; (ii) establish triggers for increased industrial facility inspections and enforcement of SWPPP requirements for industrial facilities identified as responsible for the plastic pellet WLA herein; and (iii) address possible plastic pellet spills.

(2) Responsible jurisdictions that have no industrial facilities or activities related to the manufacturing, handling, or transportation of plastic pellets, may not be required to conduct monitoring at MS4 outfalls, but shall be required to include a response plan in the PMRP. In order to be absolved of the requirement to conduct monitoring at MS4 outfalls, documentation of the absence of industrial facilities and activities within the jurisdiction that are related to the manufacturing, handling and transportation of plastic pellets must be provided in the proposed PMRP.

(3) A MS4 Permittee may demonstrate to the Regional Board that it has only residential areas within its jurisdiction, and that it has limited commercial or industrial transportation corridors (rail and roadway), such that it is not considered a potential source of plastic pellets to Santa Monica Bay. Such demonstration may be submitted in lieu of a PMRP and must include the municipal zoning plan and other appropriate documentation. The Executive Officer may approve an exemption from the requirement to prepare a PMRP for the MS4 Permittee on the basis of this demonstration, if appropriate.

If a jurisdiction changes its zoning and land use plans, or issues operating licenses to industries that import, manufacture, process, transport, store, recycle or otherwise handle plastic pellets within its jurisdiction, then it shall be subject to the requirement to submit a PMRP, if it has not already done so, within 90 days of any one of those actions.

The Regional Board shall be notified by the agency or jurisdiction within 24 hours of the responsible agency or jurisdiction becoming aware of a spill. The PMRP shall include protocols for a timely and appropriate response to possible plastic pellets spills within their jurisdictional area, and a comprehensive plan to ensure that plastic pellets are contained.

The Regional Board may reconsider the TMDL to assign the WLA for plastic pellets to additional jurisdictions and agencies including, but not limited to, industrial permittees, MS4 permittees, and any agencies or jurisdictions which are responsible for discharging plastic pellets to the Santa Monica Bay.

7.0 MONITORING AND REPORTING PLAN

Trash

Responsible agencies and jurisdictions shall develop a Trash Monitoring and Reporting Plan (TMRP) for Executive Officer approval that describes the methodologies that will be used to assess and monitor trash in their responsible areas within the Santa Monica Bay WMA or along Santa Monica Bay.

For purposes of compliance determination, the default Baseline WLA for Los Angeles County, Cities of Los Angeles, Culver City, Santa Monica, El Segundo, Manhattan Beach, Hermosa Beach, Redondo Beach, Torrance, Palos Verdes Estates, Rancho Palos Verdes, Rolling Hills, and Rolling Hills Estates is 807 gal/mi^2/yr.

The existing Ballona Creek Trash TMDL assigned a Baseline WLA of 86 cubic feet per square mile per year (ft^3/mi^2/yr) (equivalent to 643.3 gal/mi^2/yr) to jurisdictions including the County of Los Angeles, the Cities of Beverly Hills, Culver City, Inglewood, Los Angeles, Santa Monica, and West Hollywood.

The TMRP shall include a plan to establish a site specific trash Baseline WLA if responsible agencies and jurisdictions elect to not use the default Baseline WLAs assigned above.

Requirements for the TMRP shall include, but are not limited to, assessment and quantification of trash collected from source areas in the Santa Monica Bay WMA, and shoreline of the Santa Monica Bay. The monitoring plan shall provide details on the frequency, location, and reporting format. Responsible jurisdictions shall propose a metric (e.g., weight, volume, pieces of trash) to measure the amount of trash discharged from their jurisdictional areas.

The TMRP shall include a prioritization of areas that have the highest trash generation rates. The TMRP shall give preference to this prioritization when scheduling the installation of full capture devices, BMPs, or trash assessment and collection (MFAC) programs. The TMRP shall also evaluate and identify the most appropriate BMPs to implement given the nature of the trash impairment.

