Dominguez Channel Watershed Management Area Group

# Coordinated Integrated Monitoring Program (CIMP)

Revised April 7, 2015

# COORDINATED INTEGRATED MONITORING PROGRAM FOR THE DOMINGUEZ CHANNEL WATERSHED MANAGEMENT AREA GROUP

City of Los Angeles, Bureau of Sanitation
TOS S55C Enhanced Watershed Management Program (EWMP) for the Dominguez Channel Watershed Management Area Group

**FINAL**

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# Acronyms

| | |
|---|---|
| BMP | Best Management Practice |
| CERCLA | Comprehensive Environmental Response, Compensation and Liability Act |
| CIMP | Coordinated Integrated Monitoring Program |
| CMP | Coordinated Monitoring Program |
| CSMP | Contaminated Sediment Management Plan |
| CTR | California Toxics Rule |
| DC | Dominguez Channel |
| DCE | Dominguez Channel Estuary |
| DCWMA | Dominguez Channel Watershed Management Area |
| DCWMA Group | Dominguez Channel Watershed Management Area Group |
| EIA | Effective Impervious Area |
| EWMP | Enhanced Watershed Management Program |
| GIS | Geographic Information System |
| HRU | Hydrologic Response Units |
| HUC | Hydrologic Unit Code |
| IC/ID | Illicit Connection/Illicit Discharge |
| LACFCD | Los Angeles County Flood Control District |
| LARWQCB | Los Angeles Regional Water Quality Control Board |
| LID | Low Impact Development |
| LWQMP | Lake Water Quality Management Plan |
| MCM | Minimum Control Measure |
| ME | Mass Emission |
| MRP | Monitoring and Reporting Program |
| MS4 | Municipal Separate Storm and Sewer System |
| NPDES | National Pollutant Discharge Elimination System |
| NSW | Non-storm Water |
| NWS | National Weather Service |
| QA/QC | Quality Assurance/Quality Control |
| PERMIT | Order R4-2012-0175 |
| RWL | Receiving Water Limitation |
| SCB | Southern California Bight |
| SCCWRP | Southern California Coastal Water Research Project |
| SMC | Southern California Stormwater Monitoring Coalition |
| SOP | Standard Operating Procedure |
| SUSMP | Standard Urban Stormwater Mitigation Plan |
| SWAMP | Surface Water Ambient Monitoring Program |

## Acronyms (continued)

| | |
|---|---|
| TIWRP | Terminal Island Water Reclamation Plant |
| TMDL | Total Maximum Daily Load |
| TSS | Total Suspended Solids |
| USEPA | United States Environmental Protection Agency |
| WBPC | Water Body-Pollutant Combination |
| WLA | Waste Load Allocation |
| WQBEL | Water Quality Based Effluent Limitation |

## Units

| | |
|---|---|
| µg/kg | Microgram per kilogram |
| µg/L | Microgram per liter |
| cfu | Colony Forming Unit |
| g/day | Grams per day |
| g/yr | Grams per year |
| kg | Kilogram |
| kg/yr | Kilograms per year |
| mg/L | Milligram per liter |
| mg/kg | Milligram per kilogram |
| mL | Milliliter |
| MPN | Most Probable Number |
| TUc | Toxic Unit Chronic |

# 1 Introduction

The National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit, Order R4-2012-0175 (Permit) became effective on December 28, 2012. On June 27, 2013, the cities of El Segundo, Hawthorne, Inglewood, and Los Angeles (including the Port of Los Angeles), the County of Los Angeles and the Los Angeles County Flood Control District (LACFCD) (collectively known as the Dominguez Channel Watershed Management Area (DCWMA) Group (DCWMA Group)) submitted a Notice of Intent to develop a collaborative approach to meet the requirements of the Permit, which includes developing an Enhanced Watershed Management Program (EWMP) and Coordinated Integrated Monitoring Program (CIMP) for their respective portion of the DCWMA. In early June 2014, the City of Lomita joined the DCWMA Group.

Attachment E of the Permit identifies the requirements of the Monitoring and Reporting Program (MRP). The MRP establishes monitoring, reporting, and recordkeeping requirements that implement the federal regulations under the Clean Water Act and the California Water Code. The primary objectives as stated in the MRP are as follows:

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 Total Maximum Daily Load (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.

The DCWMA CIMP has been prepared by the DCWMA Group to address the requirements of the MRP. The CIMP is composed of the following five MRP elements (Part II.E):

1. Receiving water monitoring
2. Storm water outfall based monitoring
3. Non-Storm Water (NSW) outfall based monitoring
4. New Development/Re-development effectiveness tracking
5. Regional studies

Additionally, the DCWMA CIMP addresses the MS4 infrastructure data requested as part of the CIMP submittal (MRP Section VII.A), presents the adaptive management approach for the CIMP, discusses the data management and reporting process, and outlines the schedule for implementing the CIMP. Attachments to the CIMP provide additional background on the DCWMA, factsheets for the monitoring locations, analytical and sample collection procedures, and additional details on reporting.

The DCWMA Group does not contain all of the MS4 Permittees in the Dominguez Channel watershed as some have elected to develop their own strategy for addressing these requirements under the Permit. Table 1-1 below, provides a list of the participating Permittees under the DCWMA Group.

| Table 1-1: List of Participating Permittees under the DCWMA Group | | |
|---|---|---|
| **Participating Permittee** | **Jurisdictional Area (ac)** | **% of Jurisdictional Area** |
| City of Los Angeles | 19,243 | 51.1% |
| County of Los Angeles | 8,141 | 21.6% |
| Los Angeles County Flood Control District | NA | NA |
| City of El Segundo | 1,252 | 3.3% |
| City of Inglewood | 3,884 | 10.3% |
| City of Hawthorne | 3,892 | 10.3% |
| City of Lomita | 1,227 | 3.3% |
| **Total** | **37,640** | |

## 1.1 Watershed Management Plan Area

The Dominguez Channel Watershed Management Area (DCWMA) is located in the southern portion of the Los Angeles County and includes the drainage area of the Dominguez Channel, Machado Lake, and the Los Angeles/Long Beach Harbors watersheds. The Dominguez Channel Watershed is an important industrial, commercial, and residential area with unique and important historical and environmental resources, such as the Dominguez Estuary and Cabrillo Beach. The Dominguez Channel Watershed Management Area is approximately 133 square miles in area, 120 of which are comprised of land and the remaining is the Los Angeles/Long Beach Harbors. Approximately 72 square miles drains directly to the 15.7-mile-long Dominguez Channel, which begins in the City of Hawthorne and eventually discharges to the Los Angeles Harbor. The other 48 square miles of land area drains directly to the Los Angeles/Long Beach Harbors or Machado Lake.

The land area of the DCWMA Group encompasses 58 square miles (37,315 acres) or 43.6 percent of the total 133 square miles (75,000 acres) of the DCWMA. Additionally, the DCWMA Group does not have jurisdiction over the land that is owned by the State of California and the US Government. The boundaries of the participating cities within the watershed are shown in Figure 1-1.

The watershed receives an average of approximately 12.11 inches of rain per year, most of it during the winter season (Los Angeles County, ALERT Rain Gage 315, Dominguez Precipitation). The DCWMA is composed of three subwatershed (hydrologic unit code (HUC) 12) drainage areas as follows.

1. Upper Dominguez Channel

1. Lower Dominguez Channel and Estuary

2. Los Angeles and Long Beach Harbors (including Machado Lake)

The DCWMA is dominated by urban land uses such as residential, industrial, commercial, and transportation, which accounts for approximately 74 percent of the land area. The dominant land uses are presented in Table 1-2 and Figure 1-2.

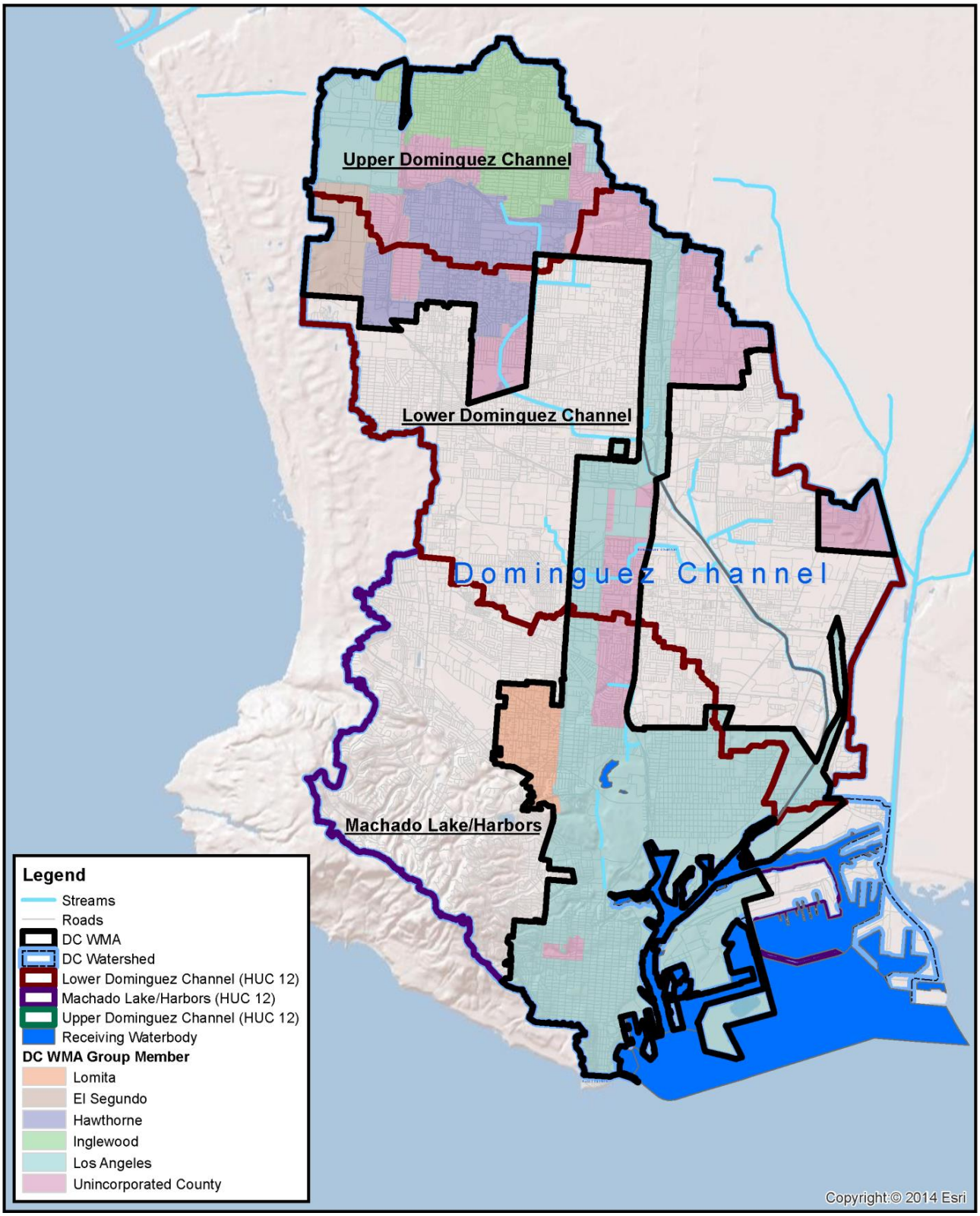


**Figure 1-1. DCWMA Group Boundary**

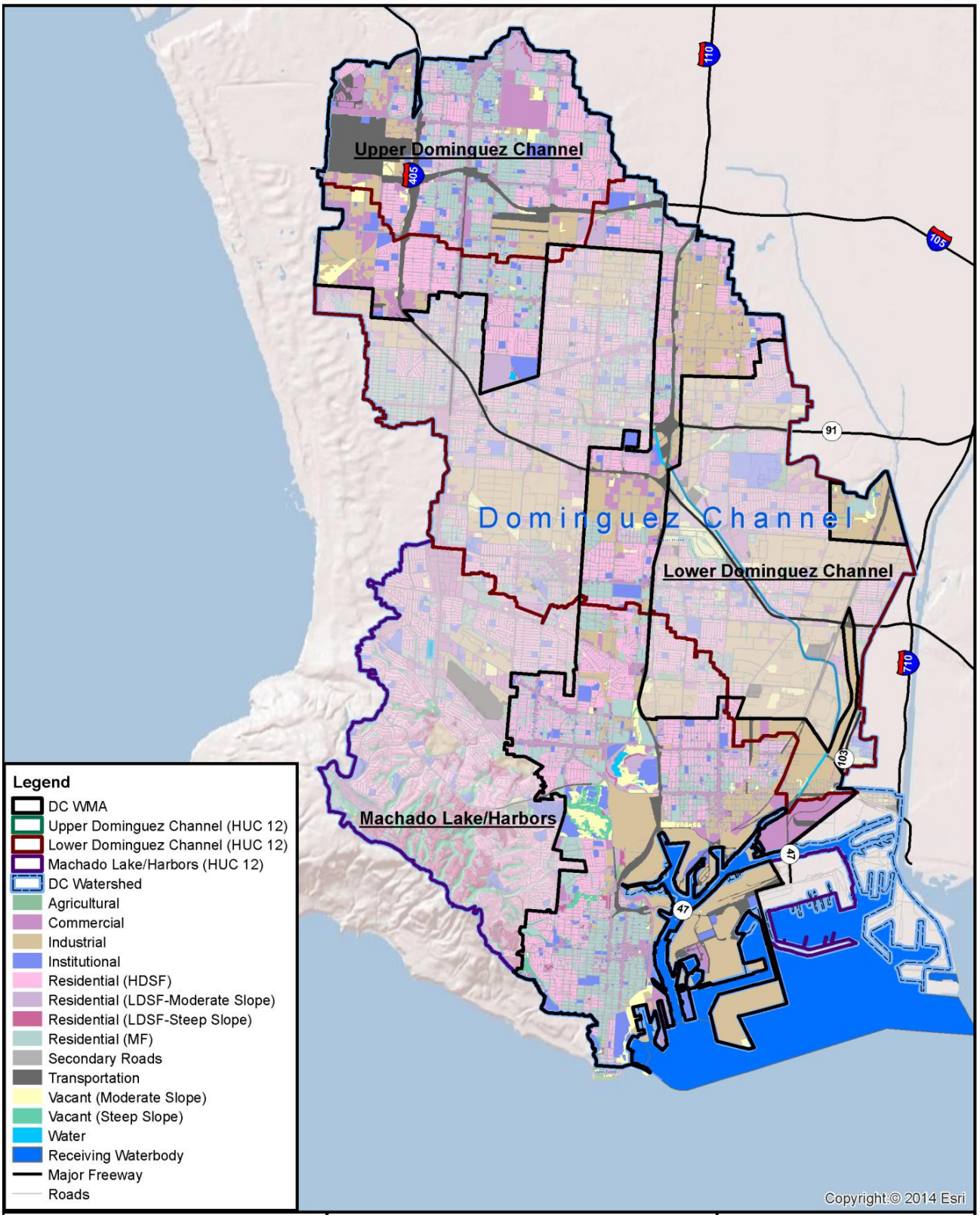


**Figure 1-2. Land Use in the Dominguez Channel Watershed Management Area**

| Table 1-2: DCWMA Group Land Use | | |
|---|---|---|
| **Land Use Category** | **Area (square miles)** | **Percentage** |
| Agricultural | 0.1 | 0.2% |
| Commercial / Institutional | 9.5 | 16.4% |
| Industrial | 12.9 | 22.1% |
| Residential | 19.6 | 33.7% |
| Transportation / Secondary Roads | 14.0 | 24.0% |
| Vacant | 2.0 | 3.4% |
| Water | 0.2 | 0.3% |
| **Total:** | **58.3** | **100%** |

## 1.2 Water Quality Priorities

The water quality priorities for the DCWMA were assessed using available monitoring data, TMDLs, 303(d) listed impairments and water quality thresholds listed in the Basin Plan for the Coastal Watersheds of the Los Angeles and Ventura Counties (Basin Plan) and the California Toxics Rule (CTR). Water-body pollutant combinations (WBPCs) were then prioritized using an initial source assessment based on land use and pollutant exceedance data for the Dominguez Channel (and tributaries), the Dominguez Channel Estuary (DCE) and Machado Lake. Additional water quality information was evaluated for Cabrillo Beach and the Consolidated Slip portions of the WMA.

WBPCs for which there were monitoring data were placed into one of three categories as outlined in the NPDES Permit (Table 1-3). See Attachment A for additional details on the water quality priorities.

| Table 1-3: Categorized Water Body-Pollutant Combinations | | | |
|---|---|---|---|
| **Waterbody** | **Category 1 (TMDL)** | **Category 2 (303(d) List)** | **Category 3 (Other)** |
| **Dominguez Channel (lined portion above Vermont Ave)** | Copper (diss.), Lead (diss.), Zinc (diss.), Toxicity | Indicator Bacteria, Ammonia, Diazinon | Cadmium (diss.), Chromium (diss.), Mercury (diss.), Thallium (diss.), Bis(2-Ethylhexl) phthalate, pH, Dissolved Oxygen |
| **Torrance Lateral** | Copper (diss.), Lead (diss.), Zinc (diss.) | Coliform Bacteria | Cadmium (diss.), Cyanide, pH, Ammonia, PCBs (sed.), DDT (sed.) |
| **Dominguez Estuary (unlined portion below Vermont Ave)** | Cadmium (sed.), Copper (diss. and sed.), Lead (diss., sed., & tissue), Zinc (diss. & sed.), DDT (tissue & sed.), PCBs (sed.), Chlordane (tissue & sed.), Dieldrin (tissue & sed.), PAHs (sed.), Benthic Community Effects, Sediment Toxicity | Ammonia, Coliform Bacteria | Arsenic (sed.), Chromium (sed.), Silver (diss. & sed.), Nickel (diss.), Mercury (sed.), Thallium (diss.) |

| Table 1-3: Categorized Water Body-Pollutant Combinations | | | |
|---|---|---|---|
| **Waterbody** | **Category 1 (TMDL)** | **Category 2 (303(d) List)** | **Category 3 (Other)** |
| **Machado Lake** | Trash, Total Phosphorus, Total Nitrogen, Ammonia, Chlorophyll-a, PCBs (sed.), DDT (sed.), Chlordane (sed.), Dieldrin (sed.), Dissolved Oxygen | *None* | *E. coli*, pH |
| **Wilmington Drain** | *None* | Coliform Bacteria, Copper (diss.), Lead (diss.) | Total Nitrogen, DDT (sed.), PCBs (sed.), Chlordane, Dieldrin (sed.) |
| **LA Harbor[1] - Cabrillo Marina** | DDT (tissue & sed.), PCBs (tissue & sed.), PAHs | *None* | *None* |
| **LA Harbor[1] - Consolidated Slip** | Cadmium, Chromium, Copper, Lead, Mercury, Zinc, DDT (tissue & sed.), PCBs (tissue & sed.), PAHs (sed.), Chlordane (tissue & sed.), Dieldrin, Toxaphene (tissue), Benthic Community Effects, Sediment Toxicity | *None* | Arsenic, Silver, Nickel |
| **LA Harbor[1] - Fish Harbor** | Copper, Lead, Mercury, Zinc, DDT (tissue & sed.), PCBs (tissue & sed.), Chlordane, PAHs, Sediment Toxicity | *None* | *None* |
| **LA/LB Inner Harbor[1]** | Copper, Lead, Zinc, DDT (tissue & sed.), PCBs (tissue & sed.), PAHs, Benthic Community Effects, Sediment Toxicity, Indicator Bacteria | *None* | Copper (diss.), Silver (diss.) |
| **LA/LB Outer Harbor[1]** | DDT (tissue & sed.), PCBs (tissue & sed.), Sediment Toxicity | *None* | Cadmium, Nickel, Silver (diss.), Copper (diss.), Mercury |
| **LA Harbor[1] - Inner Cabrillo Beach** | Indicator Bacteria, DDT (sed. and tissue), PCBs (tissue & sed.) | *None* | *None* |

[1] Los Angeles Harbor metals and organic pollutants constituents are for sediment unless otherwise noted.

## 1.3 CIMP Overview

This section provides an overview of the components included in the DCWMA Group CIMP. The DCWMA Group CIMP is comprised of the following sections and each item is discussed briefly below:

1. Introduction
3. Receiving water monitoring
4. MS4 Infrastructure Database
5. Storm Water outfall based monitoring
6. Non-Storm Water Outfall Based Screening and Monitoring
7. New Development/Re-development Effectiveness Tracking
8. Regional Studies
9. Special Studies
10. Non-Direct Measurements
11. Adaptive Management
12. Reporting
13. Schedule

### 1.3.1 Receiving Water Monitoring

The MRP states that receiving water monitoring shall be performed at previously designated mass emission (ME) stations, TMDL receiving water compliance points as designated in Regional Water Board Executive Officer approved TMDL Monitoring Plans (see Table E-1 for a list of approved TMDL Monitoring Plans), and additional receiving water locations representative of the impacts from MS4 discharges. The objectives of the receiving water monitoring 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,

c. Determine whether the designated beneficial uses are fully supported as determined by water chemistry, as well as aquatic toxicity and bioassessment monitoring.

The DCWMA Group selected 11 sites to fulfill the needs of the receiving water monitoring program: one new ME station and 11 TMDL monitoring sites (which includes the new ME site). The TMDL sites include four new sites for the Dominguez Channel Toxics TMDL, four existing sites incorporated from the existing plans for the Machado Lake TMDLs, and three existing sites for the LA Harbor Bacteria TMDL. Although not a part of the DCMWA, it should be noted that in addition to the receiving water sites included herein, there are 22 sites being monitoring as part of the Coordinated Compliance, Monitoring, and Reporting Plan (CCMRP) for the Greater Los Angeles and Long Beach Harbors TMDL.

Additional details of the Receiving Water Monitoring Program are available in Section 5.

### 1.3.2 Storm Water Outfall Monitoring

The MRP requires that storm water discharges from the MS4 be monitored at outfalls or in channels at the jurisdictional boundaries of the DCWMA Group. The DCWMA Group selected five outfall monitoring sites to fulfill the needs of the outfall monitoring and TMDL Monitoring programs. The Storm Water Outfall Monitoring Program has two types of outfalls:

- **NPDES Storm Water Outfall Sites.** Three sites were selected to be used for the storm water outfall monitoring program. One major outfall is representative of discharges into the Upper Dominguez Channel HUC 12 (DOM-OF-001). The other two are representative of discharges within the Lower Dominguez Channel HUC 12, one at Torrance Lateral (DOM-OF-002) and the other to the Dominguez Channel Estuary (DOM-OF-003).

- **TMDL Outfall Sites.** The DCWMA Group will monitor two additional outfalls identified for outfall monitoring into the Machado Lake Nutrients and Toxics TMDLs at locations P-77 and P-510. In addition, two of the NPDES Storm Water Outfall Sites (DOM-OF-002 and DOM-OF-003) will also serves as monitoring stations for the Dominguez Channel Toxics TMDL.

Additional details for the Storm Water Outfall Monitoring Program are available in Section 4, Attachment B, and Attachment C.

### 1.3.3 Non-Storm Water Outfall Program

The NSW Outfall Monitoring Program is intended to foster collaboration and enhance the efforts of DCWMA Group's and the LACFCD's efforts to meet the requirements outlined in the Permit for the Illicit Connection and Illicit Discharge (IC/ID) Program to detect, investigate, and eliminate the IC/IDs pursuant to Part VI.D.4.d and Part VI.D.10 of the NPDES Permit. The NSW Monitoring Program proposed under the DCWMA CIMP is comprised of the following components.

1. Identification of Outfalls with Significant NSW Discharge
2. Inventory of MS4 Outfalls with NSW Discharge
3. Prioritized Source Identification
4. Identify Sources of Significant NSW Discharge
5. Monitor NSW Discharge Exceeding Criteria

Additional NSW Program details are provided in Section 5 and Attachment C.

### 1.3.4 New Development and Re-development Effectiveness Tracking

The objective of New Development/Re-Development Effectiveness Tracking element is to track whether post-construction BMPs are implemented as planned to ensure that the intended volume of storm water is retained or reused onsite, or treated when retention is infeasible, as required by Part VI.D.7.c.i. of the Permit.

To meet the MRP requirements of Permit Attachment E, Part X.A, the DCWMA Group will maintain an informational database record for each new development/re-development project subject to the minimum control measure (MCM) requirements in Part VI.D.7 of the Permit and their adopted Low Impact Development (LID) Ordinance.

In addition to the requirements in Part X.A of the MRP, Part VI.D.7.d.iv of the Permit requires that the DCWMA Group implement a tracking system for new development/re-development projects that have been conditioned for post-construction BMPs.

Participating agencies have developed mechanisms for tracking new development/re-development projects that have been conditioned for post-construction BMPs pursuant to MS4 Permit Part VI.D.7 Agencies also have developed mechanisms for tracking the effectiveness of these BMPs pursuant to MS4 Permit Attachment E.X.A and 12 elements in Part VI.D.7.d.iv. As such, the CIMP provides general details on the requirements and approaches related to the new and redevelopment tracking requirements. Specifics are available from each DCWMA Group member. More information is located in Section 6.

### 1.3.5 Regional Studies

The MRP identifies the Southern California Stormwater Monitoring Coalition (SMC) Watershed Monitoring Program as a required regional study (Section XI, Page E29-30). Sites in the DCWMA are not specifically called out in the MRP; however, as it is a coastal watershed in the specified study area, it is anticipated that the required coordination may occur in this watershed in the future. The DCWMA Group (LACFCD) will continue to coordinate with Southern California Coastal Water Research Project (SCCWRP) regarding plans to include sites within the Dominguez Channel Watershed regional monitoring.

Other regional studies of note that may affect future monitoring efforts in the DCWMA include:

- There are not currently any watershed wide monitoring programs in the DCWMA. California's Surface Water Ambient Monitoring Program (SWAMP) conducted a short-term assessment of the Dominguez Channel Watershed in the 2002-2003 fiscal year (LARWQCB 2007)).

- The Terminal Island Water Reclamation Plant (TIWRP) discharges treated wastewater in the Outer Los Angeles Harbor within the DCW. The plant has a dry weather design capacity of 30 MGD and as of 2007 averaged a discharge rate of 15.8 MGD of tertiary treated effluent (City of Los Angeles 2008). The TIWRP effluent monitoring program monitors an extensive list of constituents, which is noted in Section 7.

- The City of Los Angeles, Los Angeles County and LACFCD are participating in a Contaminated Sediment Management Plan (CSMP) with non-participating DCWMA Cities designed to meet the requirement of the TMDL schedule for the Dominguez Channel Toxics TMDL.

### 1.3.6 Special Studies

TMDL special studies may be used to refine source assessments, assign appropriate allocation based on updated information from the results of implementation actions and monitoring program, and help focus implementation efforts (Los Angeles Regional Water Quality Control Board (LARWQCB) and United States Environmental Protection Agency (USEPA) 2010).
Currently, the adopted TMDLs in the DCWMA Area do not have required TMDL special studies.

# 2 Receiving Water Monitoring Program

The objective of this section is to present the Receiving Water Monitoring Program for the DCWMA Group. This Section is intended to satisfy the requirements of Section VI.B (Page E-14) of the MRP. The following presents the receiving water monitoring objectives, sites, monitoring parameters and frequency, as well information to support the approach utilized to meet the objectives of the MRP. The approach builds off the MRP requirements, the TMDL monitoring requirements (detailed in Attachment A), as well as existing monitoring programs in the watershed (detailed in Attachment A).

## 2.1 Receiving Water Monitoring Objectives

The Monitoring and Reporting Program (Attachment E of the Permit) states that the objectives of the Receiving Water Monitoring Program include the following:

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

## 2.2 Receiving Water Monitoring Sites

For the DCWMA, the Receiving Water Monitoring Program monitoring sites are classified as follows:

- DCWMA ME Station - Monitoring at the new DCWMA ME Station (DOM-RW-DC01) will be used to determine if receiving water limitations (RWLs) in the DCWMA are achieved, assess trends in pollutant concentrations over time, and determine whether designated uses are supported. All analyses required by the NPDES Permit (including relevant TMDLs) are monitored at this site. The existing ME Station operated by the LACFCD will not be used by the DCWMA Group as this station is affected by non-DCWMA agencies, the new DCWMA ME Station will be utilized to meet the elements of the Receiving Water Monitoring Program. This station will also be utilized to meet the monitoring requirements outlined for the Dominguez Channel in the toxics TMDL.
- TMDL Monitoring Sites - TMDL Monitoring sites will be used to evaluate applicable TMDLs and TMDL compliance points identified in approved TMDLs. Pollutants addressed by the applicable TMDLs to the DCWMA are monitored at these sites. To fulfill the needs of the TMDL monitoring programs, the DCWMA Group selected 10 sites, in addition to the DCWMA ME Station (11 sites total). An overview of the receiving water monitoring locations within the watershed as they related the DCWMA Group cities is show in Figure 2-1 below.

Table 2-1 summarizes each of the monitoring locations and a detailed fact sheet of each location is provided in Attachment B.

The specific parameters and frequency that each site will be monitored for is provided in Table 2-2. Detailed information on sampling and analytical methods is provided in Attachment C.