Consistent with the requirements of their respective MS4 permits, the flood control districts, including the Los Angeles County Flood Control District and the Ventura County Watershed Protection District, and other MS4 Permittees are responsible for visually monitoring and removing trash and debris from all open channels and other MS4 drainage structures under their ownership. These requirements are intended to address fugitive trash and debris that has been deposited either illegally or through wind transport into the open channels. The flood control districts and other MS4 Permittees shall also identify and prioritize problem areas of illicit discharge. For these problem areas, the flood control districts and other MS4 Permittees shall propose a more frequent schedule of inspection and removal beyond the standard requirements of their MS4 permits. Alternatively, the flood control districts and other MS4 Permittees shall demonstrate that fugitive trash and debris is captured or removed prior to its discharge from the MS4 to Santa Monica Bay.

Plastic Pellets

Industries responsible for discharge of plastic pellets shall enroll with the California State Water Resources Control Board (State Board) as a permittee of the statewide Waste Discharge Requirements for Discharges of Storm Water Associated with Industrial Activity (IGP) or apply for a general permit or an individual industrial stormwater permit from the Regional Board. Permittees of the IGP shall prepare a SWPPP and keep it onsite for inspection. Permittees for other general permits or individual industrial stormwater permits shall submit a Best Management Practices Plan and/or SWPPP to the Regional Board. All responsible permittees as defined under the Waste Load Allocation section are required to prepare and submit annual monitoring reports with monitoring designed to ensure compliance with the assigned WLAs, to the Regional Board. The requirements for the monitoring report preparation shall be consistent with provisions specified in the IGP, any appropriate general permit, or individual industrial permit.

MS4 permittees identified as responsible jurisdictions and agencies for point sources of trash in this Santa Monica Bay Debris TMDL and in the existing Malibu Creek and Ballona Creek Trash TMDLs, including the Los Angeles County Flood Control District and the Ventura County Watershed Protection District, shall either prepare a Plastic Pellet Monitoring and Reporting Plan (PMRP), or demonstrate that a PMRP is not required under certain circumstances, as follows:

~~(1) Responsible jurisdictions that have industrial facilities or activities related to the manufacturing, handling, or transportation of plastic pellets within their jurisdiction shall prepare a PMRP to (i) monitor the amount of plastic pellets being discharged from the MS4 at critical locations and times (including, at a minimum, once during the dry season and once during the wet season); (ii) establish triggers for increased industrial facility inspections and enforcement of SWPPP requirements for industrial facilities identified as responsible for the plastic pellet WLA herein; and (iii) address possible plastic pellet spills.~~

(2) Responsible jurisdictions that have no industrial facilities or activities related to the manufacturing, handling, or transportation of plastic pellets, may not be required to conduct monitoring at MS4 outfalls, but shall be required to include a response plan in the PMRP. In order to be absolved of the requirement to conduct monitoring at MS4 out falls, documentation of the absence of industrial facilities and activities within the jurisdiction that are related to the manufacturing, handling and transportation of plastic pellets must be provided in the proposed PMRP.

~~(3) A MS4 Permittee may demonstrate to the Regional Board that it has only residential areas within its jurisdiction, and that it has limited commercial or industrial transportation corridors (rail and roadway), such that it is not considered a potential source of plastic pellets to Santa Monica Bay. Such demonstration may be submitted in lieu of a PMRP and must include the municipal zoning plan and other appropriate documentation. The Executive Officer may approve~~

~~an exemption from the requirement to prepare a PMRP for the MS4 Permittee on the basis of this demonstration, if appropriate.~~

The PMRP shall include protocols for a timely and appropriate response to possible plastic pellets spills within a Permittee's jurisdictional area, and a comprehensive plan to ensure that plastic pellets are contained.

8.0 TRASH MONITORING AND REPORTING PLAN

Please see the Attachment 1.0, Ballona Creek Trash TMDL Annual Report.

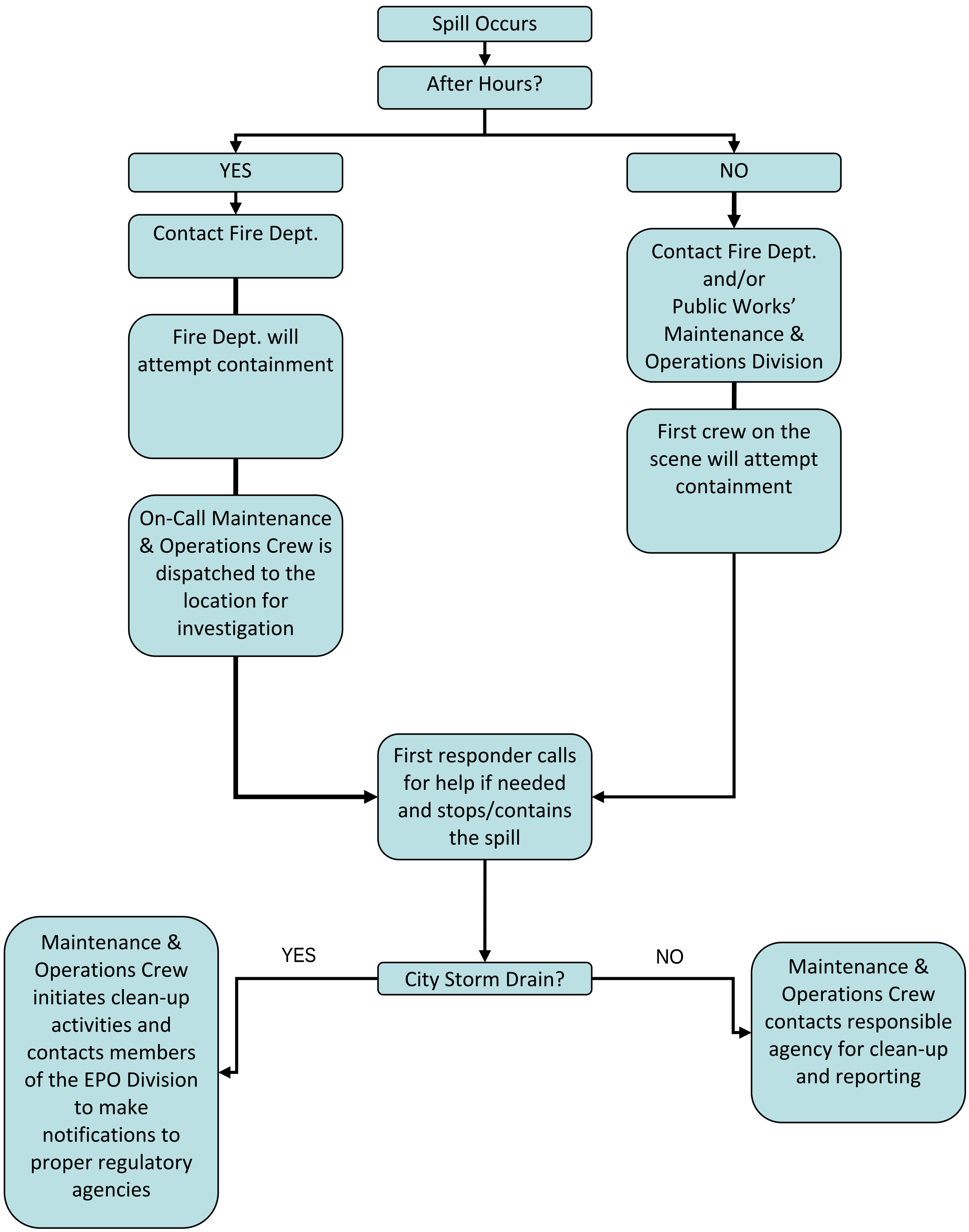
9.0 PLASTIC PELLET MONITORING AND REPORTING PLAN

The City of Culver City (City) has no industrial facilities or activities related to the manufacturing, handling, or transportation of plastic pellets. Therefore, the City is not required to monitor MS4 outfalls.