**Table 2-1: Receiving Water Monitoring Program Locations**

| Site ID | Water Body/Location | Coordinates | | Monitoring Type | |
|---|---|---|---|---|---|
| | | Latitude | Longitude | ME | TMDL |
| DOM-RW-DC01 | Dominguez Channel at 135th | 33.909458 | -118.32579 | ● | ● |
| DOM-RW-DCE01 | Upper Dominguez Channel Estuary | 33.870514 | -118.289802 | | ● |
| DOM-RW-DCE02 | Lower Dominguez Channel Estuary | 33.791886 | -118.230535 | | ● |
| DOM-RW-TL01 | Torrance Lateral at Hamilton Ave | 33.844779 | -118.286518 | | ● |
| ML-1 | Machado Lake, Upper | 33.787913 | -118.292661 | | ● |
| ML-2 | Machado Lake, Lower | 33.783196 | -118.293571 | | ● |
| ML-3 | Machado Lake, Middle | 33.78563 | -118.294339 | | ● |
| WD-1 | Wilmington Drain at PCH | 33.790864 | -118.287574 | | ● |
| CB01 | Inner Cabrillo Beach, North End | 33.713432 | -118.283779 | | ● |
| CB02 | Inner Cabrillo Beach, South End | 33.711213 | -118.282911 | | ● |
| HW07 | Main Ship Channel | 33.722607 | -118.269888 | | ● |
| Various Harbor Sites | Greater LA/Long Beach Harbor Area | Various | Various | | ● |

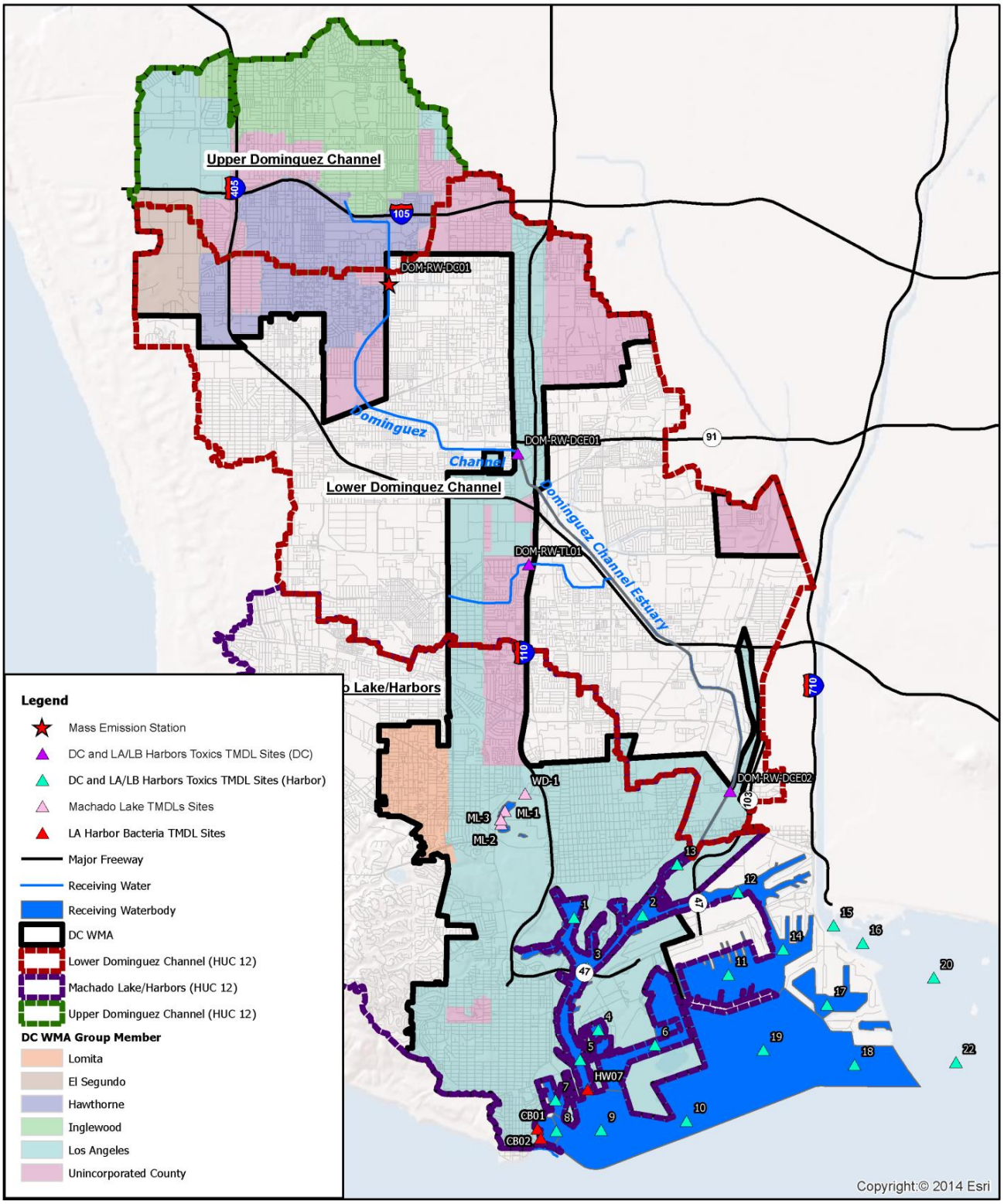


**Figure 2-1. Map of Receiving Water Monitoring Program**

### 2.2.1 New DCWMA ME Station, DOM-RW-DC01

The DCWMA Group is establishing a new ME Station along the Dominguez Channel north of 135th Street. This location was selected as this site is representative of the potential effect of MS4 discharges that originate from the cities of Los Angeles, Inglewood, El Segundo, Hawthorne, and the County of LA Unincorporated Areas, and the DCWMA Group accounts for 99.5 percent of the land area discharging to this site. The location of the site in relation to watershed and the associated catchment area is illustrated in Attachment B. An overview of the site location's catchment area is provided in Table 2-2. A detailed fact sheet of each location is provided in Attachment B.

**Table 2-2: Summary of NPDES Receiving Water Monitoring Sites**

| Site ID | Site | Catchment Area (acres) | DCWMA Group Area* (acres) | Non-DCWMA Group Area (acres) | DCWMA Group Area Ratio | Designation |
|---|---|---|---|---|---|---|
| DOM-RW-DC01 | Dominguez Channel @ 135th St | 10,249.5 | 10,191.2 | 48.3 | 99.5% | New DCWMA ME Station |

*The LACFCD area is included as part of area for the jurisdiction for which it resides.

### 2.2.2 DCWMA TMDL Sites

The following TMDLs contain monitoring requirements applicable to the DCWMA:

- DC and Greater Los Angeles and Long Beach Harbors Toxics TMDL
- Los Angeles Harbors Bacteria TMDL
- Machado Lake Nutrient TMDL
- Machado Lake Toxics TMDL
- Machado Lake Trash TMDL

The TMDL sites have been identified, in addition to the new DCWMA ME Station; to meet the requirements of the TMDLs. Table 2-3 summarizes the TMDLs that each of the TMDL monitoring sites addresses. A number of the sites are existing sites that provide a long-term record by which to assess trends over time and attainment of TMDL targets. Four new sites have been identified to support further evaluation, which will support the characterization of current conditions, and over time, assess trends. Note that receiving water monitoring sites within the Harbor complex are addressed through a Coordinated Monitoring Program (CMP) prepared by the cities of Los Angeles and Long Beach along with the Port of Los Angeles and Port of Long Beach as detailed in the CCMRP, dated June 2013. The County of Los Angeles, LACFCD and City of Los Angeles are all members of the Greater Harbors Regional Monitoring Coalition, which submitted the CCMRP.

**Table 2-3: TMDLs Addressed by Each Site**

| Constituents | DC Watershed Sites | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Channel | Estuary | | Lateral | Machado Lake | | | | Los Angeles Harbor | | | |
| Relevant TMDL | DOM-RW-DC01 | DOM-RW-DCE01 | DOM-RW-DCE02 | DOM-RW-TL01 | ML-1 | ML-2 | ML-3 | WD-1[4] | CB01 | CB02 | HW07 | 1 - 22 |
| | Upper Dominguez Channel | Upper Dominguez Channel Estuary | Lower Dominguez Channel Estuary | Torrance Lateral at Hamilton Ave | Machado Lake, Upper | Machado Lake, Lower | Machado Lake, Middle | Wilmington Drain at PCH | Inner Cabrillo Beach, North End | Inner Cabrillo Beach, South End | Main Ship Channel[1] | Greater Los Angeles and Long Beach Harbors[2] |
| DC and Harbors Toxics TMDL | ● | ● | ● | ● | | | | | | | | ● |
| Los Angeles Harbors Bacteria TMDL | | | | | | | | | ● | ● | ● | |
| Machado Lake Nutrient TMDL[3] | | | | | ● | ● | ● | ● | | | | |
| Machado Lake Toxics TMDL[3] | | | | | ● | ● | | ● | | | | |
| Machado Lake Trash TMDL[3] | | | | | | | | | | | | |

[1]Monitoring conducted by TIWRP.

[2]Monitoring performed in accordance with the CCMRP for the Greater Los Angeles and Long Beach Harbor (separate from the monitoring as described in this CIMP). Data collected by the CCMRP will be utilized by the DCWMA to assess the harbor receiving waters.

[3]Monitoring is outlined in the LACFCD's Machado Lake Multi-pollutant TMDL Monitoring Plan, which is for both the Machado Lake Nutrients and Toxics TMDL. The City of LA's Machado Lake Nutrients and Toxics TMDL Lake Water Quality Management Plan (LWQMP) (2014) was also used as a reference.

[4]Monitoring data from WD-1 receiving water monitoring site is also used to characterize discharges to Machado Lake.

## 2.3 Monitored Parameters, Frequency, and Duration of Monitoring

The constituents and frequencies of sample collection to meet the receiving water monitoring requirements of the Permit for the DCWMA Group are presented in Table 2-4. Analytical methods, detection limits, sampling methods and handling procedures, and details regarding the collection of QA/QC samples are provided in Attachment C. Included in Attachment C is a table outlining the SWAMP QAPP requirement and the location of the requirement in this CIMP.

For the purpose of predicting and determining a wet weather event for the purposes of monitoring the National Weather Service (NWS) rain gauge at the Hawthorne Airport will serve as the reference weather station for the DCWMA Group. Additional information to support evaluating weather conditions and targeting wet weather sampling events is provided in Attachment C.

## 2.4 Monitoring Coordination

The DCWMA Group receiving water monitoring program will be coordinated with the other agencies, CIMPs, and IMPs in order to enhance the efficiency and effectiveness of the monitoring programs within the DCWMA to the extent possible. Additionally, receiving water data collected from industrial waste Permittees or by the TIWRP will be reviewed and evaluated as part of the Adaptive Management (Section 10) to determine if there is a need to modify the monitoring within the DCWMA.

## 2.5 Receiving Water Monitoring Summary

The DCWMA Group selected 11 sites to fulfill the needs of the receiving water monitoring and TMDL monitoring programs (Table 2-4). An overview of the receiving water monitoring locations within the watershed as they related the DCWMA Group Cities is show in Figure 2-1, presented above.

Table 2-4 summarizes each of the monitoring locations and the specific parameters monitored for at each site. The implementation schedule for the various monitoring programs listed in Table 2-4 are discussed in Section 12. A detailed fact sheet on each location is provided in Attachment B. Detailed information on sampling and analytical methods is provided in Attachment C.

| Table 2-4: Constituents and Parameters Measured[1] | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Constituents** | **Channel** | **Estuary** | | **Lateral** | **Machado Lake** | | | | **Los Angeles Harbor** | | |
| **Site ID and Location** | **DOM-RW-DC01** | **DOM-RW-DCE01** | **DOM-RW-DCE02** | **DOM-RW-TL01** | **ML-1** | **ML-2** | **ML-3** | **WD-1** | **CB01** | **CB02** | **HW07** |
| | Dominguez Channel at 135th | Upper Dominguez Channel Estuary | Lower Dominguez Channel Estuary | Torrance Lateral at Hamilton Ave | Machado Lake, Upper | Machado Lake, Lower | Machado Lake, Middle | Wilmington Drain at PCH | Inner Cabrillo Beach, North End | Inner Cabrillo Beach, South End | Main Ship Channel |
| Water Column | | | | | | | | | | | |
| Flow and field parameters(2) | 3/2 | 2/1 | 2/1 | 2/1 | 0/26 | 0/26 | 0/3 | Phase 1: 3/0<br>Phase 2: 1 x 2yr/0 | 0/260 | 0/260 | 0/52 |
| Pollutants identified in Table E-2 of the MRP(3) and not otherwise addressed below | 1/1 (First year only) | | | | | | | 1/1 | | | |
| Aquatic Toxicity and Toxicity Identification Evaluation (TIE) | 2/1 | | | | | | | | | | |
| *E. Coli* | 3/2 | | | | | | | | | | |
| *Enterococcus,* Total Coliform, Fecal Coliform | | | | | | | | | 0/260 | 0/260 | 0/52 |
| Hardness | 3/2 | | | 2/1 | | | | | | | |
| TSS | 3/2 | | | 2/1 | | | | | | | |
| Copper (total + diss.) | 3/2 | | | 2/1 | | | | | | | |
| Lead (total + diss.) | 3/2 | | | 2/1 | | | | | | | |
| Selenium (total) | | | | | | | | | | | |
| Zinc (total + diss.) | 3/2 | | | | | | | | | | |

| Table 2-4: Constituents and Parameters Measured[1] | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Constituents** | **Channel** | **Estuary** | | **Lateral** | **Machado Lake** | | | | **Los Angeles Harbor** | | |
| **Site ID and Location** | **DOM-RW-DC01** | **DOM-RW-DCE01** | **DOM-RW-DCE02** | **DOM-RW-TL01** | **ML-1** | **ML-2** | **ML-3** | **WD-1** | **CB01** | **CB02** | **HW07** |
| | Dominguez Channel at 135th | Upper Dominguez Channel Estuary | Lower Dominguez Channel Estuary | Torrance Lateral at Hamilton Ave | Machado Lake, Upper | Machado Lake, Lower | Machado Lake, Middle | Wilmington Drain at PCH | Inner Cabrillo Beach, North End | Inner Cabrillo Beach, South End | Main Ship Channel |
| Mercury (total + diss.) | 3/2 | | | | | | | | | | |
| Chlordane[(4)], DDT[(5)], PCBs[(6)], and PAHs[(7)] | 3/2 | | | | | | 0/1 | | | | |
| Ammonia as N, Nitrate as N, Nitrite as N, Nitrate+Nitrite, Nitrogen (NO3-N+NO2-N) | 3/2 | | | | 0/26 | 0/26 | | 3/2 | | | |
| Total phosphorus, Orthophosphorus, Chlorophyll-a | | | | | 0/26 | 0/26 | | | | | |
| Secchi depth and lake elevation | | | | | 0/26 | 0/26 | | | | | |
| Bis(2-ethylhexyl)Phthalate | 3/2 | | | | | | | | | | |
| 2,3,7,8-TCDD (Dioxin) | 3/2 | | | | | | | | | | |
| Diazinon | 3/2 | | | | | | | | | | |
| Chloride | 3/2 | | | | | | | | | | |
| Sulfate | 3/2 | | | | | | | | | | |

| Table 2-4: Constituents and Parameters Measured[1] | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Constituents** | **Channel** | **Estuary** | | **Lateral** | **Machado Lake** | | | | **Los Angeles Harbor** | | |
| **Site ID and Location** | **DOM-RW-DC01** | **DOM-RW-DCE01** | **DOM-RW-DCE02** | **DOM-RW-TL01** | **ML-1** | **ML-2** | **ML-3** | **WD-1** | **CB01** | **CB02** | **HW07** |
| | Dominguez Channel at 135th | Upper Dominguez Channel Estuary | Lower Dominguez Channel Estuary | Torrance Lateral at Hamilton Ave | Machado Lake, Upper | Machado Lake, Lower | Machado Lake, Middle | Wilmington Drain at PCH | Inner Cabrillo Beach, North End | Inner Cabrillo Beach, South End | Main Ship Channel |
| TDS | 3/2 | | | | 0/1 | 0/1 | 0/1 | Phase 1: 3/0<br>Phase 2: 1 x 2yr/0 | | | |
| Cyanide | 3/2 | | | | | | | | | | |
| Suspended Sediment[8]: Copper, Lead, Zinc, Chlordane [4], DDT[5], PCBs[6], and PAHs[7] | 2/0 | | | 2/0 | | | | Phase 1: 3/0<br>Phase 2: 1 x 2yr/0 | | | |
| Bed Sediments | | | | | | | | | | | |
| Flow and field parameters[2] | | 0/(1x 5yr) | 0/(1x 5yr) | | 0/(1x 3yr) | 0/(1x 3yr) | 0/(1x 3yr) | 0/1 | | | |
| Copper | | 0/(1x 5yr) | 0/(1x 5yr) | | | | | | | | |
| Lead | | 0/(1x 5yr) | 0/(1x 5yr) | | | | | | | | |
| Zinc | | 0/(1x 5yr) | 0/(1x 5yr) | | | | | | | | |
| Chlordane [4], DDT[5], PCBs[6], and PAHs[7] | | 0/(1x 5yr) | 0/(1x 5yr) | | | | | | | | |
| Chlordane [4], DDT[5], and PCBs[6] | | | | | 0/(1x 3yr) | 0/(1x 3yr) | 0/(1x 3yr) | 0/1 | | | |
| Dieldrin | | | | | 0/(1x 3yr) | 0/(1x 3yr) | 0/(1x 3yr) | 0/1 | | | |
| TOC | | 0/(1x 5yr) | 0/(1x 5yr) | | 0/(1x 3yr) | 0/(1x 3yr) | 0/(1x3yr) | 0/1 | | | |
| Sediment Toxicity | | 0/(1x 5yr) | 0/(1x 5yr) | | 0/(1x 3yr) | 0/(1x 3yr) | 0/(1x 3yr) | 0/1 | | | |

| Table 2-4: Constituents and Parameters Measured[1] | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Constituents** | **Channel** | **Estuary** | | **Lateral** | **Machado Lake** | | | | **Los Angeles Harbor** | | |
| **Site ID and Location** | **DOM-RW-DC01** | **DOM-RW-DCE01** | **DOM-RW-DCE02** | **DOM-RW-TL01** | **ML-1** | **ML-2** | **ML-3** | **WD-1** | **CB01** | **CB02** | **HW07** |
| | Dominguez Channel at 135th | Upper Dominguez Channel Estuary | Lower Dominguez Channel Estuary | Torrance Lateral at Hamilton Ave | Machado Lake, Upper | Machado Lake, Lower | Machado Lake, Middle | Wilmington Drain at PCH | Inner Cabrillo Beach, North End | Inner Cabrillo Beach, South End | Main Ship Channel |
| Benthic Community | | 0/(1x 5yr) | 0/(1x 5yr) | | | | | | | | |
| Bioaccumulation[9] | | | | | | | | | | | |
| Chlordane [4], DDT[5], PCBs[6], and PAHs[7] | | 0/(1x 2yr) | 0/(1x 2yr) | | | | 0/(1x 3yr) | | | | |
| Dieldrin | | 0/(1x 2yr) | 0/(1x 2yr) | | | | | | | | |

Notes:

1. Annual frequency listed as number of wet-weather/dry-weather events per year, respectively (e.g., 3/2 signifies three wet weather and two dry weather events per year, 0/260 indicates zero wet weather and 260 dry weather events per year – 260 is 5 events per week for 52 weeks). Not all sampling occurs on an annual basis, these events are signified by including the yearly frequency (e.g. 1 x 3yr signifies one event every three years).
2. Field parameters are defined as DO, pH, temperature, and specific conductivity. For the Harbor and Estuary sites, tidal and water depth information will be collected in lieu of flow data. For the Machado Lake sites, water depth information will be collected in lieu of flow data.
3. Monitoring frequency only applies during the first year of monitoring. For pollutants identified in Table E-2 of the MRP that are not detected at the Method Detection Limit (MDL) or the result is below the lowest applicable water quality objective, additional monitoring will not be conducted (i.e., the monitoring frequency will become 0/0). For pollutants detected above the lowest applicable water quality objective, future monitoring will be conducted at the frequency specified in the MRP (i.e., the monitoring frequency will become 3/2).
4. Chlordane is defined as cis-Chlordane (alpha-Chlordane), trans-Chlordane (gamma-Chlordane), oxychlordane, cis-nonachlor, and trans-nonachlor.
5. DDT is defined as the sum of 2,4'-DDD, 2,4'-DDE, 2,4'-DDT, 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT.
6. Total PCBs are defined as the sum of Congeners when analyzed, refer to Attachment C.
7. PAHs include: acenaphthene, anthracene, biphenyl, naphthalene, 2,6-dimethylnaphthalene, fluorene, 1-methylnaphthalene, 2-methylnaphthalene, 1-methylphenanthrene, phenanthrene, benzo(a)anthracene, benzo(a)pyrene, benzo(e)pyrene, chrysene, dibenz(a,h)anthracene, fluoranthene, perylene, and pyrene.
8. Anticipated to be analyzed after each storm event utilizing the relationship between wet chemistry results of the aqueous sample and the suspended sediment concentration.
9. The only monitoring currently required for bioaccumulation is fish tissue.

# 3 MS4 Infrastructure Database

The objective of this section is to identify the components that address the CIMP requirements of the Outfall Based Monitoring requirement to provide the storm drains, channels, and outfall maps and/or database. The map and/or associated database will be updated annually to incorporate information for outfalls with significant NSW discharge.

## 3.1 Storm Drains, Channels and Outfalls Map and/or Database Requirements

Section VII.A of the MRP (Page E-20) requires that the CIMP include a map and/or database of the DCWMA Group MS4 to include the following information.

1. Surface water bodies within the Permittee(s) jurisdiction
2. Subwatershed (HUC 12 equivalent) boundaries
3. Land use overlay
4. Effective Impervious Area (EIA) overlay (if available)
5. Jurisdictional boundaries
6. The location and length of all open channel and underground pipes 18 inches in diameter or greater (with the exception of catch basin connector pipes)
7. The location of all dry weather diversions
8. The location of all major MS4 outfalls within the Permittee's jurisdictional boundary. Each major outfall shall be assigned an alphanumeric identifier, which must be noted on the map
9. Notation of outfalls with significant non-storm water discharges (to be updated annually)
10. Storm drain outfall catchment areas for each major outfall within the Permittee(s) jurisdiction
11. Each mapped MS4 outfall shall be linked to a database containing descriptive and monitoring data associated with the outfall. The data shall include:
    a. Ownership
    b. Coordinates
    c. Physical description
    d. Photographs of the outfall, where possible, to provide baseline information to track operation and maintenance needs over time
    e. Determination of whether the outfall conveys significant non-storm water discharges
    f. Storm water and non-storm water monitoring data

## 3.2 DC Watershed Management Area Group's Map and Database Information

The DCWMA Group has compiled the Geographic Information System (GIS) data for submittal with the CIMP.

Figure 3-1 is a map of the DCWMA Area that provides the following information.

1. Surface water bodies within the Permittee(s) jurisdiction
2. Subwatershed (HUC 12) boundaries
3. Land use overlay
4. Effective Impervious Area (EIA) overlay
5. Jurisdictional boundaries

## 3.3 Requirements Table and Schedule for Implementation

The DCWMA Group has conducted the mapping and database development for the storm drains, channels and outfalls. The information in the database will continually be updated as part of the implementation of the Storm Water and NSW Monitoring Programs of the CIMP.

The required components and how each component was addressed are presented in Table 3-1.

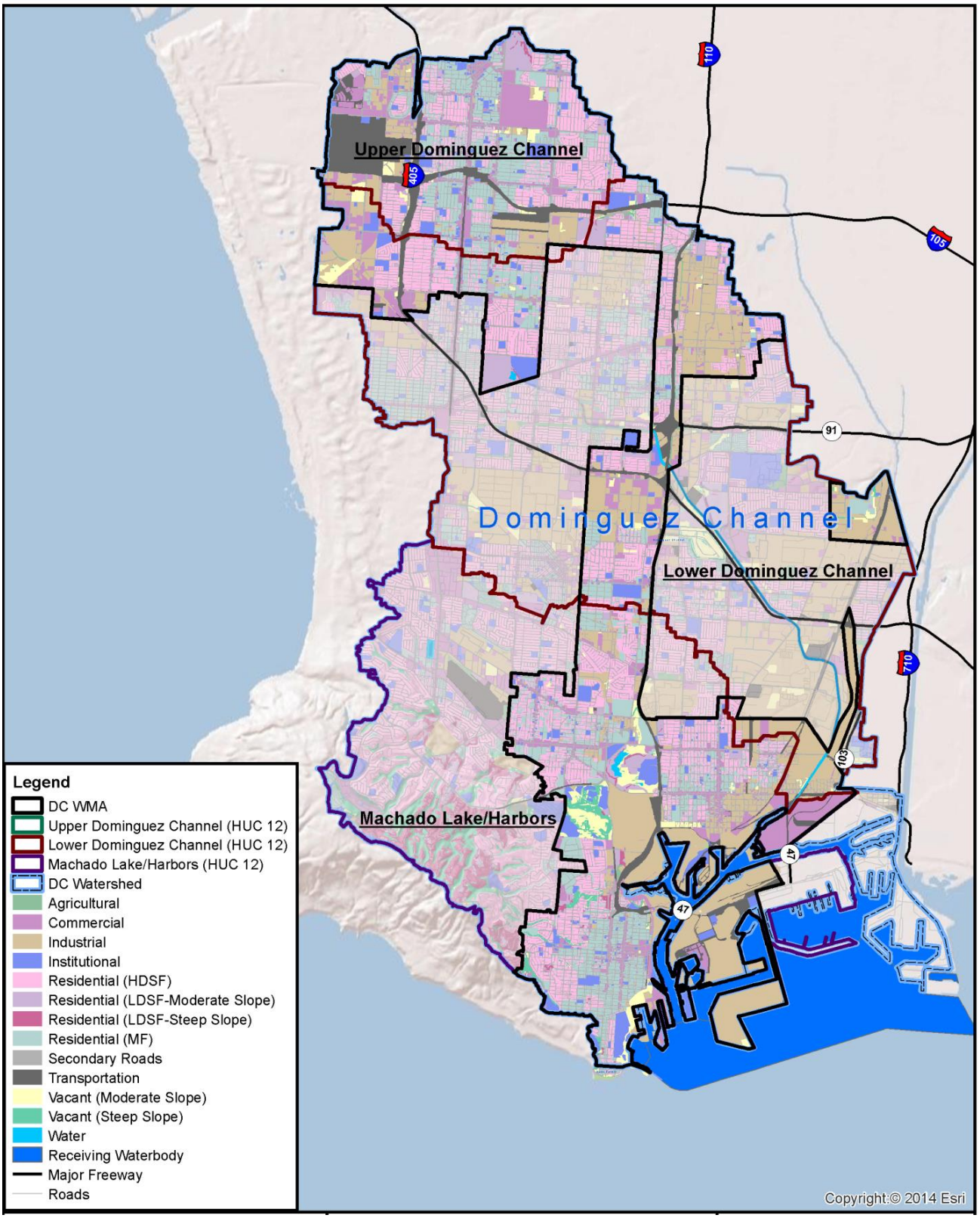


**Figure 3-1. Dominguez Channel Watershed Management Area with Land Use and HUC 12 Drainage Areas**

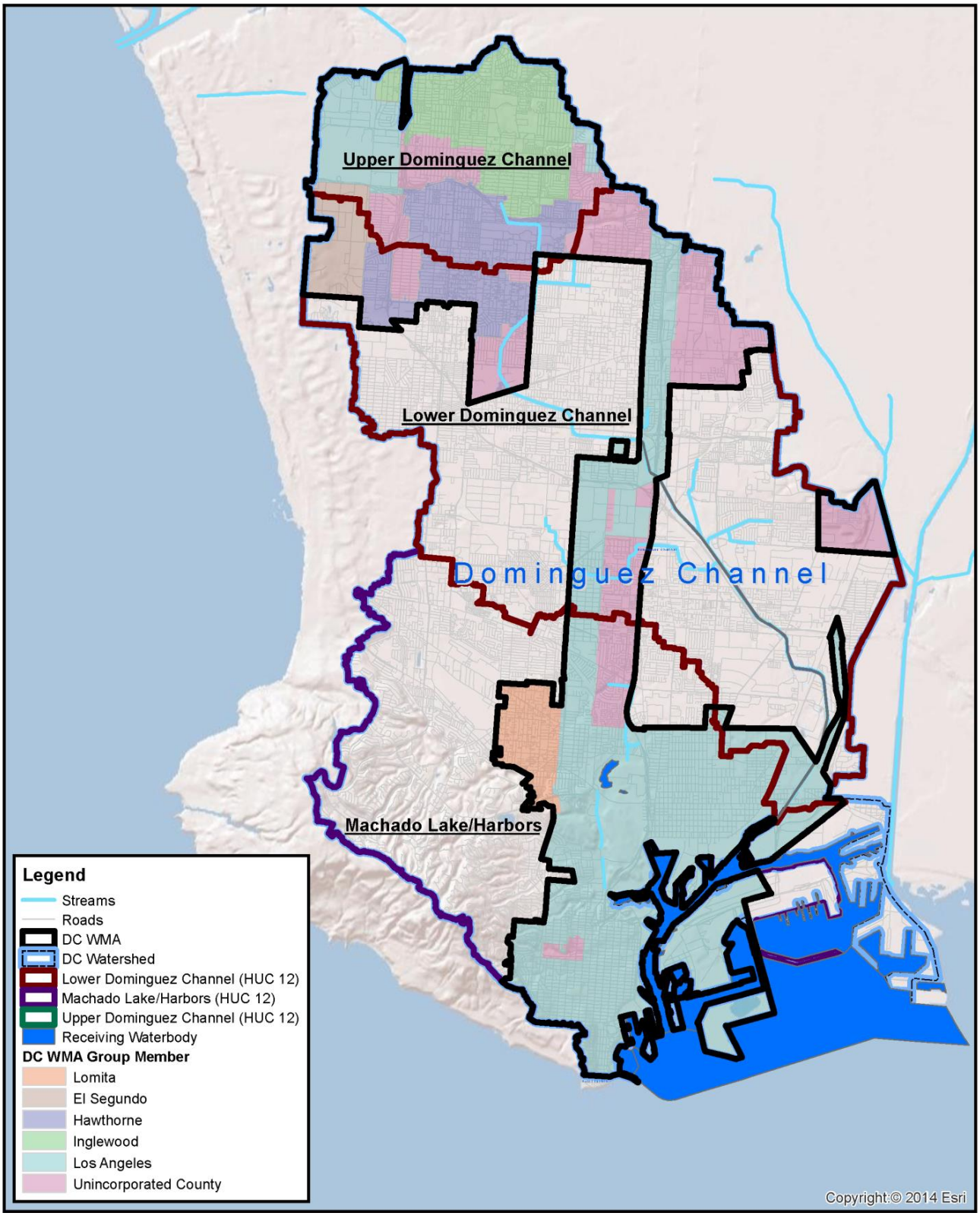


**Figure 3-2. Dominguez Channel Watershed Management Area with DCWMA Group and Jurisdictional Agencies**

| Table 3-1: Map and Database Status and Schedule | | | | |
|---|---|---|---|---|
| **#** | **Requirement** | **Status** | **Comment** | **Schedule** |
| **1** | Surface water bodies within the Permittee(s) jurisdiction | Complete | None | No updates anticipated |
| **2** | Subwatershed (HUC 12) boundaries | Complete | None | No updates anticipated |
| **3** | Land use overlay | Complete | Updated/revised land use data is periodically released | Update as needed |
| **4** | EIA overlay | Complete | Updated/revised land use data is periodically released | Update as needed |
| **5** | Jurisdictional boundaries | Complete | None | No updates anticipated |
| **6** | The location and length of all open channel and underground pipes 18 inches in diameter or greater (with the exception of catch basin connector pipes) | The current mapping includes all of the storm drain layers available | As part of the implementation, NSW Monitoring Program, any additional drains that are not mapped will be added and updated as part of the CIMP implementation | Update information obtained from the NSW Monitoring Program |
| **7** | The location of all dry weather diversions | Within the Dominguez Channel Watershed Management Area there are currently no dry weather diversions within the jurisdictional boundaries of the DCWMA Group | Any future dry weather diversions will be incorporated into the database | Update as needed |
| **8** | The location of all major MS4 outfalls within the Permittee's jurisdictional boundary. Each major outfall shall be assigned an alphanumeric identifier which must be noted on the map | Completed with known information | The locations of the major MS4 outfalls have been identified; however, additional field verification will be conducted as part of the implementation of the NSW Outfall Monitoring Program | Initial update by end of 2015 and as needed thereafter |

| Table 3-1: Map and Database Status and Schedule | | | | |
|---|---|---|---|---|
| **#** | **Requirement** | **Status** | **Comment** | **Schedule** |
| **9** | Notation of outfalls with significant non-storm water discharges (to be updated annually) | To be completed as part of CIMP implementation | Outfalls with significant NSW discharges will identified as part of the implementation of the NSW Outfall Monitoring Program of the CIMP (See Section 5) | Initial determination by end of 2015 and annually thereafter |
| **10** | Storm drain outfall catchment areas for each major outfall within the Permittee(s) jurisdiction | Outfalls were linked in the database to the modeling subwatersheds to provide information on the contributing areas | Detailed analysis of storm drain outfall catchment areas will be conducted for any new outfall monitoring locations, outfalls identified as having significant NSW discharges, and outfalls addressed by structural BMPs | Update as needed |
| **11** | Each mapped MS4 outfall shall be linked to a database containing descriptive and monitoring data associated with the outfall. The data shall include: | | | |
| **11.a** | Ownership | Complete | Ownership of outfalls, not previously included, identified during the NSW program (Section 5) will be incorporated into the database | Update as needed |
| **11.b** | Coordinates | Complete | Updates and any potential new data identified during the NSW program discussed in Section 5 will be incorporated into the database | Update as needed |
| **11.c** | Physical description | Complete | Updates and any potential new data identified during the NSW program discussed in Section 5 will be incorporated into the database | Update as needed |

| Table 3-1: Map and Database Status and Schedule | | | | |
|---|---|---|---|---|
| **#** | **Requirement** | **Status** | **Comment** | **Schedule** |
| **11.d** | Photographs of the outfalls to the MS4, where possible, to provide baseline information to track operation and maintenance needs over time | Field review of the outfalls were conducted and site photographs were taken within the DCWMA | Updates and any potential new photos identified during the NSW program discussed in Section 5 will be incorporated into the database | Update as needed |
| **11.e** | Determine if the outfall conveys significant NSW discharges | To be completed as part of CIMP implementation | Outfalls with significant NSW discharges will identified as part of the implementation of the NSW Outfall Monitoring Program of the CIMP (See Section 5) | Initial determination by end of 2015 and annually thereafter |
| **11.f** | Storm water and NSW monitoring data | To be completed as part of CIMP implementation | Storm water and NSW outfall monitoring data will be collected as part of the implementation of the SW/NSW Outfall Monitoring Program | Ongoing updates during CIMP Implementation |

# 4 Storm Water Outfall Monitoring Program

The objective of this section is to present the Storm Water Outfall Monitoring Program for the DCWMA Group. This Section is intended to satisfy the requirements of Section VIII (Page E-21) of the MRP.

The intent of the Storm Water Program is to meet the requirements of the Storm Water Outfall Program (Section II.E.3, Page E-4) outlined in the Monitoring and Reporting Program (Attachment E of the Permit) by achieving the following objectives:

a. Evaluate the quality of a Permittee's discharge relative to municipal action levels, as described in Attachment G of the Permit

b. Evaluate whether a Permittee's discharge is in compliance with applicable TMDL WLAs

## 4.1 Storm Water Outfall Monitoring Sites

Section VIII.A of the MRP requires that storm water discharges from the MS4 shall be monitored at outfalls or in channels at the jurisdictional boundaries of the DCWMA Group. In lieu of monitoring at the individual jurisdictional boundaries, the DCWMA Group selected five outfall monitoring sites that allow for the monitoring of discharges from the DCWMA Group to the receiving waters identified in Section 2. These sites have been selected by the coalition in order to meet the requirements of the respective outfall and TMDL Monitoring programs in the watershed management area. The Storm Water Outfall Monitoring Program will utilize two types of outfall sites:

6. Representative NPDES Storm Water Outfall Sites: Storm Water Outfall Sites were selected to meet all of the monitoring requirements identified in Section VIII.A of the MRP. . The NPDES Storm Water Outfall Sites represent the land uses throughout the DCWMA and their data will be generally representative of discharge conditions within the greater DCWMA.

7. TMDL Outfall Sites: TMDL Outfall Sites were selected to meet monitoring requirements specific to individual TMDLs.

An overview of the monitoring locations within the watershed as they relate to the DCWMA Group cities is provided in Figure 4-1.

### 4.1.1 NPDES Storm Water Outfall Sites

Storm water outfall sites were selected based on the following criteria and consistent with the requirements of Section VIII.A.2 of the MRP.

1. The catchment of the selected outfall is primarily collecting discharges from members of the DCWMA Group;

2. The land use in the catchment of the selected outfall is generally representative of the members of the DCWMA Group within the referenced HUC 12;

3. The outfall location was upstream of a receiving water monitoring station, which is either a ME station or TMDL monitoring site (See Section 2, Receiving Water Monitoring Program);

4. The site location provided channel geometry that is conducive to obtaining reliable flow measurements; and

5. The site location has sufficient working space to install sampling equipment and safe access for monitoring staff to operate and maintain sampling equipment.

Based on the criteria established above, the DCWMA Group identified the following three sites to be utilized as part of the NPDES Storm Water Outfall Monitoring Program:

- Outfall 1 (DOM-OF-001) – DDI 8 Outfall at Dominguez Channel upstream of DCWMA ME Station (Crenshaw and 132nd Street)
- Outfall 2 (DOM-OF-002) – PD 183 to Torrance Lateral (Vermont Ave south of Torrance Boulevard)
- Outfall 3 (DOM-OF-003) – Project 5246 and 74 to Dominguez Estuary (Vermont Ave. & 169th Street)
- Outfall 4 (DOM-OF-004) – Wilmington Drain at PCH

Attachment B presents fact sheets containing additional details on each of these sites.

### 4.1.2 TMDL Outfall Sites

The DCWMA Group will monitor two TMDL Storm Water Outfall locations that discharge into the Machado Lake as TMDL Outfall Sites. These monitoring stations are consistent with the City of Los Angeles' *Machado Lake Nutrients and Toxics TMDL Lake Water Quality Management Plan* (LWQMP) dated September 6, 2013. In addition, Outfall 2 and Outfall 3 will be used as monitoring locations for the Dominguez Channel Toxics TMDL

- Outfall 2 (DOM-OF-002) – PD 183 to Torrance Lateral (Vermont Ave south of Torrance Boulevard)
- Outfall 3 (DOM-OF-003) – Project 5246 and 74 to Dominguez Estuary (Vermont Ave. & 169th Street)
- Outfall 4 (DOM-OF-004) – Wilmington Drain at Pacific Coast Highway
- P-77 – Project 77 Drain at Machado Lake
- P-510 – Project 510 Drain at Machado Lake

Attachment B presents fact sheets containing additional details on each of these sites.

## 4.2 Monitored Parameters, Frequency, and Duration

The constituents and monitoring frequencies to meet the storm water outfall monitoring requirements of the MRP (Section VIII.B) and the TMDL outfall monitoring requirements are presented in Table 4-2. This list was generated from the current list of constituents monitored during wet weather in the receiving waters and will be updated as the constituents monitored during wet weather in the waterbody to which they discharge, as well as downstream waterbodies, are updated and/or based upon the data collected at the individual outfall site. Analytical methods, detection limits, sampling methods and handling procedures are detailed in Attachment C. In addition, details regarding the collection of QA/QC samples are outlined in Attachment C.

Monitoring of storm water discharges shall occur during wet weather conditions resulting from the first rain event of the year and at least two additional wet weather events within the same wet weather season. The DCWMA Group will target the first storm event of the storm year (with peak rainy season typically occurring October through April) with a predicted rainfall of at least 0.25 inch at a 70-percent probability of rainfall at least 24 hours prior to the event start time. Sampling events shall be separated by a minimum of three days of dry conditions (less than 0.1 inch of rain for each day).

For the determination of a wet weather event for the purposes of monitoring the National Weather Service (NWS) forecasts and rain gauge at the Hawthorne Airport will serve as the reference weather station for the DCWMA Group.

## 4.3 Storm Water Outfall Monitoring Summary

The DCWMA Group selected five outfall monitoring sites to fulfill the needs of the NPDES and TMDL outfall monitoring and TMDL Monitoring programs. A summary of how the storm water outfall monitoring program meets the intended objectives of the storm water outfall monitoring program outlined in Part VIII.A of the MRP is presented in Table 4-1. The schedule for implementing storm water outfall monitoring is presented in Section 12.

**Table 4-1: Summary of Storm Water Outfall Monitoring Program Objectives**

| Objective | CIMP Component Meeting Objective |
|---|---|
| Determine the quality of a Permittee's discharge relative to municipal action levels, as described in Attachment G of MS4 Permit. | • Storm water outfall monitoring sites chosen using a representative land use approach.<br>• Storm water outfall monitoring sites chosen to be representative of the land uses of the HUC 12s in the EWMP area.<br>• Extensive list of constituents being collectively monitored at storm water outfall monitoring sites. |
| Determine whether a Permittee's discharge is in compliance with applicable WQBELs derived from TMDL WLAs. | • Storm water outfall monitoring sites located in waterbodies with applicable WQBELs.<br>• Storm water outfall monitoring sites chosen using a representative land use approach.<br>• List of constituents based on the water quality priorities which includes constituents with WQBELs derived from TMDL WLAs. |
| Determine whether a Permittee's discharge causes or contributes to an exceedance of RWLs. | • One storm water outfall monitoring site located in each waterbody.<br>• Monitoring frequency equal to receiving water monitoring frequency to enable determination of whether the Permittee's discharge is causing or contributing to any observed exceedances of water quality objectives in the receiving water.<br>• Storm water outfall monitoring sites chosen using a representative land use approach.<br>• List of constituents based on the monitoring requirements of the waterbody to which they discharge, as well as downstream waterbodies. |

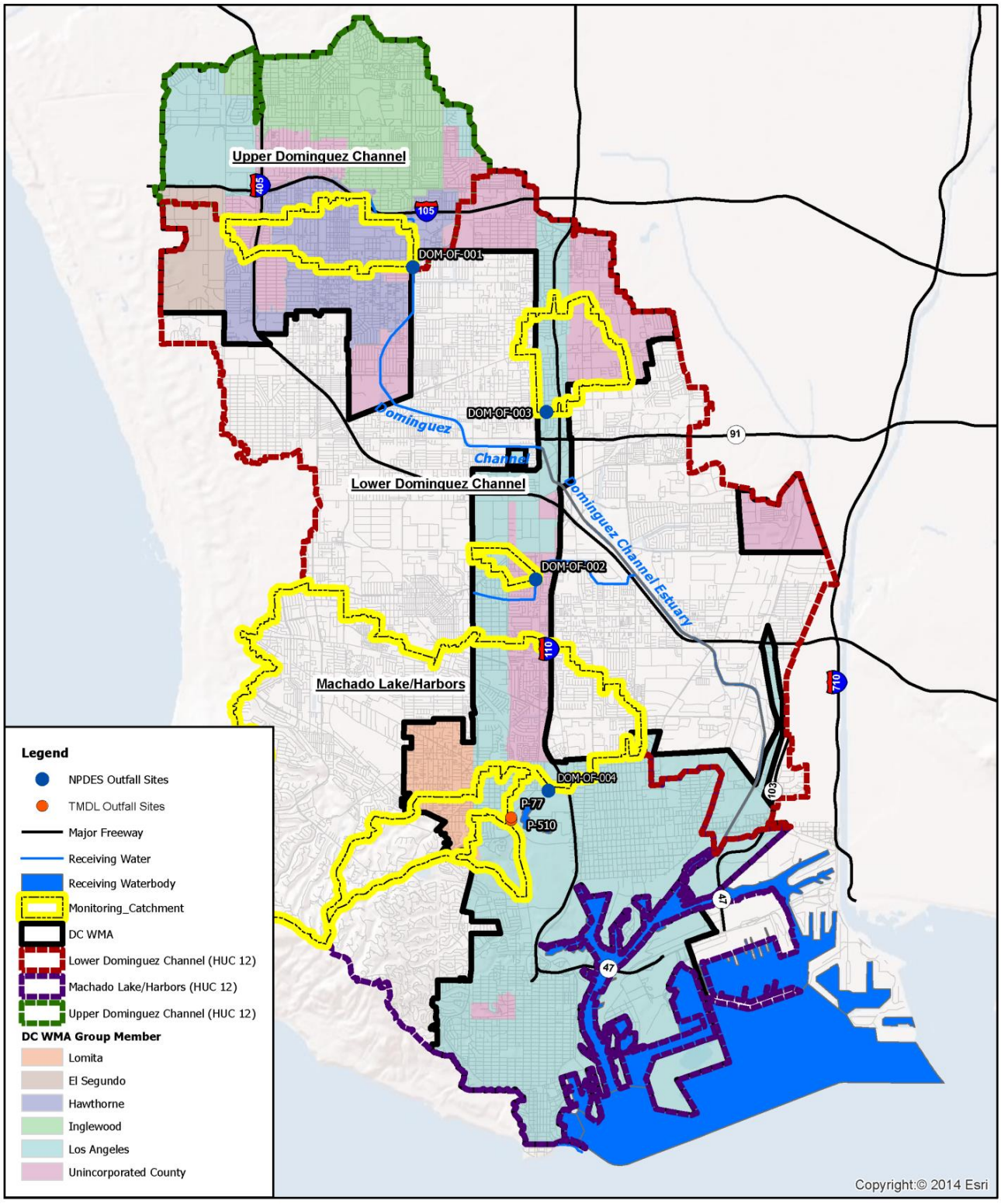


**Figure 4-1. DCWMA Group Storm Water Outfall Monitoring Sites**

| Table 4-2: List of Constituents for NPDES and TMDL Storm Water Outfall Monitoring | | | | | | |
|---|---|---|---|---|---|---|
| **Constituent** | **HUC 12 Drainage Area** | | | | | |
| | **Upper HUC 12** | **Lower HUC 12** | | **Machado Lake/Harbors HUC 12** | | |
| | **DOM-OF-001** | **DOM-OF-002** | **DOM-OF-003** | **DOM-OF-004** | **P-77** | **P-510** |
| **Site ID** | DDI 8 Outfall at Dominguez Channel (Crenshaw and 132nd St) | PD 183 to Torrance Lateral (Vermont Ave S/o Torrance Blvd) | Project 5246/74 to Dominguez Estuary (Vermont Ave. & 169th Street) | Wilmington Drain at PCH | Project 77 | Project 510 |
| Frequency | 3x/year | | | | | |
| Flow, hardness, pH, dissolved oxygen, temperature, specific conductivity, TSS and SSC | ● | ● | ● | ● | ● | ● |
| Table E-2 pollutants detected above relevant objectives and not otherwise addressed below | ● | ● | ● | ● | | |
| Copper, Lead, Zinc | ● | ● | ● | | | |
| Chlordane [(1)], DDT[(2)], PCBs[(3)], and PAHs[(4)] | ● | ● | ● | ● | | |
| Ammonia as N, Nitrate as N, Nitrite as N, Nitrate+Nitrite, Nitrogen (NO3-N+NO2-N) | | | | ● | ● | ● |
| TOC and Dieldrin | | | | ● | | |
| Suspended Sediment[(5)]: Chlordane [(1)], DDT[(2)], PCBs[(3)], and PAHs[(4)] | ● | ● | ● | ● | ● | ● |
| Suspended Sediment[(5)]: Copper, Lead, and Zinc | ● | ● | ● | | | |

1. Chlordane is defined as cis-Chlordane (alpha-Chlordane), trans-Chlordane (gamma-Chlordane), oxychlordane, cis-nonachlor, and trans-nonachlor.
2. DDT is defined as the sum of 2,4'-DDD, 2,4'-DDE, 2,4'-DDT, 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT.
3. PCBs are defined as the sum of Congeners when analyzed in water, refer to Attachment C.
4. PAHs include: acenaphthene, anthracene, biphenyl, naphthalene, 2,6-dimethylnaphthalene, fluorene, 1-methylnaphthalene, 2-methylnaphthalene, 1-methylphenanthrene, phenanthrene, benzo(a)anthracene, benzo(a)pyrene, benzo(e)pyrene, chrysene, dibenz(a,h)anthracene, fluoranthene, perylene, and pyrene.
5. Anticipated to be analyzed after each storm event utilizing the relationship between wet chemistry results of the aqueous sample and the suspended sediment concentration.

# 5 Non-Storm Water Outfall Program

The objective of this section is to present the method for the NSW outfall screening and monitoring component of the CIMP for the DCWMA Group. The NSW Outfall Monitoring Program is a major component of the MRP and is intended to be a collaborative effort between all of the agencies in the DCWMA Group. The NSW outfall monitoring program component is intended to enhance the existing permit required programs that include LACFCD's efforts under the IC/ID Program to detect, investigate, and eliminate the IC/IDs to the MS4, pursuant to Part VI.D.4.d and the responsibilities of the County of Los Angeles and the Cities of El Segundo, Hawthorne, Inglewood, and Los Angeles under Part VI.D.10 of the Permit.

The NSW Monitoring Program is comprised of the following elements.

1. Identification of Outfalls with Significant NSW Discharge
2. Inventory of MS4 Outfalls with NSW Discharge
3. Prioritized Source Identification
4. Identification of Sources of Significant NSW Discharge
5. Monitoring of Significant NSW Discharges Exceeding Criteria

## 5.1 Objectives of the NSW Program

The intent of the NSW Program is to meet the requirements of the NSW Outfall Program (Section II.E.3, Page E-4) outlined in the MRP of the Permit by achieving the following objectives:

a. Evaluate whether a Permittee's discharge is in compliance with applicable non-storm water TMDL WLAs.

b. Evaluate whether a Permittee's discharge exceeds non-storm water action levels, as described in Attachment G of the Permit.

c. Assist the Permittee in identifying illicit discharges as described in Sections VI.D.4.d and VI.D.10 of the Permit.

## 5.2 Approach Overview

The approach to addressing NSW discharges is to implement a programmatic approach to identifying non-storm water discharges and determining if the discharge is a persistent and significant non-permitted discharge that affects the quality of the downstream receiving water and as such, is a significant NSW discharge. Figure 5-1 illustrates the process by which these discharges are evaluated and incorporated into the NSW Program. Table 5-1 provides the required program components of the NSW Program and the relative timing required.

In order to address significant NSW discharges in the watershed, a progressive approach consisting of visual inspections, investigations, and evaluations combined with the existing IC/ID enforcement framework that exists for industrial waste dischargers will be used. This process will be a multi-step procedure to categorize outfall sites for their potential for persistent and significant discharge that may affect the water quality of the downstream receiving water body during dry weather. The initial identification of outfalls with significant non-storm water discharges will be utilize screening based on visual observations (at least three visual surveys) and recorded observational data. The location of

these outfalls will be compared against the known permitted discharges in order to eliminate those outfalls from further screening. If necessary, the DCWMA Group may follow up with the permitted dischargers through the existing Industrial Waste permit framework to confirm that the discharge is meeting permit requirements. For other discharges, the agencies would utilize the existing IC/ID investigation framework to track down the source of the non-permitted discharge. The information from the investigation would be used to address illicit discharges. Once the source is determined, or determined to be unknown, and cannot be eliminated the next step will consist of monitoring, and an assessment of impacts to downstream receiving waters based on the monitoring results. This stage would use a combination of flow monitoring and analytical chemistry to assess the pollutant loading contributed by the site. If the site is found to be contributing to an exceedance, the DCWMA Group or the jurisdiction will address the non-storm water discharge through the EWMP.

All of the information collected will be recorded and updated in the MS4 database (See Section 3 - MS4 Database).

**Table 5-1: NSW Outfall Program Summary Table**

| NSW Program Component | Description | Timing of Completion |
|---|---|---|
| 1. Outfall Screening | In order to implement the NSW Outfall Program, the DCWMA Group will implement a screening process to identify outfalls that exhibit significant NSW discharges and those that do not. | Prior to initiating source investigations |
| 2. Develop Inventory of NSW Outfalls with discharge | An inventory will be developed of major MS4 outfalls with known significant NSW discharges and those requiring no further assessment. | |
| 3. Develop Prioritization Criteria | Based on data collected during the Outfall Screening process, the DCWMA Group will identify MS4 outfalls with significant NSW discharges and those requiring no further action. | |
| 4. Prioritized source investigation | The data collected as part of the Outfall Screening process will be used to prioritize outfalls for source investigations. | |
| 5. Identify sources of significant NSW discharges | For outfalls exhibiting significant NSW discharges, source investigations per the established prioritization. | Source investigations will be conducted for 25% of the outfalls with significant NSW discharges by December 28, 2015 and 100% by December 28, 2017. |
| 6. Monitor NSW discharges exceeding criteria | The DCWMA Group will monitor outfalls that have been determined to convey significant NSW discharges comprised of either unknown or non-essential conditionally exempt NSW discharges, or continuing discharges attributed to illicit discharges. | Monitoring will commence after completion of source investigations. |

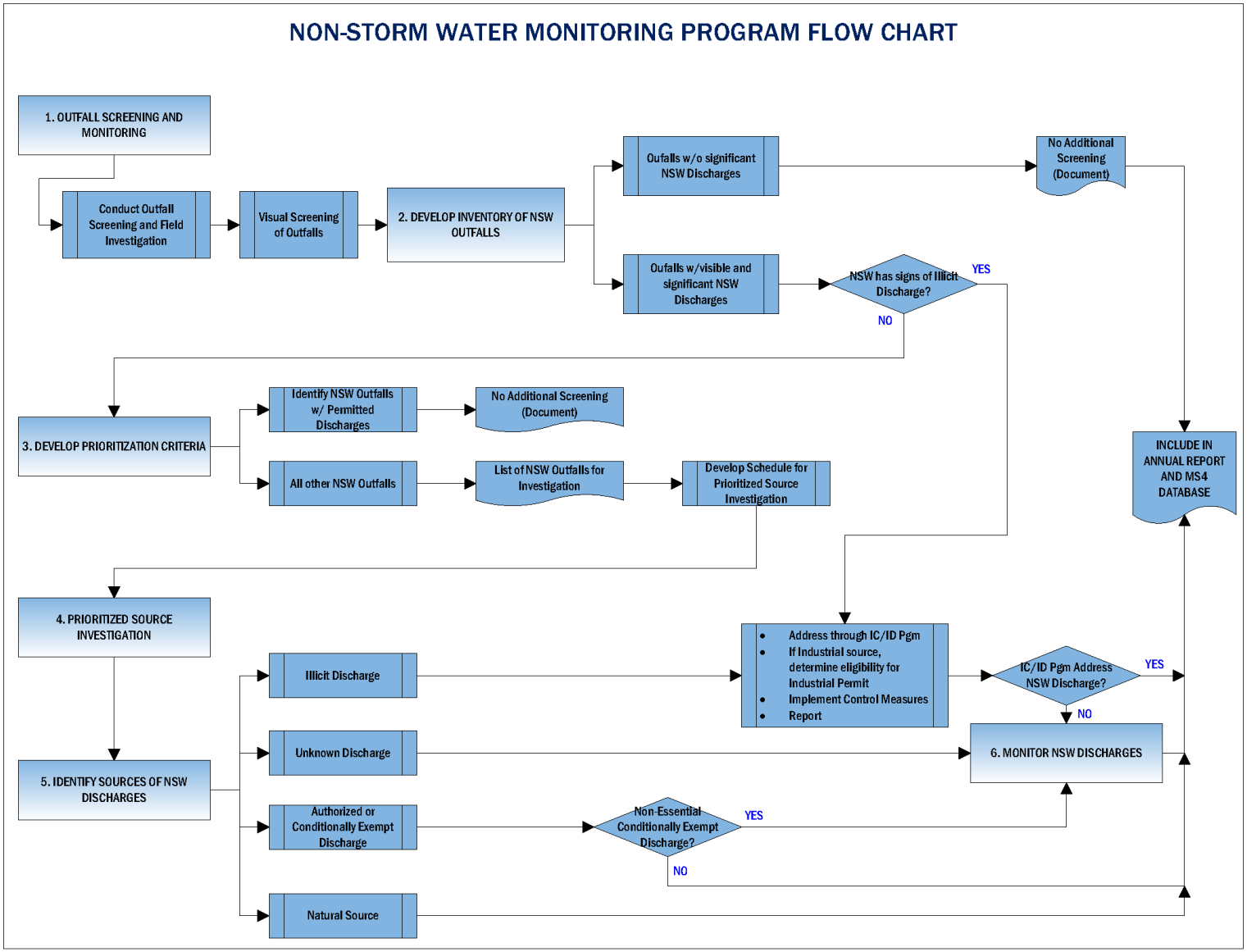


**Figure 5-1. NSW Monitoring Program Process Chart**

## 5.3 NSW Outfall Screening and Monitoring Program

In order to determine significant non-storm water discharges, an initial screening process must be conducted. The screening process will consist of both a GIS map screening and a field screening. To date, the following GIS and preliminary field screening of outfalls within the jurisdictional boundaries has been conducted during CIMP development to support implementation of the initial screening process:

### 5.3.1 GIS Database (Section 3 - MS4 Database)

Section VII.A of the MRP requires that the DCWMA Group CIMP include a map or database of the MS4 system. The DCWMA Group developed a GIS database and map which included jurisdictional boundaries, HUC 12 drainage areas, watershed boundaries, storm drains, channels, water bodies, and roads. The location of the outfalls were identified based on the point of intersection to any open channel or surface water body. These files were compiled into a single geodatabase to create a central location of information.

### 5.3.2 Preliminary Field Screening of Outfalls

A preliminary field screening of outfalls was conducted by the DCWMA Group during CIMP development to collect information and take site photographs at each location visited. After field work was completed, collected data and photos were uploaded to the geodatabase.

## 5.4 Identification of Outfalls with Significant NSW Discharge

From the MRP (Part IX.C.1), the following characteristics are applicable to the DCWMA and may be used to determine significant NSW discharges:

1. Discharges exceeding a proposed threshold discharge rate as determined by the Permittee(s).
2. Other characteristics as determined by the Permittee(s) and incorporated within the screening program. These characteristics include, but are not limited to,
    a. Flow data,
    b. Turbidity data, and
    c. COCs identified by TMDLs and 303d listings.

As part of the implementation of this CIMP, the DCWMA Group will conduct additional field screening of outfalls, collect field information, and visually verify the presence and persistence of non-storm water discharge from the outfalls that stem from the DCWMA Group. In-situ field measurements (using either probes and/or field kits) will also be collected during the screening process. Based on the data collected, the DCWMA Group will evaluate the data and establish criteria to determine what classifies as a significant NSW discharge.

## 5.5 Inventory of MS4 Outfalls with NSW Discharge

An inventory of MS4 outfalls will be completed identifying those outfalls with known significant NSW discharges and those requiring no further assessment (Part IX.D of the MRP). If the MS4 outfall requires no further assessment, the inventory will incorporate the rationale for the determination of

no further action required. Potential rationale for a determination of no future action could include the following criteria:

1. The outfall does not have flow;
2. The outfall does not have a known significant NSW discharge; or
3. Discharges observed were determined to be exempted

The inventory will be recorded in the database required in Part VII.A of the MRP (See Section 3, MS4 Database). Each year, the inventory will be updated to incorporate the most recent characterization data for outfalls with significant NSW discharges.

## 5.6 Prioritized Source Identification

Once the major outfalls exhibiting significant NSW discharges have been identified through the screening process and incorporated into the inventory, the outfalls will be prioritized by the DCWMA Group for further source investigations. The Permit identifies the following prioritization criteria that apply to the DCWMA for outfalls with significant NSW discharges in Part IX.E.1 of the MRP:

a. All major outfalls and other outfalls that discharge to a receiving water subject to a TMDL shall be prioritized according to TMDL compliance schedules.

b. Outfalls for which monitoring data exist and indicate recurring exceedances of one or more of the Action Levels identified in Attachment G of the Permit.

c. All other major outfalls identified to have significant NSW discharges.