The City has reviewed its business license and there are no businesses with SIC codes that are regulated for plastic pellets. In addition, there are no businesses with the word "plastic" in its name that must comply with this TMDL. City staff also verified with the Industrial General NPDES Permit and did not find any businesses in the City on that list either.

As required by the TMDL, below is the City's response plan:

PLASTIC PELLETS SPILL RESPONSE PLAN



Proper notification procedures so that the primary responders and regulatory agencies are informed of plastic pellet spill in a timely manner;

SPILL NOTIFICATION CONTACT NUMBERS		
AGENCY	INFO	NOTIFICATION TIME FRAME
<u>CULVER CITY PUBLIC WORKS</u>: **Charles D. Herbertson**, Director of PW/City Engineer **Damian Skinner**, EPO Div. Manager **May Ng**, WDR (Sewers) Engineer **Kaden Young**, NPDES (Stormwater) Engineer **Lee Torres**, Senior Civil Engineer **Eric Mirzaian**, Maintenance Operation Div. Manager **Benny Tenorio**, Sewer Crew Lead **Mate Gaspar**, Engineering Services Div. Manager **Culver City Fire HazMat**	 (310) 253-5630 (310) 253-6421 (310) 253-6406 (310) 253-6445; (562) 308-8269 (310) 253-6457 (310) 253-6444 (310) 849-8937; (310) 236-1345 (310) 253-5602 (310) 253-5930	Immediately
State Water Resources Control Board (SWRCB)	Submit info on this page at http://ciwqs.waterboards.ca.gov/	ASAP
California Office of Emergency Services (Cal OES)	(800) 852-7550; 24-hour reporting	Immediately
Los Angeles Regional Water Quality Control Board (LARWQCB)	(213) 576-6657; business hours (213) 305-2253; non-business hours (213) 620-6140; fax written notification	Immediately
Los Angeles County Department of Health Services (DHS)	(213) 974-1234; 24-hour reporting (626) 430-5420	Immediately
Los Angeles County Flood Control District	(818) 896-0594 (818) 248-3842; business hours only	Immediately

The Fire Chief or Director of Public Works/City Engineer will be the official who will receive immediate notification. The Chief or Director or his designee shall be immediately dispatched to the site to take control of the scene as the Incident Commander. Unless otherwise noted, the Incident Commander is responsible to ensure all listed procedures are carried out. Field crews are prepared to respond immediately with all available equipment including diking materials, pumps, vacuum truck and traffic control equipment.

The Incident Commander shall assess the magnitude of the spill by estimating the volume by the accumulation of spillage. If any plastic pellet enters the storm drain system, immediately notify the appropriate agencies according to the chart above. If the situation does not permit the Incident Commander to contact the agencies immediately, contact the Environmental Programs and Operations (EPO) Division staff to report the spill to the appropriate agencies. If EPO staff cannot be reached, contact Culver City Fire HazMat to report the spill.

The City's Fire Department and Public Work's Maintenance & Operations Crew are trained and prepared to respond to spills and overflows of all sorts. They are ready to respond at a moment's notice and secure the perimeter for necessary activities such as traffic and crowd control.

General Response Procedures

The three fundamental phases of all responses to a plastic pellet spill are: *contain*, *control*, and *cleanup*.

The first personnel on scene are to *contain* the spill or, in other words, to keep it from entering the storm drainage system or other receiving waters. This may be done in any number of ways, including the use of sand or soil dikes, sand bags, or by plugging the outlet pipe of a catch basin.

Once the spill is contained, it needs to be brought under *control*. That is, upright any fallen containers/vehicles and closing all lids and doors.

The third and final step of the response is *cleanup*. All surfaces touched by the spill must be swept and vacuumed for proper disposal. The spill should never be blown/swept down into a storm drain, it must be vacuumed.

SPILL RESPONSE PROCEDURES

1. Immediately notify the Maintenance & Operations Division Manager, who in this case should act as the Incident Commander. Incident Commander shall immediately notify the appropriate departments/division managers.