Once the prioritization is completed, a prioritized source identification listing and schedule will be developed and submitted to the LARWQCB for approval during the first year of the DCWMA CIMP implementation. Since the number of priority outfalls with significant NSW discharges is not known, the DCWMA Group will conduct the Prioritized Source Investigation as provided in Table 5-2 below.

| **Table 5-2: NSW Outfall Program Schedule Overview** |
|---|
| **YEAR 1 ACTIVITIES (following approval of the CIMP)** |
| 1. Outfall Screening<br>2. Develop Inventory of NSW Outfalls<br>3. Develop Prioritization Criteria and Schedule for Prioritized Source Investigation |
| **YEAR 2-3 ACTIVITIES** |
| 4. Conduct Prioritized Source Investigation<br>5. Identify Sources of NSW Discharges<br>6. Monitor NSW Discharges |
| **Source Investigation Schedule** |
| • **Year 2** - Source Investigation of 50% of the NSW outfalls<br>• **Year 3** – Source Investigation of 100% of the NSW outfalls |

Based on the visual observations conducted during field screening, the follow up GIS analysis, or other pertinent information, both the source identification prioritization criteria and scheduling may be revised and updated by the DCWMA Group upon completion of the first year of implementation of the NSW Screening and Outfall Program.

## 5.7 Identify Sources of Significant NSW Discharge

Based on the results of the Prioritized Source Investigation, if the source is determined to be an illicit discharge, each member of the DCWMA Group that has jurisdiction of the catchment area will implement procedures to eliminate the discharge consistent with IC/ID requirements and document the actions in the next Annual Report.

If the source is determined to be an NPDES permitted discharge, a discharge subject to a Record of Decision approved by USEPA pursuant to section 121 of Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), a conditionally exempt essential non-storm water discharge, or entirely comprised of natural flows as defined at Part III.A.d of the Permit, the DCWMA Group will document the source and report to the LARWQCB in the next Annual Report. In addition, if during the review of the data on these discharges, if it is determined that they are found to cause or contribute to receiving water impairment the DCWMA Group (or the Group's representative) will report the findings to the LARWQCB within 30 days.

If the source is determined to originate from upstream of the DCWMA Group's jurisdictional boundaries, the DCWMA Group will notify the LARWQCB and that jurisdiction within 30 days of determination.

## 5.8 Monitor NSW Discharge Exceeding Criteria

Within 90 days after completing the source identification, the DCWMA Group will monitor those outfalls that have been determined to convey significant NSW discharges comprised of unknown discharges, or continuing discharges attributed to illicit discharges. The following parameters will be monitored:

a. Flow

b. General Water Chemistry (pH, Dissolved Oxygen, Turbidity, Conductivity, and Temperature)

c. Additional pollutants that will be monitored are provided in Table 5-3. This list was generated from the current list of constituents monitored during dry weather in the receiving waters and will be updated as the constituents monitored during dry weather in the waterbody to which they discharge, as well as downstream waterbodies, are updated and/or based upon the data collected at the individual outfall site.

d. Pollutants identified in a TIE conducted in response to observed aquatic toxicity during dry weather at the nearest downstream receiving water monitoring station during the last sample event or, where the TIE conducted on the receiving water sample was inconclusive, aquatic toxicity. If the discharge exhibits aquatic toxicity, then a TIE shall be conducted.

e. Other parameters in Table E-2 identified as exceeding the lowest applicable water quality objective in the nearest downstream receiving water monitoring station per Part VI.D.l.d.

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

For the purposes of this program, and per the MRP, Part IX.H, NSW discharges shall be monitored during dry weather on days when precipitation is < 0.1 inch, and not within the following three days after a rain event. Flow-weighted composite samples shall be taken using a continuous sampler, or it

shall be taken as a combination of a minimum of 3 sample aliquots, taken in each hour during a 24-hour period, unless the Regional Water Board Executive Officer approves an alternate protocol.

Monitoring data will be collected from the discharge from at least two separate events, upon evaluation of the monitoring results additional sampling may be required to make a full assessment. The monitoring data collected will be evaluated to determine if discharges are causing or contributing to downstream receiving water impacts. Based on the outcome of this evaluation, subsequent actions will be assigned and assessed.

**Table 5-3: List of Constituents for Non-Storm Water Outfall Monitoring**

| Water Body | Category 1 | Category 2 |
|---|---|---|
| **Dominguez Channel (lined portion above Vermont Ave)** | Copper (diss.), Lead (diss.), Zinc (diss.) | Indicator Bacteria, Ammonia, Diazinon |
| **Torrance Lateral** | Copper (diss.), Lead (diss.), Zinc (diss.) | Coliform Bacteria |
| **Dominguez Estuary (unlined portion below Vermont)** | Copper (diss.), Lead (diss.), Zinc (diss.) | Ammonia, Coliform Bacteria |
| **Machado Lake** | Total Phosphorus, Total Nitrogen, Ammonia, Chlorophyll-a, Dissolved Oxygen | *None* |
| **Wilmington Drain** | *None* | Coliform Bacteria, Copper (diss.), Lead (diss.) |
| **LA Harbor – Cabrillo Marina** | Copper, Lead, Zinc, PAHs | *None* |
| **LA Harbor – Inner Cabrillo Beach** | Indicator Bacteria, Copper, Lead, Zinc, PAHs | *None* |

## 5.9 Non-Storm Water Outfall Monitoring Program Summary

The NSW Outfall Monitoring Program is intended to enhance the efforts of DCWMA Group's efforts to meet the requirements of the IC/ID Program to detect, investigate, and eliminate the IC/IDs to the MS4, pursuant to Part VI.D.4.d and Part VI.D.10 of the Permit.

The NSW Monitoring Program proposed under the DCWMA CIMP is comprised of the following components.

1. Identification of Outfalls with Significant NSW Discharge
2. Inventory of MS4 Outfalls with NSW Discharge
3. Prioritized Source Identification
4. Identify Sources of Significant NSW Discharge
5. Monitor NSW Discharge Exceeding Criteria

Historically, in the DCWMA, there has been limited outfall screening and monitoring efforts to identify, evaluate and assess NSW discharges from which to build the more comprehensive program from. In order to develop the most effective approach, a comprehensive effort will be conducted to screen the outfalls within the DCWMA, develop the most appropriate method for determining which outfalls have significant NSW discharge and prioritization, conduct source investigation, and monitor significant NSW discharges. As a result, a phased approach towards achieving these goals will be implemented. This approach will progress towards identifying and reducing NSW discharges in the DCWMA.

As stated in Section 10 Adaptive Management, as the NSW Monitoring program is implemented, the DCWMA Group will update the LARWQCB with the inventory of prioritized NSW outfalls, source investigation efforts, and discharge monitoring efforts. Analytical methods, detection limits, sampling methods and handling procedures are detailed in Attachment C. In addition, details regarding the collection of QA/QC samples are outlined in Attachment C.

# 6 New Development/Re-Development Effectiveness Tracking

The objective of this section is to present an overview of the requirements for the New Development/Redevelopment Effectiveness Tracking Component of the CIMP for the DCWMA Group. Due to the complexity of land development processes across jurisdictions, data management and tracking procedures will vary by jurisdiction. The DCWMA Group members will each individually develop a complete tracking system that works for their individual needs and internal processes and meets the requirements of the Permit.

## 6.1 Program Objectives

The objectives of the New Development/Redevelopment effectiveness tracking, as stated in the MRP, is to track whether the conditions in the building permit issued by the Permittee(s) 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 (Section II.E.4, Page E-5) .

To meet the MRP requirements of Permit Attachment E, Part X.A, each member of the DCWMA Group will need to maintain an informational database record for each new development/re-development project subject to the minimum control measure (MCM) requirements in Part VI.D.7 of the Permit and their adopted LID Ordinance.

## 6.2 Existing New Development/Re-Development Tracking Procedures

The DCWMA Group will collect essential information as such as the project name, developer name, project location, date of certificate of occupancy, and project conditions of approval or the information previously collected under the 2001 MS4 Permit for Standard Urban Stormwater Mitigation Plan (SUSMP) requirements.

## 6.3 Special Considerations for Data Management and Reporting

### 6.3.1 Data Management

The DCWMA Group will coordinate the Data Management and Reporting efforts to minimize interagency variability and promote the collection of consistent high quality data for reporting and assessment in the group new development/re-development tracking program report.

### 6.3.2 Additional Data

Development review processes generally consist of the following similar steps:

- Planning - Project proponents submit an application to agency planning department to determine whether or not the project meets jurisdictional requirements. The project may require a public hearing for conditions and entitlements. Project conditions may include water quality, flow control/volume reduction or hydromodification management related requirements.
- Building - Projects may be subject to engineering, community services, or building department review and approval of plans or technical reports. During review, required water quality BMP designs are reviewed and accepted. When a building and/or grading permit is issued, project construction usually proceeds without further discretionary approvals.
- Construction - During construction, approved BMPs are implemented then verified by the jurisdiction's inspector prior to issuance of a Certificate of Occupancy.
- Post-Construction Inspections - Once constructed, inspection and verification of maintenance is transferred to the jurisdiction's water quality program manager.

Relevant project data is collected during each phase of the development review process described above. Table 6.1 illustrates data collection that will occur throughout the planning, building, construction and post-construction inspection processes.

**Table 6-1: Development Review Process and Data Collection**

| Stage | Process | Data Collection |
|---|---|---|
| **Planning** | Planning review, conditions and entitlements | Project name |
| | | Developer name |
| | | Location/Map |
| | | Documentation of issuance of requirements |
| **Building** | Engineering review and approval of plans and technical reports | 85th and 95th percentile storm event criteria |
| | | Other hydromodification management requirements |
| | | Project design storm intensity and volume |
| | | Percent of design storm volume retained onsite |
| | | Design volume for treatment BMPs |
| | | One-year/one-hour storm intensity |
| | | Percent of design storm infiltrated offsite |
| | | Percent of design storm retained/treated with biofiltration offsite |
| | | Location/Maps of offsite mitigation |

| Table 6-1: Development Review Process and Data Collection | | |
|---|---|---|
| **Stage** | **Process** | **Data Collection** |
| **Construction** | Approval of BMP construction and issuance of Certificate of Occupancy | Issuance date of Certificate of Occupancy |
| **Post-Construction Inspections** | Inspection and tracking of post-construction BMPs | Inspection and maintenance dates |

### 6.3.3 Reporting

The DCWMA Group data collection template for New Development and Redevelopment will provide information to assist with the annual reporting. The DCWMA Group will develop standard collection templates that include the information to be tracked for each project and is presented in Tables 6.2 and 6.3.

| Table 6-2: Required Data to Track for New Development and Re-Development Projects Per Attachment E.X.A | |
|---|---|
| **Subject to Part VI.D.7, as per Attachment E.X.A.** | |
| Name of the Project | Project design storm volume (gallons or MGD) |
| Name of the Developer | Percent of design storm volume to be retained onsite |
| Project location and map[1] | Design volume for water quality mitigation treatment BMPs (if any) |
| Date of Certificate of Occupancy | One year, one hour storm intensity[2] (if flow through treatment BMPs are approved) |
| 85th percentile storm event for the project design (inches per 24 hours) | Percent of design storm volume to be infiltrated at an offsite mitigation or groundwater replenishment site |
| 95th percentile storm event for projects draining to natural water bodies (inches per 24 hours) | Percent of design storm volume to be retained or treated with biofiltration at an offsite retrofit project |
| Other design criteria required to meet hydromodification requirements for drainages to natural water bodies | Location and maps of offsite mitigation, groundwater replenishment, or retrofit sites1 |
| Project design storm (inches per 24 hours) | Documentation of issuance of requirements to the developer |

[1] Preferably linked to the GIS storm drain map.

[2] As depicted on the most recently issued isohyetal map published by the Los Angeles County hydrologist.

| Table 6-3: Required Data to Track for New Development and Re-Development Projects Per Part VI.D.7.d.iv | |
|---|---|
| **Conditioned with Post Construction BMPs, as per Part VI.D.7.d.iv.(1)(a)** | |
| Municipal Project ID | Maintenance Records |
| State WDID Number | Inspection Date(s) |
| Project Acreage | Inspection Summary(ies) |
| BMP Type and Description | Corrective Action(s) |
| BMP Location (coordinates) | Date Certificate of Occupancy Issued |
| Date of Acceptance | Replacement or Repair Date |
| Date of Maintenance Agreement | |

Annual Assessment and Reporting requirements to be included in an annual report are outlined in Part XVIII.A.1 through A.7 of the MRP.

## 6.4 Summary of New Development/Re-Development Effectiveness Tracking

The DCWMA Group members will each individually develop a complete tracking system that is consistent with each agencies individual needs and internal processes and meets the applicable requirements of the Permit.

# 7 Regional Studies

The objective of this section is to present the Regional Studies that apply to the Dominguez Channel Watershed and the DCWMA Group as well as identify other studies occurring in the area that may be considered regional in nature to the DCWMA.

As stated in the MRP, Section II.E.5, Regional Studies are required to further characterize the impact of the MS4 discharges on the beneficial uses of the receiving waters. Regional studies shall include the Southern California Stormwater Monitoring Coalition (SMC) Regional Watershed Monitoring Program (bioassessment) and special studies as specified in approved TMDLs.

## 7.1 Regional Study Participation

The MRP identifies one regional study: the SMC Watershed Monitoring Program as a required regional study (Section XI, Page E29-30). The MRP states that each Permittee is responsible for supporting the monitoring described at the sites within the watershed management area(s) that overlap with the Permittee's jurisdictional area. Currently, it does not appear that the SMC is implementing monitoring within the DCWMA. However, the DCWMA Group is conducting bioassessment, toxicity, and water and sediment chemistry monitoring in the Dominguez Channel Estuary. In this manner, the DCWMA Group is in turn supporting the goals of the SMC. Additionally, it should be noted that the LACFCD and City of Los Angeles will continue to participate in the SMC Regional Watershed Bioassessment Program.

## 7.2 Other Potentially Relevant Regional Studies

Additional studies are being conducted within receiving waters associated with the DCMWA. These studies may provide information relevant to the DCWMA Group and are identified below. The discussion of the other relevant studies is for informational purposes as these studies are not a component of the DCWMA Group CIMP.

### 7.2.1 Contaminated Sediment Management Plan

The City of Los Angeles, Los Angeles County and Los Angeles County Flood Control District are participating in a CSMP designed to meet the requirement of the TMDL schedule for the Dominguez Channel Toxics TMDL. The TMDL requires that responsible parties in the Dominguez Channel Watershed develop a CSMP to address contaminated sediments in the DCE. The CSMP was submitted to the LARWQCB on March 20, 2014.

The objective of the CSMP is to establish specific steps to identify, prioritize, and implement sediment management actions. The initial step of the CSMP is to analyze available data, identify data gaps, collaborate with regional monitoring programs, conduct special studies, as needed, and identify sources and nature and extent of impacted sediments. Sediment and water quality will be evaluated within areas pursuant to the cooperating parties' jurisdictions as part of the required Dominguez Channel Toxics TMDL monitoring program, MS4 and NPDES permits' required monitoring programs, regional monitoring programs, and related special studies. The special studies are described in Section 8 of the CIMP.

### 7.2.2 Southern California Bight (SCB)

To improve the efficacy of existing monitoring programs and improve capacity for regional assessments, SCCWRP initiated a series of monitoring efforts throughout the SCB in 1994, 1998, 2003, 2008, and 2013. The DCWMA Group will follow the Bight Regional Monitoring project and will coordinate the efforts under the Dominguez Channel Toxics TMDL.

# 8 Special and Preliminary Studies

The objective of this section is to address the MRP special study requirements and identify preliminary studies that will be undertaken by the DCWMA Group in order to address the MRP requirements.

## 8.1 Special Studies Requirements

The Monitoring and Reporting Program (Attachment E of the Permit) states that the following requirements for Special Studies (Section XIII, Page E-36) are as follows.

> *"Each Permittee shall be responsible for conducting special studies required in an effective TMDL or an approved TMDL Monitoring Plan applicable to a watershed that transects its political boundary."*

Currently, the adopted TMDLs in the DCWMA do not contain required Special Studies.

# 9 Non-Direct Measurements

Environmental data (water, sediment, and tissue data) collected by others through different monitoring programs in the watershed will be incorporated to the extent practicable. The extent practicable will be determined by the DCWMA Group if needed to better characterize the MS4 discharges from their jurisdictional areas. It is not the intent or purpose of this CIMP to compile and analyze all available data.

**Criteria**

If deemed necessary by the DCWMA Group, the environmental data reported by other entities will be evaluated for suitability for inclusion in the CIMP database and will be accepted if it meets the following requirements:

- Conducted and documented in accordance with the sampling procedures outlined in the 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.

If the data are deemed to be suitable they will be included in the database described in Section 3.

## 9.1 Non-Direct Measurements for the DCWMA Group CIMP

The following Non-direct measurements may be obtained by the DCWMA Group to address the MRP requirements of the CIMP and support CIMP implementation.

- Tidal Measurements – Tidal measurements will be obtained from the National Oceanic and Atmospheric Administration as described in Attachment C.
- Flow Data – Additional flow data will be obtained for the LACFCD stream gages as described in Attachment C.
- Rainfall Data – Rainfall information will be obtained from the LACFCD rain gages as described in Attachment C.

# 10 Adaptive Management

The adaptive management process will be utilized to evaluate the DCWMA CIMP annually as part of the annual reporting and, if deemed necessary by the DCWMA Group, update components of the DCWMA CIMP. The objective of this section is to present the method for adapting the DCWMA CIMP:

## 10.1 Integrated Monitoring and Assessment Program

As the DCWMA CIMP is implemented, additional information will be gathered that may require modifications to the procedures identified in the CIMP. Annually, an evaluation of the CIMP will be conducted as part of the annual reporting to identify potential modifications that may enhance the monitoring program for evaluation and approval by the DCWMA Group to incorporate into the CIMP as deemed necessary.

### 10.1.1 Outfall Based Monitoring, Storm Drains, Channels, and Outfall Map(s) and/or Database

The MS4 database will be updated annually per Section VII, A.9 of the MRP (Page E-21).

### 10.1.2 Storm Water Outfall Monitoring Program

The implementation of the EWMP may introduce projects across the watershed that may not be located in the representative catchment used for the storm water outfall monitoring discussed above. In addition, there may be a need to gather additional data to assist in siting projects or gathering data for adapting the EWMP. In light of this, the adaptive management approach would provide a set of criteria that would allow for the DCWMA Group to relocate an outfall monitoring station to meet the needs of the EWMP as it is implemented. Criteria the group could consider for relocation of an outfall monitoring site include, but are not limited to:

- Implementation of water quality improvement projects
- Changes to land use in the watershed
- Establishment of water quality data in another representative catchment
- No detected exceedances of water quality targets

The DCWMA Group Storm Water Outfall Monitoring Program may be adapted during the term of the Permit. The following criteria may be considered for relocation of an outfall monitoring site:

- The BMPs implemented in the catchments leading to the outfall are achieving the desired goals.
- Other outfalls may be considered, if BMPs in the monitored catchments are achieving their desired goals.
- Receiving water data may suggest that while the monitored outfall is achieving its desired goals, other outfalls may not be achieving the desired goals.
- Other criteria as determined appropriate by the DCWMA Group.

### 10.1.3 Non Storm Water (NSW) Outfall Monitoring

The NSW Program is an adaptive program and monitoring for NSW discharges will require plan updates as part of the program implementation. As NSW discharges are addressed, monitoring at the prioritized outfalls will cease (Section IX.G, Page E-28). Additionally, if monitoring demonstrates that discharges do not exceed any NALs or water quality standards for pollutants identified on the 303(d) list, monitoring will cease at an outfall after the first year. Also, given the phased approach to the screening process, the inventory of outfalls determined to be significant NSW discharges will be updated after the completion of the screening process.

The MRP requires the following components of the NSW Program to be reviewed and updated annually by the DCWMA Group:

- Outfall Screening and Monitoring Plan
- Monitoring and MS4 inventory of significant NSW discharges

#### *10.1.3.1 Outfall Screening and Monitoring Plan*

The NSW Outfall Monitoring Program will be assessed annually as part of the annual reporting and updated as necessary to meet the following requirements (Section IX.B, Page E-24):

- The procedures for the NSW outfall-based screening and monitoring program plan must be updated as needed to reflect the DCWMA CIMP.
- The DCWMA Group must conduct at least one re-assessment of its NSW outfall-based screening and monitoring program during the term of the Permit to determine whether changes or updates are needed. Where changes are needed, the DCWMA Group will make the changes in its written program documents, implement these changes in practice, and describe the changes within the next Annual Report.

#### *10.1.3.2 Inventory of MS4 Outfalls with NSW Discharges*

The MS4 Outfalls with significant NSW discharges will be reviewed and updated as required by the MRP (Section IX.D.4, Page E-26). The Storm Drains, Channels and Outfalls map and associated outfall database required in Part VII.A of the MRP will be updated to incorporate the most recent characterization data for outfalls with significant NSW discharge beginning on the first year following approval of the CIMP by the LARWQCB.

## 10.2 CIMP Revision Process

The DCWMA Group will submit an Annual Report to the LARWQCB Executive Officer by December 15 of each year. The Annual Report will include an assessment of the CIMP program elements and any applicable program updates. The Annual Report will cover a reporting period from July 1 to June 30.

The CIMP identifies a number of procedures that will require updates to the MS4 database and the NSW Outfall Monitoring Program. Since these items are discussed in the MRP CIMP provisions, it should not be necessary to obtain approval from the LARWQCB.

The DCWMA Group would determine if any necessary modifications will be incorporated into the DCWMA CIMP for subsequent implementation.

The following modifications or adjustments to the monitoring program will be proposed by the DWMA Group via a notification to the LARWQCB and subsequently documented in the Annual Report. Notification to the LARWQCB will consist of a letter which may be transmitted via email.

1. Discontinuing monitoring for Table E-2 constituents that are not identified as a water quality priority and are not detected at levels above relevant water quality objectives in the first year of monitoring, as stated in the MRP.
2. Adding constituents, increasing monitoring frequency, or adding sites as a result of any requirements in the Permit (e.g., TIE results), procedures outlined in the CIMP or to further support meeting the monitoring objectives.
3. Modifying methods for consistency with EPA method requirements or to achieve lower detection limits.
4. Changing analytical laboratories.

5. Relocating a monitoring location determined to be not representative of the MS4 discharges from the DCWMA Group (for reasons other than the observed water quality), provided that the alternate location is within the same vicinity or capture a similar drainage area.

6. Modifications to sampling protocols resulting from coordination with other watershed monitoring programs.

7. Modifications to implementation schedules

8. Other activities requiring immediate action, not listed above, may be implemented through an initial telephone consultation with the LARWQCB staff to obtain concurrence, followed by a notification letter.

The following modifications or adjustments to the monitoring program will be proposed by the DCWMA Group Members to the LARWQCB. These modifications will be proposed by the DCWMA Group via a letter to the LARWQCB and may be subject to approval by the Executive Officer of the LARWQCB.

1. Discontinuing monitoring of any non-TMDL constituent at a specified site if there are two years with no exceedances observed for the same condition (i.e., wet or dry weather).

2. Removing monitoring locations determined to be not representative of MS4 discharges from the DCWMA Group (for reasons other than the observed water quality).

Should additional modifications be identified that are not specified in this section that would result in a major changes to the DCWMA CIMP (e.g., relocation of a storm water outfall site or a receiving water monitoring site), the modifications will be discussed in the Annual Report and a separate letter will be submitted to the LARWQCB requesting for approval from the Executive Officer. Upon receipt of written approval from the Executive Officer, the DCWMA CIMP will be updated and a revised CIMP will be provided to the LARWQCB and the DCWMA Group.

# 11 Data Management and Reporting

Attachment D details the procedures for managing and reporting data to meet the goals and objectives of the CIMP and in turn the Permit. The details contained in Attachment D serve as a guide for ensuring that consistent protocols and procedures are in place for successful data management and reporting. Data management procedures include data review, verification and validation.

Semi-annual analytical data reports and annual monitoring reports will be submitted as outlined in the MRP. Semi-annual analytical data reports are required to be submitted on a semi-annual basis. Reporting for the period between July 1 through December 31 the analytical data report will be submitted by June 15. Reporting for the period between January 1 through June 30, the semi-annual report will be submitted by December 15.

The Semi-annual analytical data reports will include the following:

- Exceedances applicable to WQBELs, RWLs, action levels or aquatic toxicity thresholds
- Corresponding sample dates and monitoring locations

Annual monitoring reports are required to be submitted by December 15 of every year. The annual monitoring reports will cover the monitoring period of July 1 through June 30. The annual monitoring reports will include the following:

- Watershed Summary Information
    - Watershed Management Area
    - Subwatershed (HUC-12) Descriptions
    - Description of Permittee(s) Drainage Area within the Subwatershed
    - Annual Assessment and Reporting
    - Storm-water Control Measures
    - Effectiveness Assessment of Storm water Control Measures
    - NSW Control Measures
    - Effectiveness Assessment of NSW Control Measures
    - Integrated Monitoring Compliance Report
    - Adaptive Management Strategies
    - Supporting Data and Information

Details on the reporting requirements from the MRP that will be submitted with the semi-annual analytical data reports and annual monitoring reports are presented in Attachment D. In addition to the requirements from the MRP, a discussion of how the reported data are to be used is included in Attachment D.

# 12 Schedule for DCWMA CIMP Implementation

## 12.1 CIMP Implementation Requirements

Section IV.C.6. of the MRP states that monitoring shall commence within 90 days after approval of the CIMP by the Executive Officer of the Regional Water Board. The DCWMA Group will implement the CIMP within 90 days of approval as provided in the schedule shown on Figure 12-1.

However, the schedule for the new and redevelopment effectiveness tracking will begin no later than the submittal of the Draft EWMP (June 28, 2014).

## 12.2 Schedule Constraints

The status of implementation of the various CIMP Program Elements will vary based on the current status of implementation of existing monitoring programs, seasonal conditions, and the feasibility of collecting a water quality sample at the time of approval of the CIMP. The two primary factors affecting the CIMP implementation schedule relate to 1) automatic water sampler installation; and 2) monitoring that is dependent upon prerequisite information (e.g., monitoring of significant NSW discharges).

## 12.3 Monitoring Sites with Autosamplers

Monitoring sites require the use of automatic water samplers in order to characterize the water quality during a storm event. Non-tidally influenced receiving water wet weather samples and storm water outfall samples will generally be collected with as composite samples. As such, the installation of an automatic water sampler is necessary before monitoring can commence. Other factors that may affect the installation of an autosampler may include access permits, regulatory permits, and availability of equipment, security, and electrical power.

The DC WMA Group will make every effort to implement the receiving water monitoring and the outfall monitoring. The phased approach for implementation was developed for this program to provide the DCWMA Group with adequate time to establish the monitoring stations. The DCWMA Group will have the option to conduct water quality sampling using any of the following methods.

1. Time-weighted temporary/portable sampling equipment

2. Collecting a grab sample every 20 minutes for 3 hours or the duration of the storm (if less than 3 hours) in accordance with the EPA NPDES Storm Water Sampling Guidance Document, EPA 833-B-92, 40 CFR 122.21 (g)(7)(ii).

## 12.4 Receiving Water Monitoring Phased Schedule

The DCWMA Group will initiate the dry-weather monitoring, within 90 days following approval of the CIMP. Initiation of dry-weather monitoring includes the following activities.

- DC Toxics TMDL Dry-Weather TMDL monitoring at Upper and Lower Dominguez Channel Estuary.
- Continue with the bacteria TMDL monitoring at Cabrillo Beach.

The Receiving Water Monitoring Program also requires the installation of an automatic water sampler and equipment. These include the non-tidally influenced receiving water stations that are not part of any existing monitoring program. These stations would require the design, permitting, and installation of a new monitoring station in addition to the procurement of the monitoring equipment. Stations that fall in this category include DOM-RW-DC01 (Mass Emission Station), DOM-RW-TL01 (Torrance Lateral), and WD-1 (Wilmington Drain).

For the tidally influenced or lake receiving water monitoring sites DOM-RW-DCE01 (Upper Dominguez Estuary), DOM-RW-DCE02 (Lower Dominguez Estuary), ML-1 to ML-3 (Machado Lake), and 1 to 22 (Greater Harbor Waters) are not dependent on the installation of monitoring stations. The schedule of monitoring at Machado Lake is impacted by the Machado Lake Rehabilitation and as such, the monitoring of the lake sites will not commence until the lake rehabilitation is completed. The monitoring of the Dominguez Estuary stations can begin within the established program schedule.

The time required for autosampler installation is accounted for in the phased approach to implementation of the sampling for the receiving water and storm water outfall elements of the CIMP (Figure 12-1). Phasing in the receiving water and storm water outfall elements of the CIMP will allow evaluation of the sites to determine if any need to be changed due to significant contributions from non-MS4 sources or other reasons that sampling is not feasible at a site and one of the alternate or new sites must be utilized.

Table 12-1 describes the installation of the receiving water sampling stations. Should sampling be required prior to the installation of the permanent automatic samplers, the DCWMA Group has the option to conduct water quality sampling using time-weighted temporary or portable sampling equipment. If temporary or portable sampling equipment is not available, then a grab sample will be collected every 20 minutes for the first 3 hours of the storm or the full duration of the storm (if the storm event is less than 3 hours total) (USEPA 1992).

**Table 12-1: Receiving Water Monitoring Locations with Sampling Stations**

| Location (Site ID) | Installation[1] | Sampling Start | Comments |
|---|---|---|---|
| Dominguez Channel at 135th (DOM-RW-DC01) | Year 1[1] | Year 2 (Mid-Year) | Design, Permitting, and Installation would start following approval of CIMP |
| Torrance Lateral at Hamilton Ave (DOM-RW-TL01) | Year 1 | Year 2 (Mid-Year) | Design, Permitting, and Installation would start following approval of CIMP |
| Wilmington Drain at PCH (WD-1) | Year 2 | Year 3 | Design could start following approval of CIMP, however permitting and installation would be pending based on the completion of Machado Lake Ecosystem Rehabilitation Project |

[1] Year 1 is assumed to start within 90 days of CIMP Approval

## 12.5 Storm Water Outfall Monitoring Phase Schedule

The Storm Water Outfall Monitoring Program also requires the installation of Sampling Stations at the 5 Outfall monitoring sites. Similarly, the sampling station will consist of automatic water samplers, equipment, enclosures, foundation, and establishing data and electrical service.

Given the continued use of previously monitored receiving water sites in Dominguez Chanel at sites DOM-OF-001(DDI 8) and DOM-OF-003 (Project 5246/74), the infrastructure for sampling is currently available and would only require the procurement of new autosampling equipment, minor repairs and upgrades to the stations, and the installation and testing of the equipment at the site. As such, it is anticipated that wet weather outfall monitoring at these sites can reasonably conducted within six to eight months after CIMP approval.

The non-tidally influenced storm water outfall stations are not part of any existing monitoring program and would require the design, permitting, and installation of a new monitoring station in addition to the procurement of the monitoring equipment. Stations that fall in this category include DOM-OF-002 (PD 183), P-77 (Project 77), P-510 (Project 510).

Table 12-2 provides a table describing the phasing for the installation of the Storm Water Outfall sampling stations.

**Table 12-2: Storm Water Outfall Sampling Station Schedule**

| Location (Site ID) | Installation[1] | Sampling Start | Comments |
|---|---|---|---|
| Outfall 1 – DDI 8 at Dominguez Channel (DOM-OF-001) | Year 1 | Year 2 | Existing station installation will be assessed. If necessary upgrades and/or repairs will be Designed and Implemented at the MS4 Outfall Station |
| Outfall 2 - PD 183 to Torrance Lateral (DOM-OF-002) | Year 1 | Year 2 (Mid-Year) | Design and Installation of new MS4 Outfall Station |
| Outfall 3 – Project 5246 and 74 (DOM-OF-003) | Year 1 | Year 2 | Existing station installation will be assessed. If necessary upgrades and/or repairs will be Designed and Implemented at the MS4 Outfall Station |
| Project 77 at Machado Lake (P-77) | Year 2 | Year 3 | Design of new TMDL Outfall Station. Installation pending completion of Machado Lake Rehabilitation Project |
| Project 510 at Machado Lake (P-510) | Year 2 | Year 3 | Design of new TMDL Outfall Station. Installation pending completion of Machado Lake Rehabilitation Project |

[1] Year 1 is assumed to start within 90 days of CIMP Approval

## 12.6 Non-Storm Water Monitoring Program Schedule Requirements

The Non-Storm Water Monitoring Program will require a phased approach in order to account for the time required to complete all six steps of the NSW Outfall Program, a phased approach to sampling will be conducted for the NSW outfall elements of the CIMP. Table 12-3 presents the overview of the NSW Outfall Program schedule.

| Table 12-3: NSW Outfall Program Schedule Overview |
|---|
| **YEAR 1 ACTIVITIES (following approval of the CIMP)** |
| 1. Outfall Screening<br>2. Develop Inventory of NSW Outfalls<br>3. Develop Prioritization Criteria and Schedule for Prioritized Source Investigation |
| **YEAR 2-3 ACTIVITIES** |
| 4. Conduct Prioritized Source Investigation<br>5. Identify Sources of NSW Discharges<br>6. Monitor NSW Discharges |
| **Source Investigation Schedule** |
| • **Year 2** - Source Investigation of 50% of the NSW outfalls<br>• **Year 3** – Source Investigation of 100% of the NSW outfalls |

## 12.7 NSW Outfall Monitoring Program

As described in Section 5, the NSW Outfall Program consists of a process which consists of six elements which occur sequentially:

1. Outfall Screening

3. Identification of outfalls with significant NSW discharge

4. Inventory of outfalls with significant NSW discharge

5. Prioritized source investigation

6. Identify sources of significant NSW discharge

7. Monitoring significant NSW discharges exceeding criteria

To account for the time required to complete all six steps of the NSW Outfall Program, a phased approach to as outlined in the MRP will be conducted for the NSW outfall elements of the CIMP. Phasing in the NSW outfall elements of the CIMP will provide the time necessary to complete each element of the NSW Outfall Program. Phase I will commence within 90 days after approval of the CIMP. Phase I will consist of completion of elements one through three of the NSW Outfall Program and the completion of 25 percent of the source investigations included in element four of the NSW Outfall Program. Phases II and III NSW monitoring will consist of completion of the remaining 75 percent of the source investigations included in element four of the NSW Outfall Program. Phase IV will consist of elements five and six of the NSW Outfall Program and will commence 42 months from the approval of the CIMP to allow sufficient time for all source investigations to be completed.

| | Program Year 1 | Program Year 2 | Program Year 3 | Program Year 4 | Program Year 5 |
|---|---|---|---|---|---|
| **Receiving Water Monitoring** | | | | | |
| ***Mass Emission Station*** | Install Mass Emission Station & Equipment | Dry Weather Monitoing - 2 times per year<br>Wet Weather Monitoring - 3 times per year<br>Storm Borne Sediments - Preliminary Study | Dry Weather Monitoing - 2 times per year<br>Wet Weather Monitoring - 3 times per year<br>Stomr Borne Sediments - Preliminary Study | Dry Weather Monitoing - 2 times per year<br>Wet Weather Monitoring - 3 times per year<br>Storm Borne Sediments - 2 times per year | Dry Weather Monitoing - 2 times per year<br>Wet Weather Monitoring - 3 times per year<br>Storm Borne Sediments - 2 times per year |
| ***TMDL Monitoring*** | | | | | |
| Machado Lake | Machado Lake Remediation (Anticipated) | Install Wilmington Drain Station & Equipment<br>Machado Lake Remediation (Anticipated) | Lake Water Column Nutrients - Bi-Weekly<br>Lake Water Column Toxics - 1 time per year<br>Lake Bed Sediments - 1 time per year<br>Lake Bioaccumulation - 1 time per year<br>Wilmington Drain Suspended Sediments - 3 times per year<br>Trash - Annual Weight | Lake Water Column Nutrients - Bi-Weekly<br>Trash - Annual Reporting | Lake Water Column Nutrients - Bi-Weekly<br>Wilmington Drain Suspended Sediments - 1 time per year<br>Trash - Annual Reporting |
| Harbor Toxics | | | | | |
| *Harbor & Dominguez Estuary* | Dry Weather Monitoing - 1 times per year<br>Wet Weather Monitoring - 2 times per year | Dry Weather Monitoing - 1 times per year<br>Wet Weather Monitoring - 2 times per year<br>Bed Sediments - 1 time per year<br>Bioaccumulation - Preliminary Study | Dry Weather Monitoing - 1 times per year<br>Wet Weather Monitoring - 2 times per year | Dry Weather Monitoing - 1 times per year<br>Wet Weather Monitoring - 2 times per year<br>Bed Sediments - 1 time per year<br>Bioaccumulation - 1 time per year | Dry Weather Monitoing - 1 times per year<br>Wet Weather Monitoring - 2 times per year |
| *Torrance Lateral* | Install Receiving Water Station & Equipment | Dry Weather Monitoing - 1 time per year<br>Wet Weather Monitoring - 2 times per year<br>Storm Borne Sediments - Preliminary Study | Dry Weather Monitoing - 1 times per year<br>Wet Weather Monitoring - 2 times per year<br>Storm Borne Sediments - Preliminary Study | Dry Weather Monitoing - 1 times per year<br>Wet Weather Monitoring - 2 times per year<br>Storm Borne Sediments - 2 times per year | Dry Weather Monitoing - 1 times per year<br>Wet Weather Monitoring - 2 times per year<br>Storm Borne Sediments - 2 times per year |
| Harbor Bacteria | Cabrillo Beach - 5 times per week<br>Main Ship Channel - Weekly | Cabrillo Beach - 5 times per week<br>Main Ship Channel - Weekly | Cabrillo Beach - 5 times per week<br>Main Ship Channel - Weekly | Cabrillo Beach - 5 times per week<br>Main Ship Channel - Weekly | Cabrillo Beach - 5 times per week<br>Main Ship Channel - Weekly |
| **Outfall Monitoring Program** | | | | | |
| **Outfall Database** | Updated on an Annual Basis | Updated on an Annual Basis | Updated on an Annual Basis | Updated on an Annual Basis | Updated on an Annual Basis |
| **Storm Water Outfall Monitoring** | | | | | |
| MS4 Outfalls | Install Equipment at Existing Outfall Stations<br>Install Equipment at New Outfall Stations | Wet Weather Monitoring - 3 times per year<br>Storm Borne Sediments - As -Needed, Determined by Applicable<br>Receiving Water Results. | Wet Weather Monitoring - 3 times per year<br>Storm Borne Sediments - As -Needed, Determined by Applicable Receiving Water Results. | Wet Weather Monitoring - 3 times per year<br>Storm Borne Sediments - As -Needed, Determined by Applicable Receiving Water Results. | Wet Weather Monitoring - 3 times per year<br>Storm Borne Sediments - As -Needed, Determined by Applicable Receiving Water Results. |
| TMDL Outfalls | Machado Lake Remediation (Anticipated) | Install Equipment at New Outfall Stations<br>Machado Lake Remediation (Anticipated) | Wet Weather Monitoring - 2 times per year<br>Storm Borne Sediments - 2 times per year | Wet Weather Monitoring - 2 times per year<br>Storm Borne Sediments - 2 times per year | Wet Weather Monitoring - 2 times per year<br>Storm Borne Sediments - 2 times per year |
| **Non-Storm Water Outfall Monitoring** | Outfall Screening and Field Investigation | Source Investigation and Monitoring | Source Investigation and Monitoring | Source Investigation and Monitoring | Source Investigation and Monitoring |

**Figure 12-1. Implementation Schedule for Major CIMP Elements**

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# Attachment A:
# Watershed Management
# Plan Area Background

# Attachment A: Watershed Management Plan Area Background

## A.1 Watershed Background

The Dominguez Channel Watershed Management Area (WMA) (DCWMA) is located in the southern portion of the Los Angeles County and includes the drainage area of the Dominguez Channel, Machado Lake, and the Los Angeles/Long Beach Harbors watersheds. The DCWMA is an important industrial, commercial, and residential area with unique and important historical and environmental resources, such as the Dominguez Estuary and Cabrillo Beach. The Dominguez Channel Watershed is approximately 133 square miles in area, 120 of which are comprised of land and the remaining is the Los Angeles/Long Beach Harbors. Approximately 72 square miles drains directly to the 15.7 mile long Dominguez Channel which begins in the City of Hawthorne and eventually discharges to the east basin of the Los Angeles Harbor. The other 48 square miles includes areas directly draining to Los Angeles/Long Beach Harbors and Machado Lake tributaries.

The Dominguez Channel and the Los Angeles and Long Beach Harbors Watershed are characterized by industrial, commercial and residential areas that include important historical and environmental resources (Figure A-1).

The watershed receives an average of approximately 12.11 inches of rain per year, most of it during the winter season (Los Angeles County, ALERT Rain Gage 315, Dominguez Precipitation).

### A.1.1 Participating Permittees

The entire DCWMA is comprised of the cities of Gardena, Hawthorne, Lawndale and Lomita; portions of the cities of Carson, Compton, El Segundo, Inglewood, Los Angeles, Long Beach, Manhattan Beach, Palos Verdes Estates, Redondo Beach, Rolling Hills Estates, Rolling Hills, Rancho Palos Verdes and Torrance; and the unincorporated areas of the County of Los Angeles. The DCWMA Group consists of the jurisdictions of the following participating MS4 Permittees within the WMA: the cities of El Segundo, Hawthorne, Inglewood, Lomita and Los Angeles (including the Port of Los Angeles), the County of Los Angeles, and the Los Angeles County Flood Control District.

### A.1.2 Geographic Boundaries

The land area of the DCWMA Group encompasses 58 square miles (37,315 acres) or 43.6% of the total 133 square miles (77,000 acres) of the Dominguez Channel Watershed. Additionally, the DCWMA Group does not have jurisdiction over the land that is owned by the State of California and the US Government. The boundaries of the participating cities within the watershed are shown in Figure 2.

The DCWMA is dominated by urban land uses such as residential, industrial, commercial, and transportation, which accounts for approximately 74 percent of the land area. The dominant land uses are presented in Table A-1 and Figure A-2.

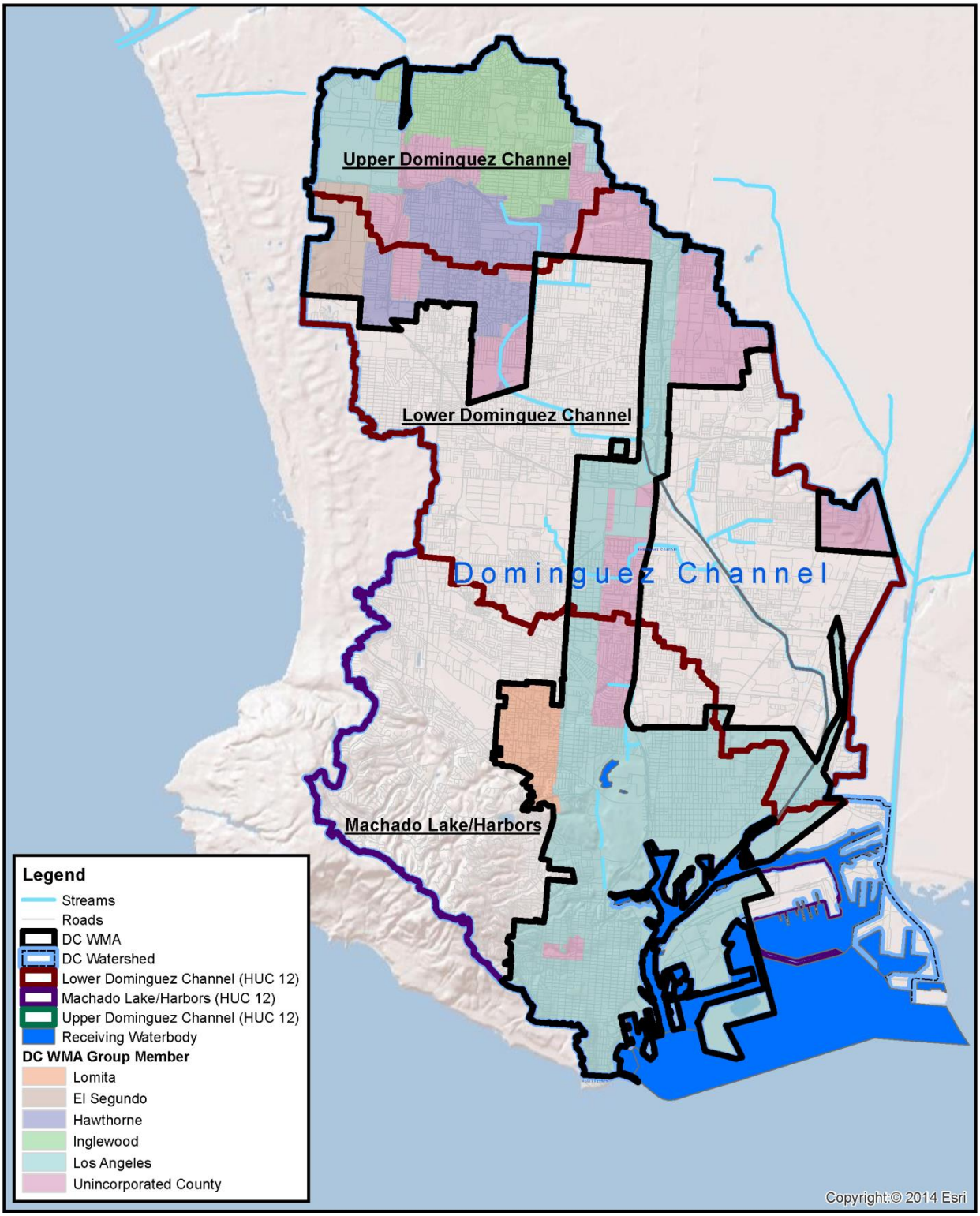



**Figure A-1. DCWMA Group Boundary**

| Table A-1: DCWMA Group Land Use | | |
|---|---|---|
| **Land Use Category** | **Area (square miles)** | **Percentage** |
| Agricultural | 0.1 | 0.2% |
| Commercial / Institutional | 9.5 | 16.4% |
| Industrial | 12.9 | 22.1% |
| Residential | 19.6 | 33.7% |
| Transportation / Secondary Roads | 14.0 | 24.0% |
| Vacant | 2.0 | 3.4% |
| Water | 0.2 | 0.3% |
| **Total:** | **58.3** | **100%** |

The DCWMA is composed of three subwatershed (HUC 12) drainage areas as follows.

1. Upper Dominguez Channel
2. Lower Dominguez Channel and Estuary
3. Los Angeles and Long Beach Harbors (including Machado Lake)

The upper and lower Dominguez Channel Subwatersheds drain primarily via an extensive network of underground storm drains. The lower Dominguez Channel Subwatershed drains directly into the Los Angeles Harbor Subwatershed via the Dominguez Channel Estuary (Figure A-2).

The DCWMA is dominated by urban land uses such as residential, industrial, commercial, and transportation, which accounts for approximately 78 percent of the land area. The dominant land uses are presented in Table A-2 and Figure A-2.

| Table A-2: Land Use Breakdown for the Watershed and the HUC 12s | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Land use Category** | **Watershed** | | **LA Harbor HUC** | | **Upper Dom HUC** | | **Lower Dom HUC** | |
| | **Percentage** | | **Percentage** | | **Percentage** | | **Percentage** | |
| | DCWMAG[1] | All[2] | DCWMAG[1] | All[2] | DCWMAG[1] | All[2] | DCWMAG[1] | All[2] |
| Agricultural | 0% | 1% | 0% | 0% | 0% | 0% | 1% | 1% |
| Commercial | 8% | 9% | 5% | 6% | 14% | 13% | 9% | 9% |
| Industrial | 26% | 23% | 35% | 22% | 9% | 9% | 29% | 28% |
| Institutional | 5% | 5% | 4% | 5% | 5% | 5% | 5% | 5% |
| Residential (High Density Single Family ) | 18% | 22% | 17% | 25% | 18% | 18% | 19% | 20% |
| Residential (Low Density Single Family - Moderate Slope) | 3% | 3% | 2% | 3% | 3% | 3% | 3% | 3% |
| Residential (Low Density Single Family - Steep Slope) | 0% | 2% | 1% | 5% | 0% | 0% | 0% | 0% |
| Residential (Multi-Family) | 13% | 11% | 14% | 10% | 18% | 18% | 8% | 9% |
| Secondary Roads | 16% | 16% | 16% | 16% | 18% | 18% | 16% | 16% |
| Transportation | 6% | 5% | 2% | 2% | 15% | 14% | 6% | 4% |
| Vacant (Moderate Slope) | 2% | 2% | 3% | 2% | 1% | 1% | 2% | 2% |
| Vacant (Steep Slope) | 1% | 2% | 2% | 5% | 0% | 0% | 0% | 0% |
| Water | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 1% |
| Overall Area | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

[1] Covers only land use within the jurisdictions of participating DCWMA Group Agencies

[2] Covers land use within all Cities in the specified area

DCWMAG = DCWMA Group

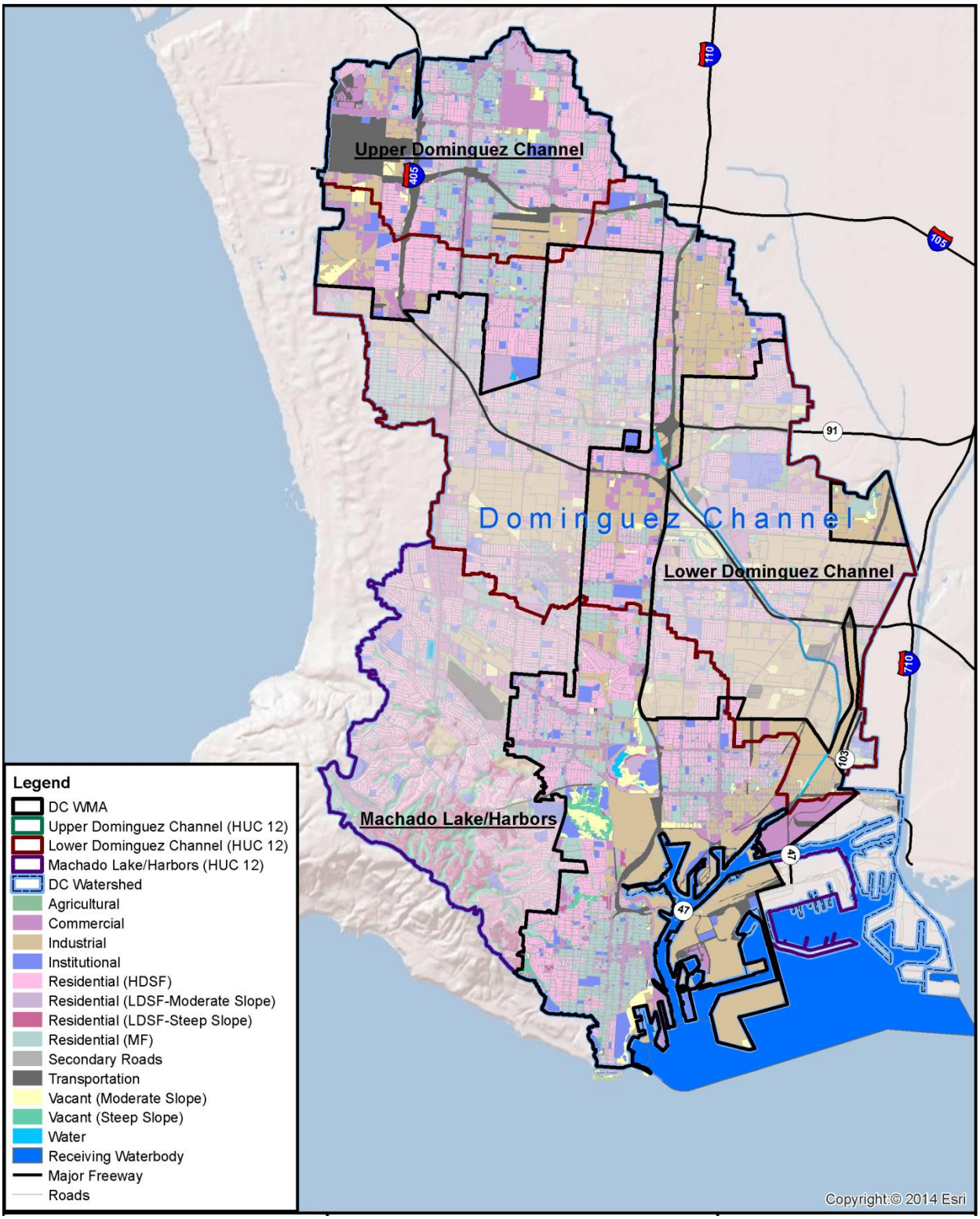



**Figure A-2. Land Use in the Dominguez Channel Watershed**

# A.2 Existing Monitoring Programs

## A.2.1 MS4 Permit Monitoring Requirements

### A.2.1.1 NDPES Permit No. CAS004001

The NPDES Order was issued on December 28, 2012. Prior to this Order, Regional Water Board Order No. 01-182 served as the NPDES Permit for MS4 storm water and non-storm water (NSW) discharges within the Coastal Watersheds of the County of Los Angeles. The requirements applied to the Los Angeles County Flood Control District, the unincorporated areas of Los Angeles County under County jurisdiction, and 84 Cities within the Los Angeles County Flood Control District with the exception of the City of Long Beach. The first county-wide MS4 permit for the County of Los Angeles and the incorporated areas therein was Order No. 90-079, adopted by the Regional Water Board on June 18, 1990.

### A.2.1.2 Monitoring and Reporting Program (No. CI-6948)

Attachment E of the Permit outlines the purpose and requirements of the MRP. The MRP provides the Permittee "the flexibility to leverage monitoring resources in an effort to increase cost-efficiency and effectiveness and to closely align monitoring with TMDL monitoring requirements and Watershed Management Programs." The MRP elements include (from Attachment E, Section II, Subsection E, page E-3, NPDES MRP 2012):

- Receiving water monitoring shall be performed at previously designated mass emission stations, TMDL receiving water compliance points, as designated in Regional Water Board Executive Officer approved TMDL Monitoring Plans (see Table E-1 for a list of approved TMDL Monitoring Plans), and additional receiving water locations representative of the impacts from MS4 discharges.

- Storm water outfall based monitoring; including TMDL monitoring requirements specified in approved TMDL Monitoring Plans (see Table E-1). Outfall monitoring locations shall be representative of the land uses within the Permittee's jurisdiction.

- Non-storm water outfall based monitoring; including TMDL monitoring requirements specified in approved TMDL Monitoring Plans (see Table E-1). Outfalls with significant non-storm water discharges that remain unaddressed after source identification shall be monitored.

- New Development/Re-development effectiveness tracking. The objectives of best management practices (BMP) 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.

- Regional studies are required to further characterize the impact of the MS4 discharges on the beneficial uses of the receiving waters. Regional studies shall include the SMC Regional Watershed Monitoring Program (bioassessment) and special studies as specified in approved TMDLs (see Section XIX TMDL Reporting of the Permit).

## A.2.2 Regional Monitoring Programs

### A.2.2.1 2001 MS4 Permit Core Monitoring Program

#### *A.2.2.1.1 Mass Emission*

A single mass emission station, the Dominguez Channel Monitoring Station (S28), exists in the Dominguez Channel watershed. The monitoring station was established by the 2001 MS4 permit as part of the Core Monitoring Program, and monitoring began during the 2001-2002 season. The Dominguez Channel Monitoring Station is located in a concrete-lined rectangular channel section of Dominguez Channel at Artesia Boulevard crossing in the City of Torrance and was chosen to avoid tidal influence. Flow at this station is measured by the flow meter attached to the autosampler. The upstream tributary area is 33 square miles. The Dominguez Channel monitoring site is located in a concrete-lined rectangular channel.

#### *A.2.2.1.2 Tributary Monitoring*

Six tributary monitoring stations were also established in accordance with the 2001 MS4 permit. Monitoring was conducted during the 2008-2009 wet season, as part of the rotating watershed tributary approach for the Core Monitoring Program. The six tributary monitoring stations were used to collect water quality data from subwatersheds in the DCWMA. Provided below is a description of the six tributary monitoring stations. In order, from the furthest upstream to the furthest downstream:

- Project No. 1232 (TS19): Located on the northeast corner of Project 1232 and S. Main Street, south of Del Amo Boulevard, in the City of Carson. The upstream tributary watershed area is approximately 5203.57 acres.
- PD 669 (TS20): Located in the south right-of-way of PD 669, on the southeast corner of Avalon Blvd. and PD 669, just north of Del Amo Blvd. in the City of Carson. The upstream tributary watershed area is approximately 2197.38 acres.
- Project Nos. 5246 & 74 (TS21): Located north of Artesia Blvd. (State Route 91), east of Vermont Avenue, and is accessed from 169th Street to the west right-of-way of Project 5246 in the City of Los Angeles. The upstream tributary watershed area is approximately 1338.07 acres.
- PD 21-Hollypark Drain (TS22): Located on the northeast corner of 135th Street at Dominguez Channel in the City of Gardena. The upstream tributary watershed area is approximately 1656.75 acres.
- D.D.I. 8 (TS23): Located on the northwest corner of Dominguez Channel and the easterly prolongation of 132nd Street in the City of Gardena. The upstream tributary watershed area is approximately 1449 acres.
- Dominguez Channel at 116th Street (TS24): Located at the corner of 116th Street and Isis Avenue in the City of Lennox. The upstream tributary watershed area of this site is approximately 2269.09 acres.

### A.2.2.2 Watershed Wide Monitoring

There are not currently any watershed wide watershed management plans (WMPs) for the Dominguez Channel Watershed. California's Surface Water Ambient Monitoring Program (SWAMP) conducted a short-term assessment of the Dominguez Channel Watershed in the 2002-2003 fiscal year (LARWQCB 2007). The goals of the SWAMP monitoring were to answer two primary questions:

- What is the percentage of streams or waterbodies in a watershed or region that support their beneficial uses (e.g., water contact recreation, cold freshwater habitat, etc.)?
- Is the percent of streams or waterbodies in a watershed or the region that support their beneficial uses increasing or decreasing over time?

### A.2.2.3 Water Reclamation Plant Monitoring

The Terminal Island Water Reclamation Plant (TIWRP) discharges treated wastewater in the Outer Los Angeles Harbor within the DCWMA. The plant has a dry weather design capacity of 30 MGD and as of 2007 averaged a discharge rate of 15.8 MGD of tertiary treated effluent (City of Los Angeles 2008). The TIWRP effluent monitoring program monitors an extensive list of constituents including:

- Total Waste
- Flow
- Total chlorine residual
- Turbidity
- pH
- Temperature
- Settleable Solids
- Suspended solids
- BOD5 @20° C
- Oil & Grease
- Dissolved Oxygen
- Ammonia
- Nitrogen
- Nitrate + Nitrite
- Nitrogen
- Organic Nitrogen
- Total Nitrogen
- Surfactants (MBAS)
- Surfactants (CTAS)
- Chronic Toxicity
- Acute Toxicity
- Copper
- Lead
- Mercury
- Nickel
- Silver
- Cyanide
- Bis(2-ethylhexyl)phthalate
- Dieldrin Tributyltin Pesticide
- TCDD
- Remaining EPA priority pollutants, excluding asbestos
- Radioactivity

## A.2.3 Existing Total Maximum Daily Load Monitoring Plans

### A.2.3.1 Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL (Harbor Toxics TMDL)

The Harbor Toxics TMDL requires monitoring in three water body areas as follows.

a. Dominguez Channel, Torrance Lateral, and Dominguez Channel Estuary

b. Greater Los Angeles and Long Beach Harbor Waters (including Consolidated Slip)

c. Los Angeles and San Gabriel River

The three main water bodies are addressed under separate plans and a brief overview of each approach is provided below.