2. Contain the spillage immediately by building berms around the spills using sandbags and vacuum truck. Block openings of nearby storm drain catch basins using sandbags. If any plastic pellets enter the storm drain, build a temporary dam (using sandbags) in downstream storm drain system, to avoid plastic pellets entering the receiving waters.

3. Take photographs of the spill and include them for review by the WDR Engineer and Department Head. If the spill was not generated from a private property but entered private property, a copy of the report and photos must be forwarded to Risk Management. Staff will request permission of the occupant of the private property before taking any pictures on private property. Confine pictures to only the areas affected by the spill.

4. Investigate the incident and develop a written chronology that describes:

   a. time, date, and cause of the spill;
   b. events and actions that led up to the spill;
   c. the approximate volume of the spill and route, if any, storm drains that were compromised;
   d. names and titles of personnel present on scene of spill; and
   e. actions taken to correct the situation, including containing the spill.

5. Clean up the spill area and remove containment.

   a. Vacuum contaminated areas or streets, block all nearby storm drain catch basin openings with sandbags to prevent pellets from entering the storm drain system.

   b. If storm drain system was compromised with plastic pellets a temporary dam will be erected downstream to capture spillage until it is vacuum extracted.
   c. Remove sandbags.
   d. Leave the area as clean as practicable.

6. The Incident Commander must verify that a Plastic Pellet Report form has been completed. This task is completed by the NPDES Engineer and filed to the State's online reporting system.

OUTSIDE RESOURCES CONTACT LIST

Spill Response Companies

Allwaste
2222 E. Sepulveda Boulevard
Carson, CA 90810
(310) 595-1000

National Plant Services
1461 Harbor Avenue
Long Beach, CA 90813
(562) 436-7600

Ocean Blue (Environmental Services, Inc.)
925 W. Esther Street
Long Beach, CA 90813
(562) 624-4120

Cleanstreet
1937 W. 169th Street
Gardena, CA 90247
(800) 225-7316 x1111

OUTSIDE AGENCY NOTIFICATION NUMBERS

A. City of Los Angeles

a. If spill is originating from a City of Los Angeles
   City of Los Angeles – Bureau of Sanitation
   Phone: (213) 485-7575 (Sewage Spill Hotline Main #)
   Phone: (213) 485-5391 (Sewage Spill Hotline Weekdays, 6:30AM – 1:00AM)
   Phone: (310) 823-5507; (310) 822-0777 (Night Emergencies, 1:00AM – 6:30AM)

B. County of Los Angeles

a. When spill enters storm drain system
   L.A. County Department of Public Works
   Floor Maintenance Division
   Phone: (800) 675-4357, ext. #1

b. Call ONLY if storm drain is compromised or if spills enter receiving water(s)
   L.A. County Department of Health Services
   Phone: (626) 430-5420, After hours: (213) 974-1234

C. California Office of Emergency Services

a. If spill exceeds 1,000 gallons or presents hazard to human health or environment
   Hazardous Spills Notification
   Phone: (800) 852-7550

D. Other Agencies (to request assistance)

a. City of Los Angeles:	(213) 485-7575
b. County of Los Angeles:	(800) 675-HELP (4357)
c. City of Hawthorne:	(213) 216-2356 (Richard Carver)
d. City of El Segundo:	(310) 524-2760
e. City of Manhattan Beach:	(310) 802-5320; (310) 345-2442 (Justin Gervais)
MB Police Station:	(310) 802-5100

E. Regional Water Quality Control Board

a. When spill enters the storm drain system
   Technical Support Unit – Spills Report Duty Officer
   (213) 576-6720, if no answer, (213) 576-6600
   After hours: (213) 774-4238
   Fax: (213) 576-6640

F. California Coastal Commission

a. When spill enters coastal waters or have the potential to enter coastal waters
   (805) 585-1816; (562) 590-5071

G. California Department of Fish and Game

a. When spill enters coastal waters or have the potential to enter coastal waters
   (562) 708-7757