#### *A.2.3.1.1 Dominguez Channel, Torrance Lateral, and Dominguez Channel Estuary*

At the time of CIMP development, the RWQCB allowed the TMDL MRP requirements to be met through the implementation of the CIMP; therefore, no specific TMDL monitoring program had been implemented to address the monitoring requirements of the TMDL. In order to fulfil the requirements outlined in the Harbor Toxics TMDL, the DCWMA Group incorporated the TMDL Monitoring Plan requirements into the receiving water and outfall monitoring sections of the CIMP.

#### *A.2.3.1.2 Greater Los Angeles and Long Beach Harbor Waters*

The Regional Monitoring Coalition (RMC) comprised of Caltrans, Los Angeles County, Los Angeles County Flood Control District, Ports of Long Beach and Los Angeles, and the cities of Bellflower, Lakewood, Long Beach, Los Angeles, Paramount, Rancho Palos Verdes, Rolling Hills, Rolling Hills Estates, and Signal Hill developed the Coordinated Compliance Monitoring and Reporting Plan (CCRMP) to address the Harbor Toxics TMDL in the Greater Los Angeles and Long Beach Harbor Waters (Anchor QEA 2013). Water and sediment samples will be collected at 22 sampling stations and the collection of fish tissue samples at four locations. Water samples are taken three times per year, two times during wet weather events and one time during dry weather events at each of the 22 stations.

Sediment monitoring will occur twice every five years at each of the 22 stations. Surface sediment grabs will be collected and submitted for chemistry, toxicity, and benthic community analyses in accordance with Sediment Quality Objectives (SQO) Part I sediment triad assessment.

Fish tissue samples will be collected once every two years at four stations: one in Consolidated Slip, one each in the Los Angeles Outer Harbor and Long Beach Outer Harbor, and one in (eastern) San Pedro Bay. Composite samples of three fish species (white croaker [*Genyonemus lineatus*], California halibut [*Paralichthys californicus*], and shiner surfperch [*Cymatogaster aggregate*]) will be collected at all stations, with the exception of Consolidated Slip; only white croaker will be collected at this station.

A summary of the monitoring locations is provided in Table A-3 and illustrated in Figure A-3. This program will continue under the agreements made by the RMC and the monitoring plan will not be modified, amended or incorporated by the CIMP implementation.

| Table A-3: Greater LA and LB Harbor Waters Monitoring – Station Locations | | |
|---|---|---|
| **Waterbody Name** | **Station ID** | **Station Location** |
| Consolidated Slip | 1 | Center of Consolidated Slip |
| Los Angeles Inner Harbor | 2 | East Turning Basin |
| | 3 | Center of the Port of Los Angeles West Basin |
| | 4 | Main Turning Basin north of Vincent Thomas Bridge |
| | 5 | Between Pier 300 and Pier 400 |
| | 6 | Main Channel south of Port O'Call |
| Fish Harbor | 7 | Center of inner portion of Fish Harbor |
| Los Angeles Outer Harbor | 8 | Los Angeles Outer Harbor between Pier 400 and middle breakwater |
| | 9 | Los Angeles Outer Harbor between the southern end of the reservation point and the San Pedro breakwater |
| Cabrillo Marina | 10 | Center of West Channel |
| Inner Cabrillo Beach | 11 | Center of Inner Cabrillo Beach |
| Long Beach Inner Harbor | 12 | Cerritos Channel between the Heim Bridge and the Turning Basin |
| | 13 | Back of Channel between Turning Basin and West Basin |
| | 14 | Center of West Basin |
| | 15 | Center of Southeast Basin |
| Long Beach Outer Harbor | 16 | Center of Long Beach Outer Harbor |
| | 17 | Between the southern end of Pier J and the Queens Gate |
| San Pedro Bay | 18 | Northwest of San Pedro Bay near Los Angeles River Estuary |
| | 19 | East of San Pedro Bay |
| | 20 | South of San Pedro Bay inside the breakwater |
| Los Angeles River Estuary | 21 | Los Angeles River Estuary Queensway Bay |
| | 22 | Los Angeles River Estuary |

#### *A.2.3.1.3 Los Angeles and San Gabriel River*

The monitoring for the Los Angeles River and San Gabriel River are addressed through CIMPs being developed by groups within those watersheds. The respective CIMPs for these watersheds should be consulted for additional details on the monitoring programs.

### A.2.3.2 Los Angeles Harbor Bacteria TMDL

Currently, the City of Los Angeles monitors water quality at two shoreline sites on Inner Cabrillo Beach and one in the Main Ship Channel under the NPDES Permit for the TIWRP. Bacterial densities are measured at the two shoreline sites and 1 site in the Main Ship Channel. The shoreline sites on Cabrillo Beach are CB01, which is located in the wave wash on the north end of the swimming beach and CB02 which is in the wave wash at the south end of the swimming beach. At these sites, total coliform, fecal coliform and enterococcus are measured 5 times per week. The site HW07 is located at the mouth of the Main Ship Channel and total coliform, fecal

coliform and enterococcus are measured weekly. The monitoring locations are shown in Figure A-3. The monitoring at these sites is incorporated as part of the CIMP and will continue to be executed in accordance with the existing agreements and monitoring plans.

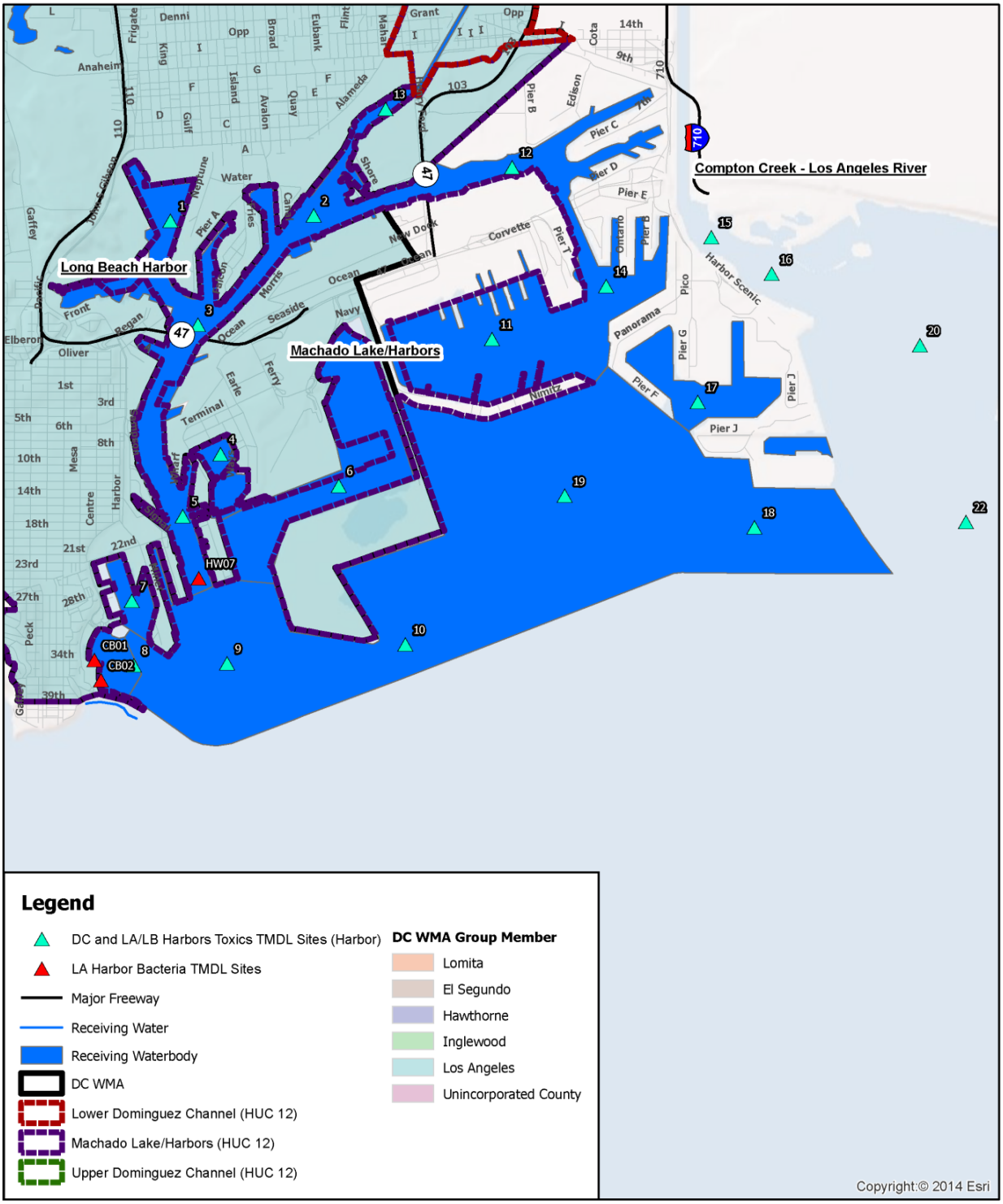



**Figure A-3. Greater LA / Long Beach Harbor Monitoring Locations**

## A.2.3.3 Machado Lake Nutrients TMDL

### *A.2.3.3.1 City of Los Angeles Department of Public Works*

The City of Los Angeles conducts biweekly sampling in Machado Lake as outlined in *"Machado Lake Nutrients TMDL Lake Water Quality Management Plan"* (City of Los Angeles 2010). Sampling consists of taking grab samples as well as in-situ measurements at two locations in the lake. The two sample locations are ML-1 and ML-2 and are marked by buoys. The average results from the two locations are used to determine attainment of the TMDL. The monitoring requirements covered by these locations have been incorporated into the receiving water monitoring section of the CIMP. Upon approval of the CIMP, this program will be incorporated by the CIMP Implementation.

### *A.2.3.3.2 County of Los Angeles Department of Public Works*

The County of Los Angeles Department of Public Works, on behalf of the County of Los Angeles unincorporated areas submitted the *"Machado Lake Multi-pollutant TMDL Monitoring and Reporting Program (MRP) Quality Assurance and Project Plan (QAPP) for the Unincorporated Areas of Los Angeles County Within the Machado Lake Watershed"* (County of Los Angeles 2011). The multi-pollutant program was developed to address the monitoring requirements of both the Machado Lake Nutrients TMDL and the Machado Lake Pesticides and PCBs TMDL (Toxics TMDL).

Monitoring sites were selected based on the results of a special study to characterize the conditions of the unincorporated areas of Los Angeles County. None of the sites from the special study were identified as contributing a unique distribution of concentrations that significantly deviates from the watershed-wide distribution. Therefore, all monitoring sites are assumed to adequately characterize and document pollutant concentrations in water and suspended sediment from the unincorporated County areas. Sites which were the most representative of flows from each of the three County areas were selected, with additional consideration given to safety and access at the sites and are summarized in Table A-4.

**Table A-4: County of LA Unincorporated Outfall Monitoring Sites in the Machado Lake Watershed**

| Site Name | County Area | Description | Coordinates |
|---|---|---|---|
| 1O_ACAD | 1 | Academy Dr./ Palos Verdes Dr. | 33.7831°N 118.3537°W |
| 2O_SCBG | 2 | Crenshaw Blvd./ Palos Verdes Dr. | 33.7844°N 118.3441°W |
| 3O_VAND | 3 | Van Deene Ave./ 228th St. | 33.8158°N 118.2878°W |

The monitoring requirements covered by the 3O_VAND site location has been incorporated into the receiving water monitoring in the CIMP and upon approval of the CIMP this program will be incorporated by the CIMP Implementation. The monitoring locations at 1O_ACAF and 2O_SCBG involve areas outside of the DCWMA Group area and will be addressed as part of the CIMPs that cover the respective areas.

### *A.2.3.3.3 Los Angeles County Flood Control District*

The Los Angeles County Flood Control District submitted the *Machado Lake Nutrient & Toxics TMDL Monitoring & Reporting Plan for the Los Angeles County Flood Control District*

(LACFCD 2012). The LACFCD's MRP outlined monitoring to be collected at the outlet of the Wilmington Drain adjacent to Pacific Coast Highway and Vermont Avenue intersection. As part of collaborative effort of the CIMP, the LACFCD's monitoring requirements have been incorporated into the DCWMA Group's CIMP.

## A.2.3.4 Machado Lake Pesticide and PCB TMDL (Machado Lake Toxics TMDL)

### *A.2.3.4.1 City of Los Angeles*

The Toxics TMDL requires Load Allocation Compliance and Numeric Target Assessment Monitoring. This includes sampling at the northern end, mid-point, and southern end of Machado Lake as well as the capture of fish for tissue analysis. Sediment samples will be collected at all three stations: ML-1, ML-2, and ML-3. The water column samples will be collected only at ML-3 (mid-point of the lake). Fish will be captured wherever they can be obtained throughout the lake. The monitoring requirements covered by these locations have been incorporated into the receiving water monitoring in the CIMP and upon approval of the CIMP this program will be incorporated by the CIMP Implementation.

### *A.2.3.4.2 County of Los Angeles Department of Public Works*

The County of Los Angeles Department of Public Works began monitoring in October 2014 for the Machado Lake Toxics TMDL under the *"Machado Lake Multi-pollutant TMDL Monitoring and Reporting Program (MRP) Quality Assurance and Project Plan (QAPP) for the Unincorporated Areas of Los Angeles County Within the Machado Lake Watershed"* (County of Los Angeles 2011). Monitoring is conducted at the same locations as the Machado Lake Nutrients TMDL, as noted in Section A.2.3.3.2. The monitoring requirements covered by the 3O_VAND site location have been incorporated into the receiving water monitoring in the CIMP, and upon approval of the CIMP, this program will be incorporated by the CIMP Implementation. The monitoring locations at 1O_ACAF and 2O_SCBG involve areas outside of the DCWMA Group area and will be addressed as part of the CIMPs that cover the respective areas.

### *A.2.3.4.3 Los Angeles County Flood Control District*

The Los Angeles County Flood Control District submitted the Machado Lake Toxics TMDL under the "*Machado Lake Nutrient & Toxics TMDL Monitoring & Reporting Plan for the Los Angeles County Flood Control District*" (LACFCD 2012). The LACFCD's MRP outlined the monitoring requirements covered by this location. As part of collaborative effort of the CIMP, the LACFCD's monitoring requirements have been incorporated into the DCWMA Group's CIMP.

## A.2.3.5 Machado Lake Trash TMDL

The Machado Lake Trash TMDL required the development of a Trash Monitoring and Reporting Plan (TMRP), which was developed by the Machado Lake Trash TMDL Jurisdictional Group in 2008. The TMRP established the baseline conditions for trash in the Machado Lake and the schedule for the installation of full capture devices, BMPs, or trash collection programs. The requirements of the TMRP, including the installation of full capture devices, will not be modified or incorporated by the CIMP Implementation.

## A.3 TMDL Monitoring Requirements

The TMDLs addressing water body-pollutant combinations within or downstream of the EWMP area are presented in Table 5. Part XIX.B of the MRP, the TMDL Basin Plan Amendments (BPAs), and the United States Environmental Protection Agency (USEPA) established TMDL documents include TMDL monitoring requirements and recommendations, which are summarized in each of the following subsections. Note that the Permit monitoring requirements are described in each of the approach sections.

The TMDLs addressing water body-pollutant combinations within or downstream of the EWMP area are presented in Table A-5. Part XIX.B of the MRP, the TMDL Basin Plan Amendments (BPAs), and the United States Environmental Protection Agency (USEPA) established TMDL documents include TMDL monitoring requirements and recommendations, which are summarized in each of the following subsections. Note that the Permit monitoring requirements are described in each of the approach sections.

**Table A-5: TMDLs Applicable to the Dominguez Channel, Dominguez Channel Estuary, and Los Angeles Harbor**

| TMDL | LARWQCB Resolution Number(s) | Effective Date and/or USEPA Approval Date |
|---|---|---|
| Dominguez Channel and Greater Los Angeles and Long Beach Harbors Waters Toxic Pollutants TMDLs | R11-088 | Mar 23, 2012 |
| Machado Lake Toxics TMDL | R10-008 | Mar 20, 2012 |
| Machado Lake Nutrient TMDL | 2008-006 | Mar 11, 2009 |
| Machado Lake Trash TMDL | 2007-006 | Mar 6, 2008 |
| Los Angeles Harbor Bacteria TMDL | 2004-011 | Mar 10, 2005 |

### A.3.1.1 Los Angeles Harbor Bacteria TMDL (Inner Cabrillo Beach and Main Ship Channel)

The Los Angeles Harbor Bacteria TMDL encompasses two separate areas of the Los Angeles Harbor: the Main Ship Channel and Inner Cabrillo Beach. These are listed separately due to the different uses, interests and environmental goals of the areas (LARWQCB 2004).

The TMDL requires a compliance monitoring program to assess compliance with the allowable exceedance days. If the number of exceedance days is greater than the allowable number of exceedance days, the City or the City and County will be considered out-of-compliance.

### A.3.1.2 Machado Lake Trash TMDL

The Machado Lake Trash TMDL includes monitoring based on a plan developed by the responsible jurisdictions and approved by the RWQCB with minimum requirements including assessment and quantification of trash collected from the surfaces and shoreline of Machado Lake (LARWQCB 2007).

### A.3.1.3 Machado Lake Eutrophic, Algae, Ammonia, and Odors (Nutrient) TMDL

The Machado Lake Eutrophic, Algae, Ammonia, and Odors (Nutrient) TMDL requires the development of a monitoring and reporting plan that will be designed to monitor and implement the TMDL to measure the progress of pollutant load reductions and improvements in water quality and to achieve the following goals:

1. Determine attainment of total phosphorus, total nitrogen, ammonia, dissolved oxygen, and chlorophyll a numeric targets.
2. Determine compliance with the waste load and load allocations for total phosphorus and total nitrogen.
3. Monitor the effect of implementation actions on lake water quality.
4. Field and water samples will be collected bi-weekly on a year-round basis. The lake sampling sites will be located in the open water portion of the lake with one in the northern portion and one in the southern portion of the lake (LARWQCB 2008).

### A.3.1.4 Machado Lake Pesticides and PCBs TMDL

The Machado Lake Pesticides and PCBs TMDL requires the implementation and assessment of the effectiveness of this TMDL (LARWQCB 2010). It is required to measure the progress of pollutant load reductions and improvements in water and sediment quality and fish tissue and achieve the following goals:

1. Determine attainment of OC pesticides and PCBs numeric targets.
2. Determine compliance with waste load and load allocations.
3. Monitor the effect of implementation actions on the lake.

Responsible parties assigned both WLAs and load allocations (LAs) may submit one document that addresses the monitoring requirements (as described below) and implementation activities for both WLAs and LAs. Monitoring shall be conducted to determine compliance with the WLAs and LAs (LARWQCB 2010).

The monitoring for WLAs will be conducted in two phases. Phase 1 monitoring will be conducted for two years, collecting samples during three (3) wet weather events each year, including the first large storm event of the season (LARWQCB 2010). Samples will be analyzed for total suspended solids (TSS). Sufficient volumes of suspended solids will be collected to analyze for the following pollutants:

- Total Organic Carbon
- Total PCBs
- DDT and Derivatives (DDE, DDD)
- Total Chlordane

Phase 2 monitoring will begin once Phase 1 has been completed. Samples will be collected during one (1) wet weather event every other year (LARWQCB 2010). Samples will be analyzed for TSS. Sufficient volumes of suspended solids will be collected to analyze for the following pollutants:

- Total Organic Carbon
- Total PCBs
- DDT and Derivatives (DDE, DDD)
- Total Chlordane

Monitoring to determine compliance with the TMDL load allocations and the fish tissue target will be conducted as part of the Lake Water Quality Management Plan (LWQMP). Lake sediment samples will be collected every three (3) years from three (3) locations in the lake (northern end, mid-point, southern end). All samples will be collected in accordance with SWAMP protocols (LARWQCB 2010). Sediment samples will be analyzed for:

- Total Organic Carbon
- Total PCBs
- DDT and Derivatives
- Total Chlordane

Fish shall be collected for tissue analysis every three (3) years (LARWQCB 2010). Fish tissue samples will be analyzed for:

- Total PCBs
- DDT and Derivatives
- Total Chlordane
- Dieldrin

#### A.3.1.5 Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL

The LARWQCB's Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL focuses on marine, inland water and human beneficial uses (LARWQCB and USEPA 2011). The TMDL requires implementing actions to meet WLAs and LAs at three specific water body areas each requiring separate MRPs. The three water body areas are as follows:

1. Dominguez Channel, Torrance Lateral, and Dominguez Channel Estuary
2. Greater Los Angeles and Long Beach Harbor Waters (including Consolidated Slip)
3. Los Angeles River and San Gabriel River

Monitoring for the Greater Harbor Waters and the Los Angeles River and San Gabriel River are addressed through other programs. The Harbors Toxics TMDL states that monitoring shall be completed under a Monitoring and Reporting Plan and Quality Assurance Project Plan. The monitoring program has not been implemented for this water body (LARWQCB and USEPA 2011).

The following are the requirements applicable for the Dominguez Channel, Torrance Lateral, and Dominguez Channel Estuary.

- Water Column Monitoring and toxicity testing required for freshwater portion of the Dominguez Channel
- Sediment Monitoring based on the Sediment Quality Objective compliance method (Sediment Triad Sampling)
- Fish tissue Monitoring

As recognized by the footnote in Attachment K-4 of the Permit, all members of the DCWMA Group have entered into an Amended Consent Decree with the United States and the State of California, including the LARWQCB, pursuant to which the LARWQCB has released the DCWMA Group from responsibility for toxic pollutants in the Dominguez Channel and the Greater Los Angeles and Long Beach Harbors. Accordingly, no inference should be drawn from the submission of this CIMP or from any action or implementation taken pursuant to it that the DCWMA Group is obligated to implement the DC Toxics TMDL, including this CIMP or any of the DC Toxics TMDL's other obligations or plans, or that the DCWMA Group has waived any rights under the Amended Consent Decree.

## A.4 Water Quality Priorities and Supporting Information For Monitoring To Address Priorities

Water quality in the watershed was assessed using available monitoring data, Total Maximum Daily Loads (TMDLs), 303(d) listed impairments, water quality thresholds listed in the Basin Plan for the Coastal Watersheds of the Los Angeles and Ventura Counties (Basin Plan) and the California Toxics Rule (CTR). Water-body pollutant combinations (WBPCs) were then categorized using the TMDLs, 303(d) listed impairments, and exceedance data for the Dominguez Channel (and tributaries), the Dominguez Channel Estuary, Machado Lake, and the Los Angeles Harbor areas.

WBPCs for which there were monitoring data were placed into one of the following three categories as outlined in the NPDES Permit:

- Category 1 (Highest Priority): Water body-pollutant combinations for which TMDLs have been established.
- Category 2 (High Priority): Pollutants for which data indicate water quality impairment in the receiving water according to the State's Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List (State Listing Policy).
- Category 3 (Medium Priority): Pollutants for which there are insufficient data to indicate water quality impairment in the receiving water according to the State's Listing Policy, but which exceed applicable receiving water limitations.

Table A-6 lists the categorized WBPCs for each water body.

**Table A-6: Water Body-Pollutant Categorization**

| Water Body | Category 1 | Category 2 | Category 3 |
|---|---|---|---|
| **Dominguez Channel (lined portion above Vermont Ave)** | Copper (diss.), Lead (diss.), Zinc (diss.), Toxicity | Indicator Bacteria, Ammonia, Diazinon | Cadmium (diss.), Chromium (diss.), Mercury (diss.), Thallium (diss.), Bis(2-Ethylhexl) phthalate, pH, Dissolved Oxygen |
| **Torrance Lateral** | Copper (diss.), Lead (diss.), Zinc (diss.) | Coliform Bacteria | Cadmium (diss.), Cyanide, pH, Ammonia, PCBs (sed.), DDT (sed.) |
| **Dominguez Estuary (unlined portion below Vermont)** | Cadmium (sed.), Copper (diss. and sed.), Lead (diss., sed., & tissue), Zinc (diss. & sed.), DDT (tissue & sed.), PCBs (sed.), Chlordane (tissue & sed.), Dieldrin (tissue & sed.), PAHs (sed.), Benthic Community Effects, Sediment Toxicity | Ammonia, Coliform Bacteria | Arsenic (sed.), Chromium (sed.), Silver (diss. & sed.), Nickel (diss.), Mercury (sed.), Thallium (diss.) |
| **Machado Lake** | Trash, Total Phosphorus, Total Nitrogen, Ammonia, Chlorophyll-a, PCBs (sed.), DDT (sed.), Chlordane (sed.), Dieldrin (sed.), Dissolved Oxygen | *None* | *E. coli*, pH |
| **Wilmington Drain** | *None* | Coliform Bacteria, Copper (diss.), Lead (diss.) | Total Nitrogen, DDT (sed.), PCBs (sed.), Chlordane, Dieldrin (sed.) |
| **LA Harbor[1] – Cabrillo Marina** | DDT (tissue & sed.), PCBs (tissue & sed.), PAHs | *None* | *None* |
| **LA Harbor[1] – Consolidated Slip** | Cadmium, Chromium, Copper, Lead, Mercury, Zinc, DDT (tissue & sed.), PCBs (tissue & sed.), PAHs (sed.), Chlordane (tissue & sed.), Dieldrin, Toxaphene (tissue), Benthic Community Effects, Sediment Toxicity | *None* | Arsenic, Silver, Nickel |
| **LA Harbor[1] – Fish Harbor** | Copper, Lead, Mercury, Zinc, DDT (tissue & sed.), PCBs (tissue & sed.), Chlordane, PAHs, Sediment Toxicity | *None* | *None* |

| Table A-6: Water Body-Pollutant Categorization | | | |
|---|---|---|---|
| **Water Body** | **Category 1** | **Category 2** | **Category 3** |
| **LA/LB Inner Harbor[1]** | Copper, Lead, Zinc, DDT (tissue & sed.), PCBs (tissue & sed.), PAHs, Benthic Community Effects, Sediment Toxicity, Indicator Bacteria | *None* | Copper (diss.), Silver (diss.) |
| **LA/LB Outer Harbor[1]** | DDT (tissue & sed.), PCBs (tissue & sed.), Sediment Toxicity | *None* | Cadmium, Nickel, Silver (diss.), Copper (diss.), Mercury |
| **LA Harbor[1] – Inner Cabrillo Beach** | Indicator Bacteria, DDT (sed. and tissue), PCBs (tissue & sed.) | *None* | *None* |

[1)] Los Angeles Harbor metals and organic pollutants constituents are for sediment unless otherwise noted.

### A.4.1 Water Body-Pollutant Combinations Subject to TMDL

Within the DCWMA there are several distinct water body segments that have different associated water quality objectives. These include the Dominguez Channel (the lined freshwater portion above Vermont Ave.), the Dominguez Channel Estuary (the unlined estuarine portion below Vermont Ave.), Machado Lake, Cabrillo Beach, and the Los Angeles Harbor. Each of the water body segments are listed as impaired for a number of constituents on California's 2010 303(d) List of Water Quality Limited Segments. TMDLs have been developed for several segments and pollutants. These include: the TMDL for Toxic Pollutants in Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters; the Machado Lake Pesticides and PCBs TMDL; the TMDL for Eutrophic, Algae, Ammonia, and Odors (Nutrient) in Machado Lake; and the Los Angeles Harbor Bacteria TMDL (Inner Cabrillo Beach and Main Ship Channel). The applicable TMDL compliance schedules used for setting priorities are listed in Table A-7.

| Table A-7: TMDL Compliance Deadlines | | | | |
|---|---|---|---|---|
| **TMDL** | **Constituents** | **Effective Date** | **Interim Deadline** | **Final Deadline** |
| **Los Angeles Harbor Bacteria TMDL[1]** | Total coliform, Fecal Coliform, *Enterococcus* | March 10, 2005 | | March 10, 2010 |
| **Machado Lake Nutrient TMDL** | Total Phosphorus, Total Nitrogen, Ammonia-N, Dissolved Oxygen, Chlorophyll-a | March 11, 2009 | March 11, 2014 | September 11, 2018 |
| **Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL** | Copper, Lead, Zinc, Mercury, Chlordane, 4,4'-DDT, Total PCBs, Benzo[a]pyrene, Dieldrin | March 23, 2012 | March 23, 2012 | March 23, 2032 |

[1]Time Schedule Order (TSO) No. R4-2014-0023 became effective February 6, 2014 and established interim requirements while responsible parties continue to work towards meeting the requirements of the final deadline, which passed on 3/10/2010. The TSO only applied to Inner Cabrillo Beach site CB01.

Several documents were used to evaluate receiving water quality in the watershed including the 1994 Basin Plan for the Coastal Watersheds of the Los Angeles and Ventura Counties (Basin Plan); the TMDLs for Dominguez Channel, Machado Lake, and Cabrillo Beach adopted as Basin Plan Amendments; other amendments to the Basin Plan Water Quality Standards; California's 303(d) List of Water Quality Limited Segments; and the California Toxics Rule (CTR) (2000). The Basin Plan designates the beneficial uses for surface waters in the Los Angeles Region and sets numeric objectives to protect the designated beneficial uses. The 2010 303(d) list indicates which pollutants are causing impairment to the beneficial uses of the different water bodies in the watershed. The California Toxics Rule establishes numeric thresholds for priority toxic pollutants in the State of California. These objectives have been developed for the protection of aquatic life under acute and chronic exposures, and for protection of human health.

## A.4.2 Water Body-Pollutant Combinations on 2010 303(d) List

Numeric and non-numeric screening considerations were compiled from the regulatory compliance documents for protection of the designated beneficial uses of the different water bodies. The constituents evaluated for each water body are shown in Table A-8.

**Table A-8: Screening Considerations**

| Water Body | Beneficial Uses | 303(d) Listed Impairments | Water Quality Criteria Source | Constituents Evaluated |
|---|---|---|---|---|
| Dominguez Channel (lined portion above Vermont Ave) | *Existing*: RARE, REC-2<br><br>*Potential*: WARM, WILD, REC-1 | Ammonia; Copper; Diazinon; Indicator Bacteria; Lead; Toxicity; Zinc | TMDL | Copper; Lead; Zinc; 4,4'-DDT; Total PCBs; Dieldrin |
| | | | Basin Plan | *E. coli*; Fecal Coliform; Ammonia |
| | | | CTR | Arsenic; Cadmium; Chromium (IV); Nickel; Silver |
| Dominguez Estuary (unlined portion below Vermont) | *Existing*: COMM, EST, MAR, WILD, RARE, MIGR, SPWN, REC-1, REC-2<br><br>*Potential*: NAV | Ammonia; Benthic Community Effects; Benz(a)preen; Benz(a)anthracite; Chlordane (tissue); Chrysene; Coliform Bacteria; DDT (tissue & sediment); Lead (tissue); PCBs; Phenanthrene; Sediment Toxicity; Zinc (sediment) | TMDL | Copper; Lead; Zinc; Mercury |
| | | | Basin Plan | Total Coliform; Fecal Coliform; *Enterococcus*; Ammonia |
| | | | CTR | Antimony; Arsenic; Cadmium; Nickel; Selenium; Silver; Thallium |

| Table A-8: Screening Considerations | | | | |
|---|---|---|---|---|
| **Water Body** | **Beneficial Uses** | **303(d) Listed Impairments** | **Water Quality Criteria Source** | **Constituents Evaluated** |
| Machado Lake | *Existing*: WARM, WILD, RARE, WET, REC-1, REC-2 | Machado Lake: Algae; Ammonia; ChemA (tissue); Chlordane (tissue); DDT (tissue); Dieldrin (tissue); Eutrophic; Odor; PCBs; Trash<br><br>Wilmington Drain: Coliform Bacteria; Copper; Lead | TMDL | Ammonia; Chlorophyll-a; DO; Total Nitrogen; Total Phosphorus |
| | | | Basin Plan | *E. coli* |
| | | | CTR | None |
| Inner Cabrillo Beach | *Existing*: NAV, COMM, MAR, WILD, MIGR, SPWN, SHELL | DDT, Indicator Bacteria, PCBs | TMDL | Total Coliform; Fecal Coliform; *Enterococcus* |
| | | | Basin Plan | None |
| | | | CTR | None |

Chronic water quality criteria were used for screening dry weather conditions and acute water quality criteria were used for screening wet weather conditions. Where weather conditions were not defined, the more conservative dry-weather criteria were used. The regulatory considerations used for evaluating the water body-pollutant combinations included the following:

**Ammonia**

- Dominguez Channel – Used the 30-day average (dry-weather) and one-hour average (wet-weather) pH and temperature dependent water quality objectives for Ammonia as N for freshwater segments (Basin Plan Amendment for Ammonia, 2002). The ambient pH and temperature at the time of sampling was used to calculate the Ammonia objectives.

- Dominguez Channel Estuary – Used the 4-day average (dry-weather) concentration of unionized Ammonia for waters not characteristic of freshwater as defined in the 2004 Basin Plan Amendment for Ammonia. The 0.035 mg/L value for NH3 was converted to NH3 as N by multiplying by 0.833, the molecular weight conversion factor suggested in the Basin Plan for converting given values of Ammonia as NH3 to Ammonia as N. No wet weather samples were present.

- Machado Lake – Used the TMDL water quality target for Ammonia from the Machado Lake Nutrients TMDL.

**Nutrients other than Ammonia**

- Machado Lake – Used the TMDL water quality targets for Total Nitrogen, Total Phosphorous, and Chlorophyll-a from the Machado Lake Nutrients TMDL.

**Bacteria (the geometric mean was not used to evaluate the data due to the requirement of a minimum number of samples not being met)**

- Dominguez Channel – Used the Basin Plan water quality objective for Fecal Coliform for waters designated non-water contact recreation (REC-2) and not designated for water contact recreation (REC-1), where no more than 10% of samples collected during a 30-day period can exceed the criterion (Basin Plan). Because the Channel has a potential designated beneficial use for REC-1, the Basin Plan single sample water quality objective for E. coli in freshwaters designated REC-1 was also investigated (Basin Plan Amendment for Bacteria, 2011).

- Dominguez Channel Estuary – Used the single sample limits for Total Coliform, Fecal Coliform, and Enterococcus from the Basin Plan Amendment (2001) for Marine Waters designated for Water Contact Recreation (REC-1).

- Machado Lake – Used the single sample limit for E. coli. from the Basin Plan Amendment (2011) for Freshwaters designated for Water Contact Recreation (REC-1).

- Cabrillo Beach – Used the single sample limits for Total Coliform, Fecal Coliform, and Enterococcus from the Los Angeles Harbor Bacteria TMDL (2004).

**Metals**

- Dominguez Channel – Criterion Continuous Concentrations (CCCs) and Criterion Maximum Concentrations (CMCs) were used for screening freshwater for dry and wet weather samples, respectively, and were calculated using CTR formulas with the ambient hardness at the time of sampling. The CTR water quality criteria for Copper, Lead, and Zinc are listed as wet weather receiving water targets in the Dominguez Channel Toxics TMDL as well.

- Dominguez Channel Estuary – Because no salinity data was available for the Estuary, the most stringent values between freshwater CMCs and saltwater CMCs for wet-weather, and freshwater CCCs and saltwater CCCs for dry or undefined weather were used. CTR human health criteria for consumption of organisms were used for Thallium (dry weather only) and Mercury. The CTR water quality criteria for Copper, Lead, Zinc, and Mercury are listed as receiving water targets in the Dominguez Channel Toxics TMDL as well.

- Machado Lake – No sampling results for metals were reported for Machado Lake, so no criteria were examined.

**Organic Compounds**

- Dominguez Channel – The freshwater CMCs for wet-weather and the CCCs dry-weather and undefined weather were used for 4,4'-DDT, Total PCBs, and Dieldrin as listed in the CTR and Dominguez Channel Toxics TMDL.

- Dominguez Channel Estuary – No sampling results for organic compounds were reported for the Estuary, so no criteria were examined.

- Machado Lake – No sampling results for organic compounds were reported for Machado Lake, so no criteria were examined.

The numeric results of the screening considerations are presented in the Appendix along with the compiled water quality data.

### A.4.3 Water Body-Pollutant Combinations with Receiving Water Limitations Exceedances

The regulatory thresholds described above were compared with the compiled data and values that exceeded the regulatory thresholds were flagged for different water bodies segmented according to locations of water quality sampling stations. The water body-pollutant combinations were then divided into categories according to the NPDES MS4 Permit. A summary of the classified water body-pollutant combinations are presented in Table A-9.

### A.4.4 Water Quality Priorities Summary

Water body-pollutant combinations were prioritized based on the following criteria:

- **Priority 1:** TMDLs for which there are water quality-based effluent limitations and/or receiving water limitations with interim or final compliance deadlines within the Permit term (i.e., December 28, 2012 through December 28, 2017), or TMDL compliance deadlines that have already passed (i.e., prior to December 28, 2012) and limitations have not been achieved.

- **Priority 2:** Water body-pollutant combinations where data indicate impairment or exceedances of receiving water limitations in the receiving water and the findings from the source assessment implicate discharges from the MS4.

- **Priority 3:** TMDLs for which there are water quality-based effluent limitations and/or receiving water limitations with interim or final compliance deadlines beyond the Permit term.

The results of the prioritizations show that all reaches of the Dominguez Channel and Estuary have Priority 1 and Priority 2 constituents.

The initial water quality priorities assessment shows that both the Channel and the Estuary are high priority areas for metals (Priority 1) and ammonia and bacteria (Priority 2). Priority 1 pollutants for Machado Lake are primarily nutrients (Total Nitrogen and Total Phosphorus). Bacteria are a Priority 1 pollutant group for Cabrillo Beach since there is an active TMDL and ongoing exceedances above the compliance requirements. The Consolidated Slip and Harbor areas should also be considered Priority 1 for PCBs and DDT in sediment based on the current TMDL thresholds.

| Table A-9: Summary of Exceedances in the Past 5 Years | | | | | |
|---|---|---|---|---|---|
| **Receiving Water Body** | **Sampling Location** | **Weather** | **Category 1 (TMDL)** | **Category 2 (303-d List or Equivalent)** | **Category 3 (Basin Plan, CTR)** |
| Dominguez Channel | El Segundo Blvd (Main) | Dry | - | Dissolved Copper, Dissolved Lead[1], *E. coli*, Ammonia[1] | - |
| | | Wet | Dissolved Copper[2] | *E. coli* | - |
| | | Undefined | - | Dissolved Copper[2], Dissolved Lead[2], Dissolved Zinc[2] | Dissolved Arsenic[2], Dissolved Cadmium[2], Dissolved Chromium (VI)[2] |
| | Yukon Ave (Tributary) | Dry | - | Dissolved Copper, Dissolved Lead[1], *E. coli* | Dissolved Chromium (VI)[2] |
| | | Wet | Dissolved Zinc[2] | *E. coli*[1] | - |
| | | Undefined | - | Dissolved Copper[2], Dissolved Lead[2] | - |
| | Sampling Station S-28 (Main) | Dry | - | Fecal Coliform, Dissolved Copper, Dissolved Lead, Dissolved Zinc | - |
| | | Wet | Dissolved Copper, Dissolved Lead, Dissolved Zinc | Ammonia, Fecal Coliform | Dissolved Cadmium[1] |
| | | Undefined | - | Fecal Coliform[1], Dissolved Lead[1], Dissolved Zinc[1] | - |
| | Western Ave (Main) | Dry | - | Dissolved Lead[1], Dissolved Copper[2], *E. coli* | Dissolved Cadmium[2] |
| | | Wet | Dissolved Copper[2] | *E. coli* | - |
| | | Undefined | - | Dissolved Copper[2], Dissolved Lead[2], Dissolved Zinc[2] | Dissolved Arsenic[2] |
| | Vermont Ave (Main) | Dry | - | Dissolved Lead[1], Dissolved Copper[2], *E. coli* | - |
| | | Wet | Dissolved Copper[2] | *E. coli* | - |
| | | Undefined | - | Dissolved Copper[2] | Dissolved Arsenic[1] |

| Table A-9: Summary of Exceedances in the Past 5 Years | | | | | |
|---|---|---|---|---|---|
| **Receiving Water Body** | **Sampling Location** | **Weather** | **Category 1 (TMDL)** | **Category 2 (303-d List or Equivalent)** | **Category 3 (Basin Plan, CTR)** |
| | Carson Plaza Dr (Tributary) | Dry | - | Dissolved Copper[2], *E. coli* | Total Selenium |
| | | Wet | - | *E. coli*[1] | - |
| | | Undefined | - | Dissolved Copper[2], Dissolved Lead[2] | Total Selenium, Dissolved Arsenic[2] |
| | Main St (Tributary) | Dry | - | Dissolved Copper[1], Dissolved Lead[1], *E. coli* | - |
| | | Wet | Dissolved Copper[2] | *E. coli* | - |
| | | Undefined | - | Dissolved Copper[2], Dissolved Lead[2], Dissolved Zinc[2] | Dissolved Cadmium[2] |
| Dominguez Channel Estuary | Wilmington Ave (Main) | Dry | Dissolved Zinc[1], Dissolved Lead[1], Dissolved Copper | *Enterococcus,* Total Coliform, Ammonia[1] | Dissolved Nickel, Dissolved Thallium[2], Dissolved Silver[2] |
| | | Wet | Dissolved Zinc[1], Dissolved Copper[1] | *Enterococcus,* Total Coliform | - |
| | | Undefined | Dissolved Copper[1], Dissolved Lead[2], Dissolved Zinc[2] | - | Dissolved Nickel[1], Dissolved Thallium[2] |
| | Henry Ford Ave (Main) | Dry | Dissolved Copper, Dissolved Lead[1], Mercury[2] | *Enterococcus*, Total Coliform, Ammonia[1] | Dissolved Nickel, Dissolved Thallium[2] |
| | | Wet | Dissolved Copper[1] | *Enterococcus*, Total Coliform | - |
| | | Undefined | Dissolved Copper[1], Dissolved Lead[2], Dissolved Zinc[2] | - | Dissolved Nickel[1], Dissolved Silver[2], Dissolved Thallium[2] |

| Table A-9: Summary of Exceedances in the Past 5 Years | | | | | |
|---|---|---|---|---|---|
| **Receiving Water Body** | **Sampling Location** | **Weather** | **Category 1 (TMDL)** | **Category 2 (303-d List or Equivalent)** | **Category 3 (Basin Plan, CTR)** |
| Machado Lake | ML-1 | Dry | Chlorophyll-a, Total Nitrogen | - | - |
| | | Wet | Chlorophyll-a[1], Total Nitrogen | - | - |
| | | Undefined | Dissolved Oxygen, Total Phosphorus | - | *E. coli* |
| | ML-2 | Dry | Chlorophyll-a, Total Nitrogen | - | - |
| | | Wet | Chlorophyll-a**[1]**, Total Nitrogen | - | - |
| | | Undefined | Dissolved Oxygen, Total Phosphorus | - | *E. coli* |
| | ML-3 | Dry | Chlorophyll-a, Total Nitrogen | - | - |
| | | Wet | Chlorophyll-a[1], Total Nitrogen[1] | - | - |
| | | Undefined | - | - | *E. coli* |
| | ML-4 | Dry | Chlorophyll-a, Total Nitrogen | - | - |
| | | Wet | Chlorophyll-a**[1]**, Total Nitrogen[1] | - | - |
| | | Undefined | - | - | *E. coli* |
| | Project 77 Storm Drain | Dry | Total Nitrogen | - | - |
| | | Wet | Total Nitrogen | - | - |
| | | Undefined | - | - | *E. coli*[1] |
| | Project 510 Storm Drain | Dry | Total Nitrogen | - | - |
| | | Wet | Total Nitrogen[2] | - | - |
| | | Undefined | - | - | - |
| | Wilmington Drain | Dry | Total Nitrogen | - | - |
| | | Wet | Total Nitrogen | - | - |
| | | Undefined | - | - | *E. coli*[2] |

[1] Only one exceedance encountered in the past 5 years of available data.

[2] No exceedances encountered in the past 5 years of data, but exceedances present more than 5 years ago.

# Attachment B:
# Monitoring Location
# Fact Sheets and Justification

| | | |
|---|---|---|
| **Site ID:** DOM-RW-DC01 | **Watershed:** Dominguez | **Status:** Active Receiving Water Site |
| **Historical Site ID:** None | **Monitoring Type:** Mass Emission / TMDL – DC | **Catchment Area:** 10,239.5 Acres |
| **Other ID:** Dominguez Channel | **Latitude:** 33.909458 | **DCWMA Group Area:** 10,191.2 Acres |
| | **Longitude:** -118.32579 | **DCMWA Area Ratio:** 99.5% |

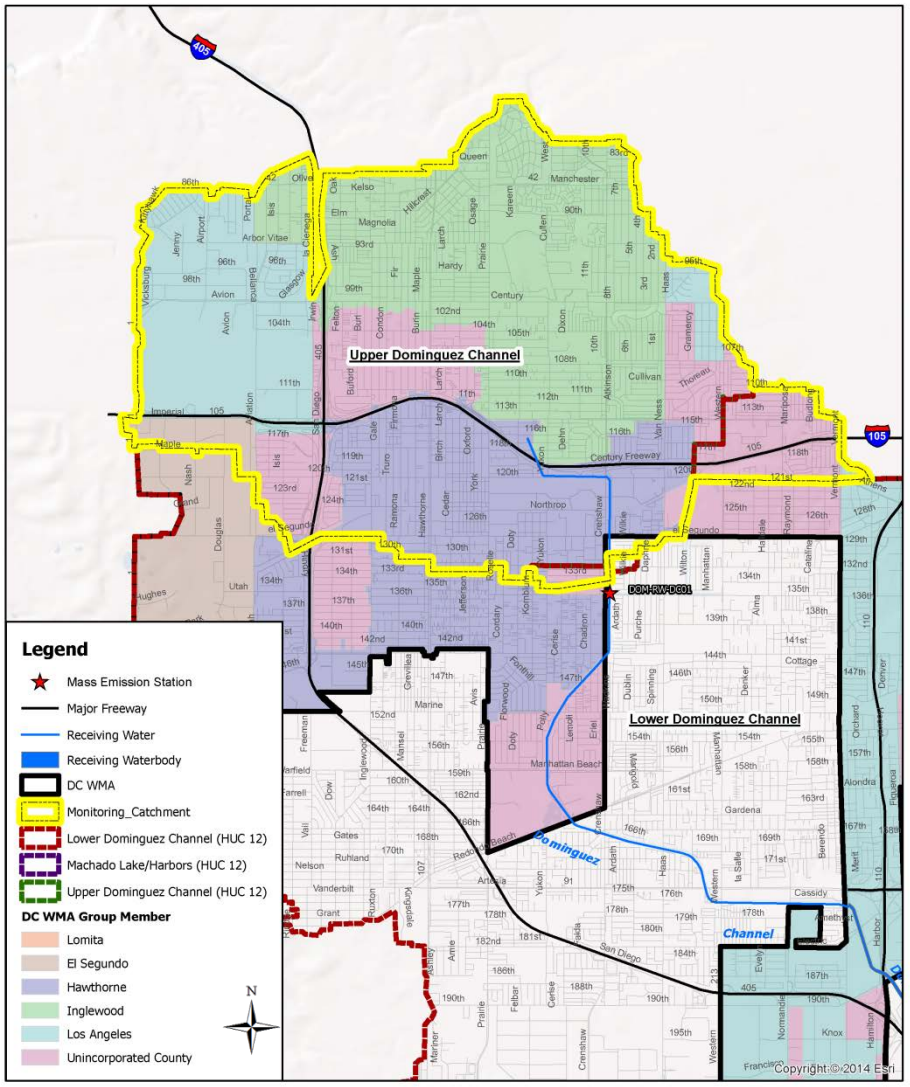
| **Catchment Land Use** | **(DCWMA/ALL)** | |
|---|---|---|
| Agricultural | 0.1% | 0.1% |
| Commercial / Institutional | 18.5% | 18.5% |
| Industrial | 8.4% | 8.4% |
| Residential | 39.2% | 39.3% |
| Transportation | 32.3% | 32.3% |
| Vacant | 1.5% | 1.5% |
| Water | 0.0% | 0.0% |

**DCWMA Group(s) in Catchment:**
Cities of Los Angeles; Inglewood, Hawthorne; El Segundo; County of Los Angeles

**Non-DCWMA Group(s) in Catchment:**
City of Gardena

**Comments:** Site access is via the Los Angeles County Flood Control District Right of Way at the northwest corner for the 135th St. bridge over Dominguez Channel, east of Crenshaw Blvd.

**Watershed Map**




**Site Location**


**Upstream View**

**Site Access**

| | | |
|---|---|---|
| **Site ID:** DOM-RW-DCE01 | **Watershed:** Dominguez | **Status:** Active Receiving Water Site |
| **Historical Site ID:** None | **Monitoring Type:** TMDL – Dominguez Estuary | **Catchment Area:** 25,554.0 Acres |
| **Other ID:** None | **Latitude:** 33.870514 | **DCWMA Group Area:** 16,800.7 Acres |
| | **Longitude:** -118.289802 | **DCMWA Area Ratio:** 65.7% |

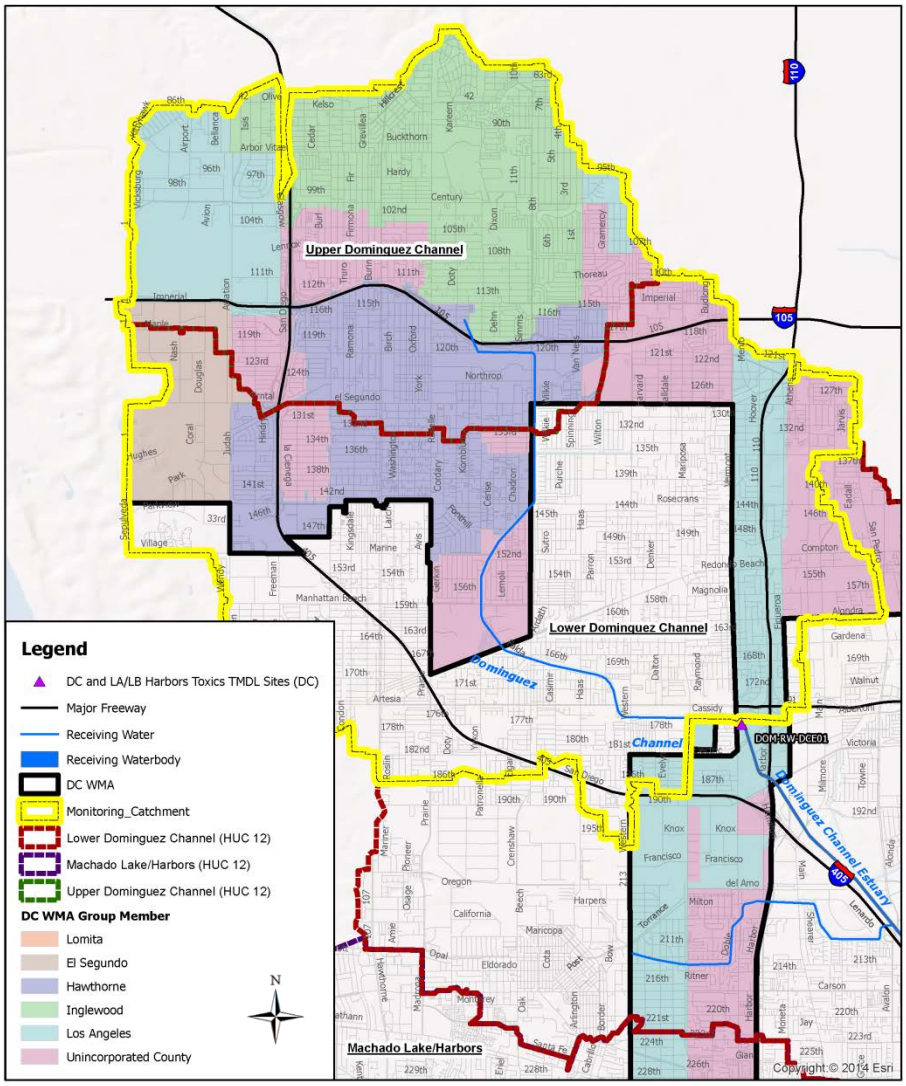
| **Catchment Land Use** | **(DCWMA/ALL)** | |
|---|---|---|
| Agricultural | 0.3% | 0.6% |
| Commercial / Institutional | 17.2% | 17.0% |
| Industrial | 13.4% | 12.9% |
| Residential | 38.9% | 41.5% |
| Transportation | 28.4% | 26.6% |
| Vacant | 1.6% | 1.3% |
| Water | 0.1% | 0.0% |

**DCWMA Group(s) in Catchment:**
Cities of Los Angeles; Inglewood, Hawthorne; El Segundo; County of Los Angeles

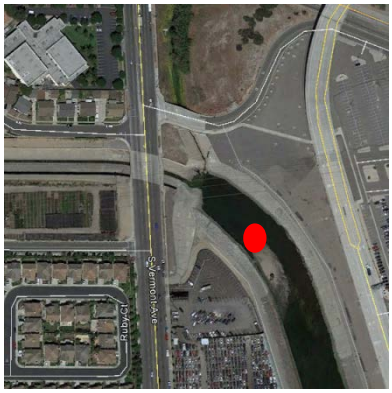
**Non-DCWMA Group(s) in Catchment:**
Cities of Gardena; Torrance, Redondo Beach

**Comments:** Site access is via the Los Angeles County Flood Control District Right of Way south of Vermont Ave. bridge over Dominguez Channel.

**Watershed Map**

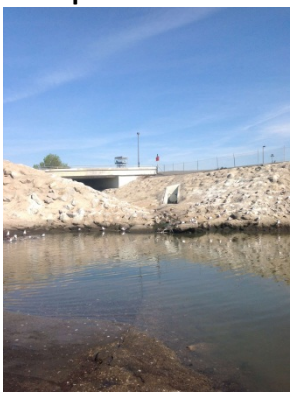



**Site Location**



**Downstream View**

**Upstream View**



| | | |
|---|---|---|
| **Site ID:** DOM-RW-DCE02 | **Watershed:** Dominguez | **Status:** Active Receiving Water Site |
| **Historical Site ID:** None | **Monitoring Type:** TMDL – Dominguez Estuary | **Catchment Area:** 45,523.4 Acres |
| **Other ID:** None | **Latitude:** 33.791886 | **DCWMA Group Area:** 21,412.1 Acres |
| | **Longitude:** -118.230535 | **DCMWA Area Ratio:** 47.0% |

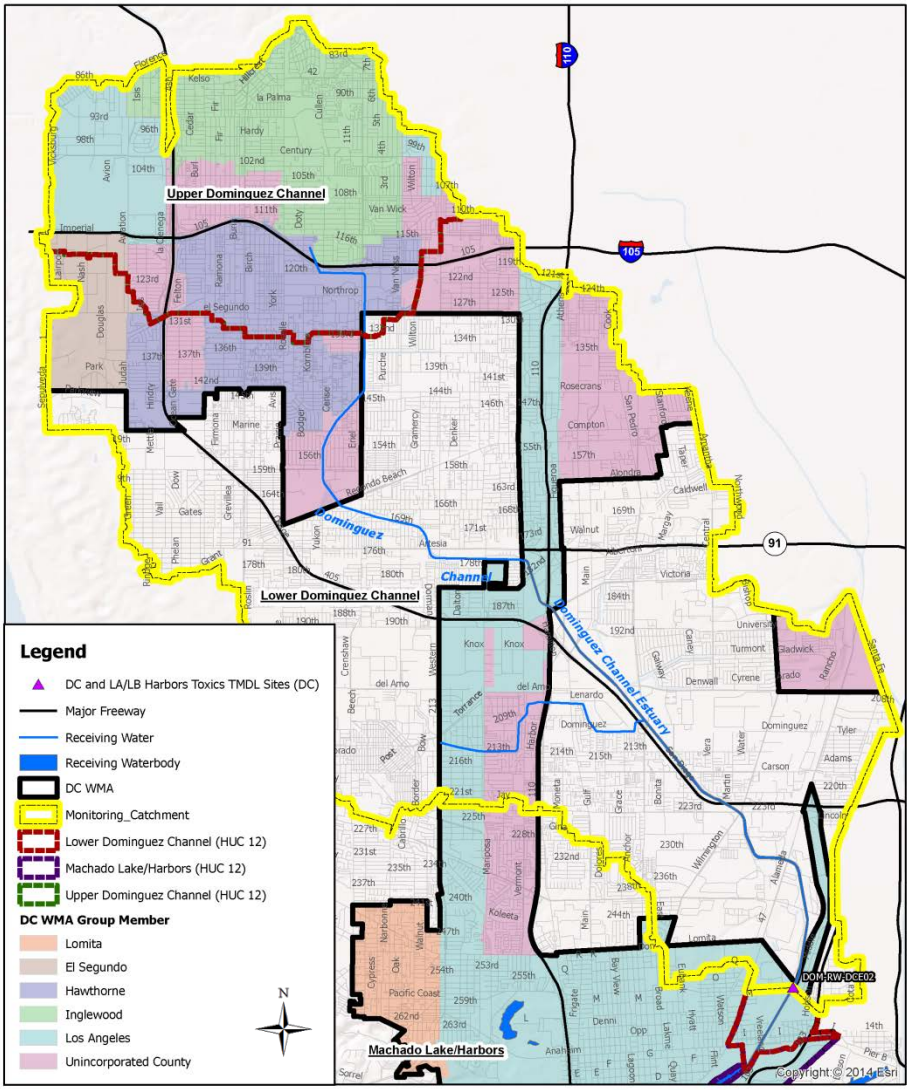
| **Catchment Land Use** | **(DCWMA/ALL)** | |
|---|---|---|
| Agricultural | 0.3% | 0.9% |
| Commercial / Institutional | 16.5% | 15.5% |
| Industrial | 19.4% | 23.5% |
| Residential | 35.4% | 34.2% |
| Transportation | 26.6% | 23.2% |
| Vacant | 1.7% | 2.1% |
| Water | 0.2% | 0.5% |

**DCWMA Group(s) in Catchment:**
Cities of Los Angeles; Inglewood, Hawthorne; El Segundo; County of Los Angeles

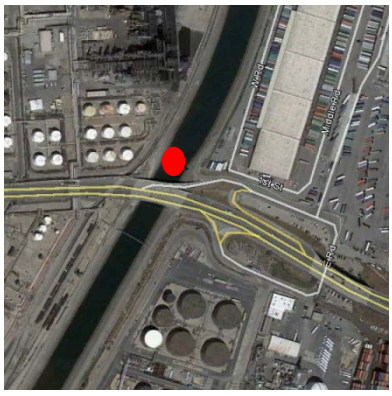
**Non-DCWMA Group(s) in Catchment:**
Cities of Gardena; Torrance; Redondo Beach; Carson

**Comments:** Site access is via the Los Angeles County Flood Control District Right of Way off of E St. E St. is accessed via Pacific Coast Highway, east of the Pacific Coast Highway Bridge over Dominguez Channel. Site can also be accessed via boat from Los Angeles Harbor.

**Watershed Map**




**Site Location**



**Downstream View**

**Upstream View**

| | | |
|---|---|---|
| **Site ID:** DOM-RW-TL01 | **Watershed:** Dominguez | **Status:** Active Receiving Water Site |
| **Historical Site ID:** None | **Monitoring Type:** TMDL – Torrance Lateral | **Catchment Area:** 5,339.3 Acres |
| **Other ID:** None | **Latitude:** 33.844779 | **DCWMA Group Area:** 1,548.9 Acres |
| | **Longitude:** -118.286518 | **DCMWA Area Ratio:** 29.0% |

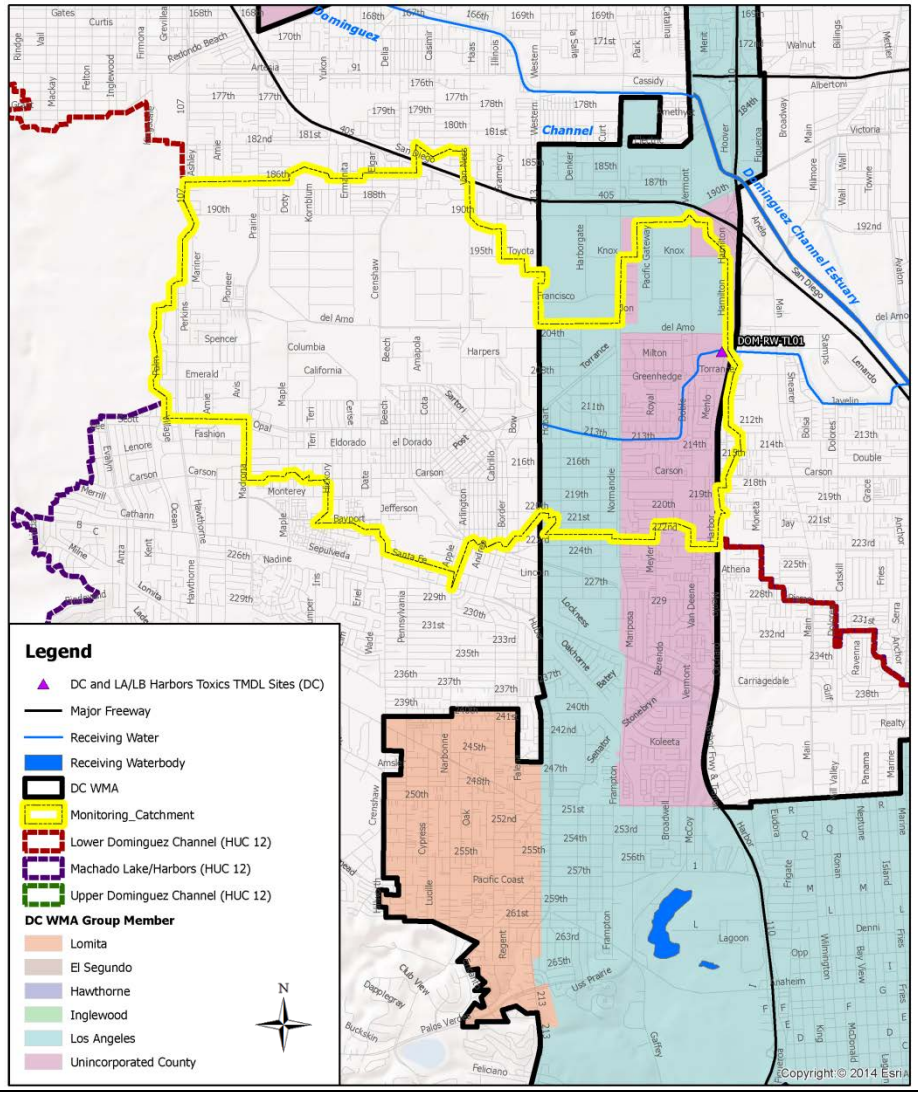
| **Catchment Land Use** | **(DCWMA/ALL)** | |
|---|---|---|
| Agricultural | 0.0% | 0.4% |
| Commercial / Institutional | 16.7% | 15.7% |
| Industrial | 21.3% | 35.8% |
| Residential | 38.4% | 27.1% |
| Transportation | 21.8% | 18.3% |
| Vacant | 1.8% | 2.6% |
| Water | 0.0% | 0.0% |

**DCWMA Group(s) in Catchment:**
City of Los Angeles; County of Los Angeles

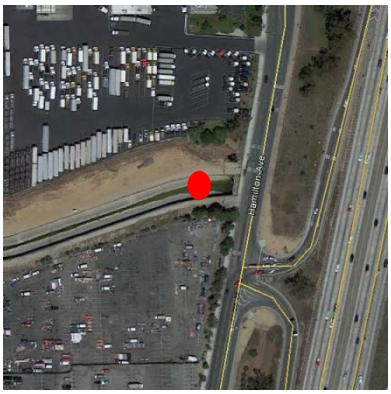
**Non-DCWMA Group(s) in Catchment:**
City of Torrance

**Comments:** Site access is via the Los Angeles County Flood Control District Right of Way off of Hamilton Ave. between Del Amo Blvd. and Torrance Blvd.

**Watershed Map**




**Site Location**



**Downstream View**

**Upstream View**

| | | |
|---|---|---|
| **Site ID:** ML-1 | **Watershed:** Dominguez | **Status:** Active Receiving Water Site |
| **Historical Site ID:** None | **Monitoring Type:** TMDL – Machado Lake | **Catchment Area:** 14,954.0 Acres |
| **Other ID:** None | **Latitude:** 33.787913 | **DCWMA Group Area:** 4,558.4 Acres |
| | **Longitude:** -118.292661 | **DCMWA Area Ratio:** 30.5% |

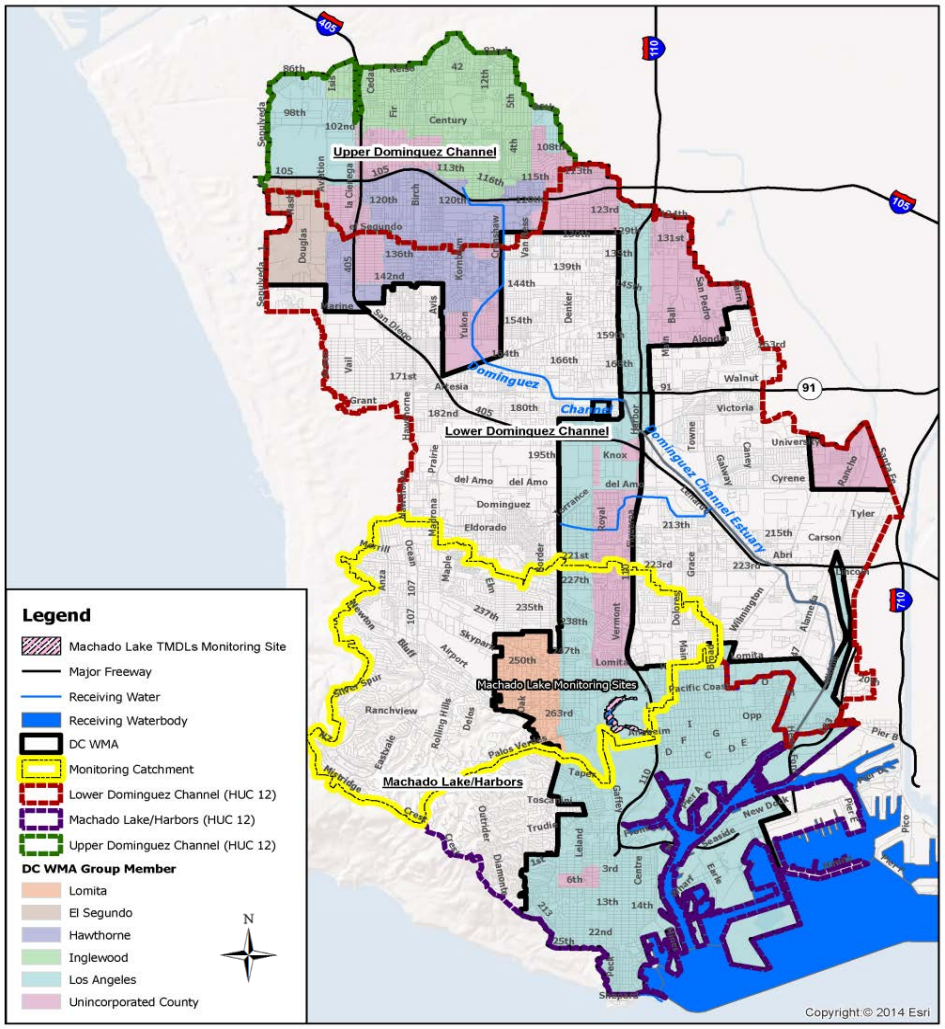
| **Catchment Land Use** | **(DCWMA/ALL)** | |
|---|---|---|
| Agricultural | 0.1% | 0.7% |
| Commercial / Institutional | 14.1% | 14.0% |
| Industrial | 7.5% | 8.4% |
| Residential | 48.7% | 48.9% |
| Transportation | 19.9% | 19.9% |
| Vacant | 9.0% | 7.7% |
| Water | 0.8% | 0.4% |

**DCWMA Group(s) in Catchment:**
Cities of Los Angeles; Lomita; County of Los Angeles

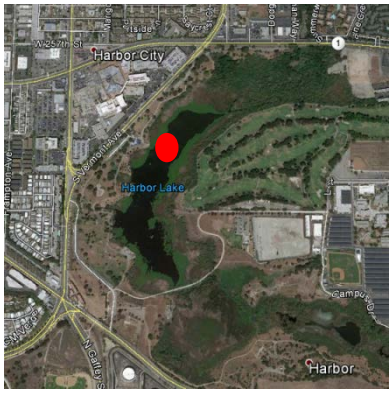
**Non-DCWMA Group(s) in Catchment:**
Cities of Torrance; Rolling Hills Rolling Hills Estates; Palos Verdes; Rancho Palos Verdes; Carson

**Comments:** Site access is via the Ken Mallory Harbor Regional Park at the intersection on Vermont Ave and Normandie Ave.

**Watershed Map**




**Site Location**




**Lake View**

**Lake View**

| | | |
|---|---|---|
| **Site ID:** ML-2 | **Watershed:** Dominguez | **Status:** Active Receiving Water Site |
| **Historical Site ID:** None | **Monitoring Type:** TMDL – Machado Lake | **Catchment Area:** 14,954.0 Acres |
| **Other ID:** None | **Latitude:** 33.783196 | **DCWMA Group Area:** 4,558.4 Acres |
| | **Longitude:** -118.293571 | **DCMWA Area Ratio:** 30.5% |

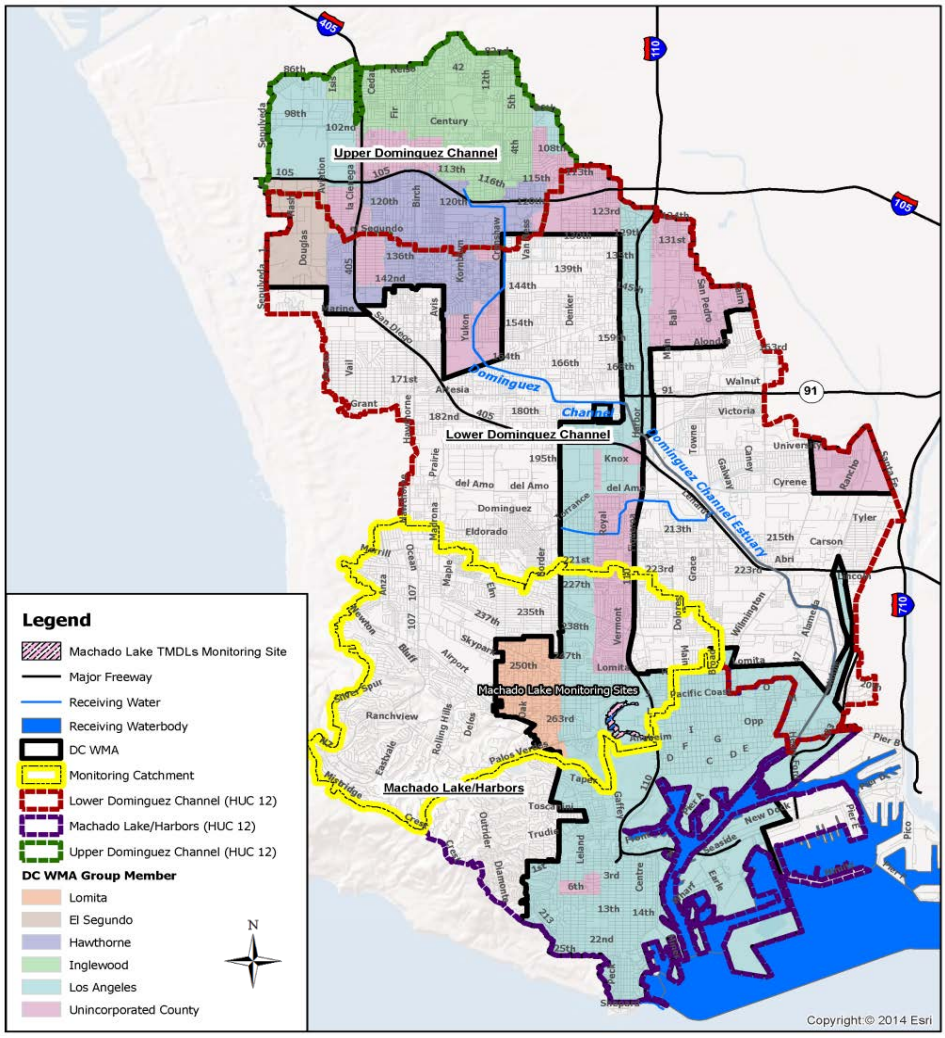
| **Catchment Land Use** | **(DCWMA/ALL)** | |
|---|---|---|
| Agricultural | 0.1% | 0.7% |
| Commercial / Institutional | 14.1% | 14.0% |
| Industrial | 7.5% | 8.4% |
| Residential | 48.7% | 48.9% |
| Transportation | 19.9% | 19.9% |
| Vacant | 9.0% | 7.7% |
| Water | 0.8% | 0.4% |

**DCWMA Group(s) in Catchment:**
Cities of Los Angeles; Lomita; County of Los Angeles

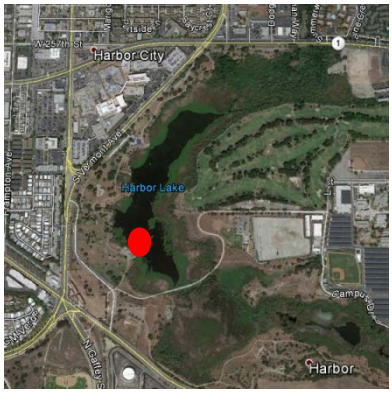
**Non-DCWMA Group(s) in Catchment:**
Cities of Torrance; Rolling Hills Rolling Hills Estates; Palos Verdes; Rancho Palos Verdes; Carson

**Comments:** Site access is via the Ken Mallory Harbor Regional Park at the intersection on Vermont Ave and Normandie Ave.

**Watershed Map**




**Site Location**




**Lake View**

**Lake View**

| | | |
|---|---|---|
| **Site ID:** ML-3 | **Watershed:** Dominguez | **Status:** Active Receiving Water Site |
| **Historical Site ID:** None | **Monitoring Type:** TMDL – Machado Lake | **Catchment Area:** 14,954.0 Acres |
| **Other ID:** None | **Latitude:** 33.78563 | **DCWMA Group Area:** 4,558.4 Acres |
| | **Longitude:** -118.294339 | **DCMWA Area Ratio:** 30.5% |

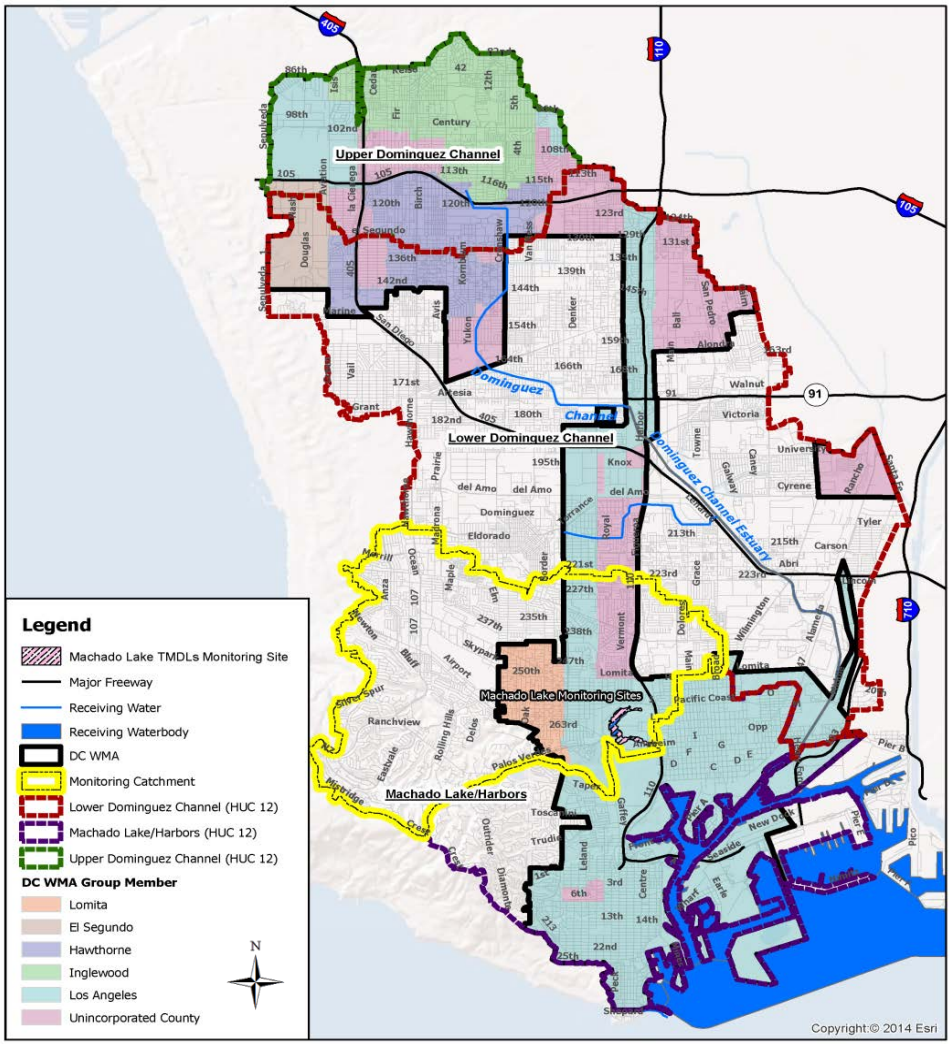
| **Catchment Land Use** | **(DCWMA/ALL)** | |
|---|---|---|
| Agricultural | 0.1% | 0.7% |
| Commercial / Institutional | 14.1% | 14.0% |
| Industrial | 7.5% | 8.4% |
| Residential | 48.7% | 48.9% |
| Transportation | 19.9% | 19.9% |
| Vacant | 9.0% | 7.7% |
| Water | 0.8% | 0.4% |

**DCWMA Group(s) in Catchment:**
Cities of Los Angeles; Lomita; County of Los Angeles

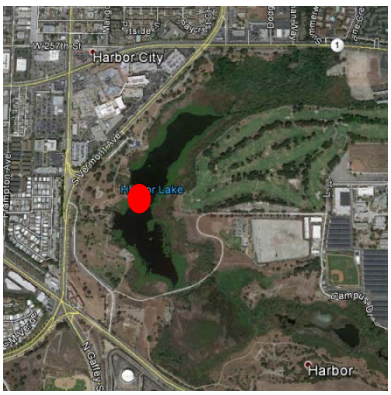
**Non-DCWMA Group(s) in Catchment:**
Cities of Torrance; Rolling Hills Rolling Hills Estates; Palos Verdes; Rancho Palos Verdes; Carson

**Comments:** Site access is via the Ken Mallory Harbor Regional Park at the intersection on Vermont Ave and Normandie Ave.

**Watershed Map**




**Site Location**




**Lake View**

**Lake View**

| | | |
|---|---|---|
| **Site ID:** WD-1 | **Watershed:** Dominguez | **Status:** Active Receiving Water Site |
| **Historical Site ID:** None | **Monitoring Type:** TMDL – Machado Lake | **Catchment Area:** 12,155.6 Acres |
| **Other ID:** DOM-OF-004 | **Latitude:** 33.790864 | **DCWMA Group Area:** 2,690.6 Acres |
| | **Longitude:** -118.287574 | **DCMWA Area Ratio:** 22.1% |

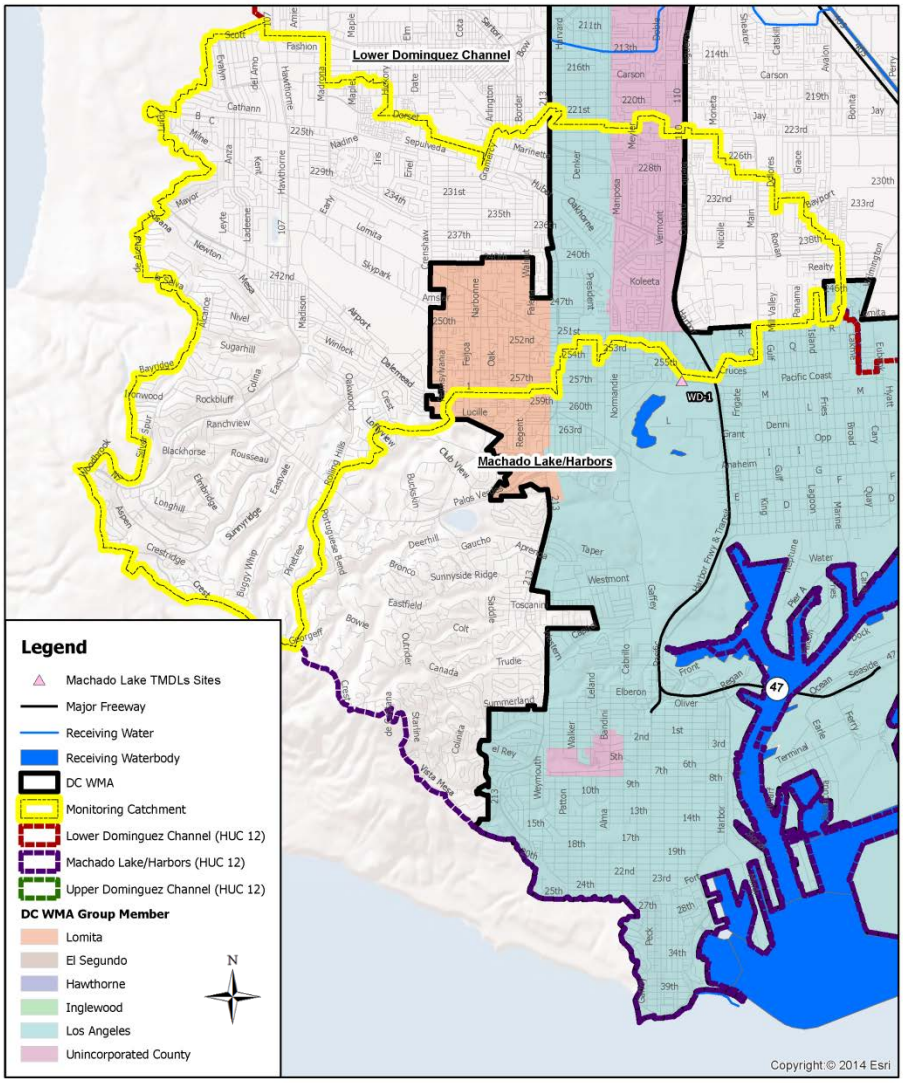
| **Catchment Land Use** | **(DCWMA/ALL)** | |
|---|---|---|
| Agricultural | 0.2% | 0.8% |
| Commercial / Institutional | 11.9% | 14.3% |
| Industrial | 9.3% | 8.9% |
| Residential | 54.7% | 49.1% |
| Transportation | 22.0% | 21.1% |
| Vacant | 1.9% | 5.6% |
| Water | 0.0% | 0.2% |

**DCWMA Group(s) in Catchment:**
Cities of Los Angeles; Lomita; County of Los Angeles

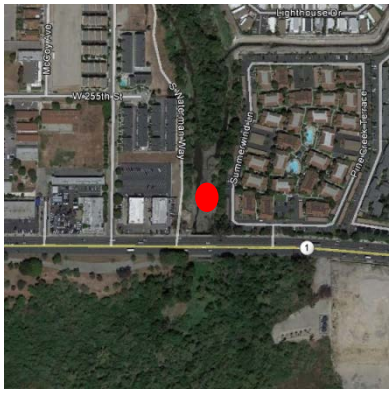
**Non-DCWMA Group(s) in Catchment:**
Cities of Torrance; Rolling Hills Rolling Hills Estates; Palos Verdes; Carson

**Comments:** Site access is via the Los Angeles Flood Control District Right of Way at the northwest corner of the Pacific Coast Highway crossing over Wilmington Drain.

**Watershed Map**

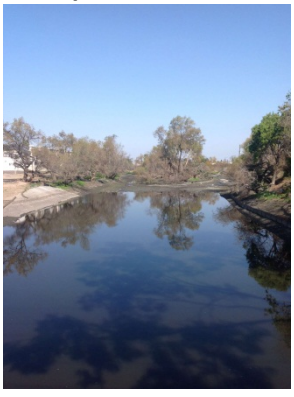



**Site Location**



**Downstream View**

**Upstream View**



| | | |
|---|---|---|
| **Site ID:** Various | **Watershed:** Dominguez | **Status:** Active Receiving Water Sites |
| **Historical Site ID:** None | **Monitoring Type:** TMDL – Toxics / Bacteria | **Catchment Area:** 59,654.4 Acres |
| **Other ID:** Refer to Table | **Latitude:** Multiple – Refer to Table | **DCWMA Group Area:** 32,456.1 Acres |
| | **Longitude:** Multiple – Refer to Table | **DCMWA Area Ratio:** 54.4 % |

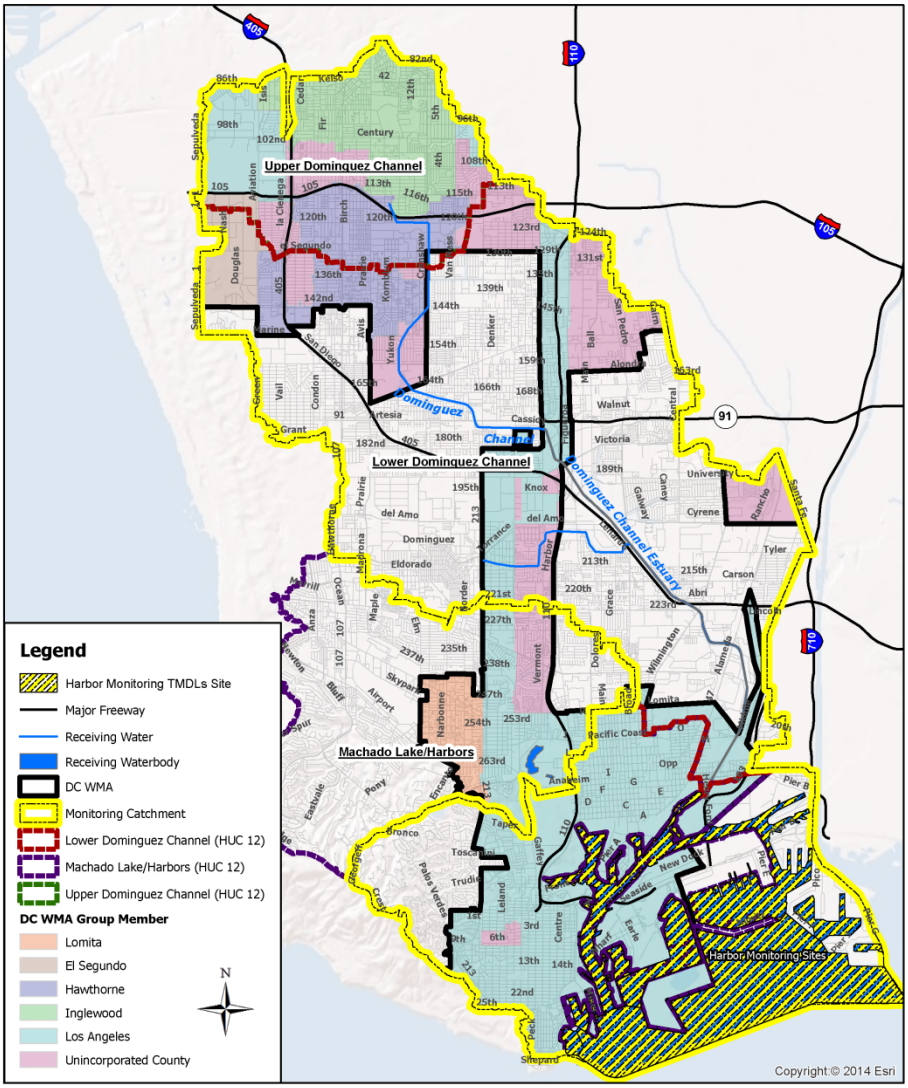
| **Catchment Land Use** | **(DCWMA/ALL)** | |
|---|---|---|
| Agricultural | 0.2% | 0.7% |
| Commercial / Institutional | 16.5% | 15.3% |
| Industrial | 25.2% | 25.2% |
| Residential | 31.1% | 33.2% |
| Transportation | 24.3% | 22.0% |
| Vacant | 2.5% | 3.2% |
| Water | 0.2% | 0.4% |

**DCWMA Group(s) in Catchment:**
Cities of Los Angeles; Hawthorne; Inglewood; El Segundo; Lomita
County of Los Angeles

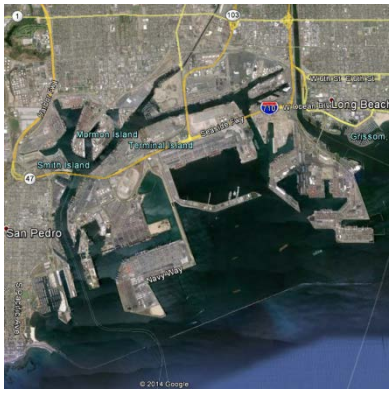
**Non-DCWMA Group(s) in Catchment:**
Cities of Torrance; Rolling Hills Rolling Hills Estates; Carson; Gardena; Palos Verdes Estates; Rancho Palos Verdes

**Comments:** Sites accessed via boat

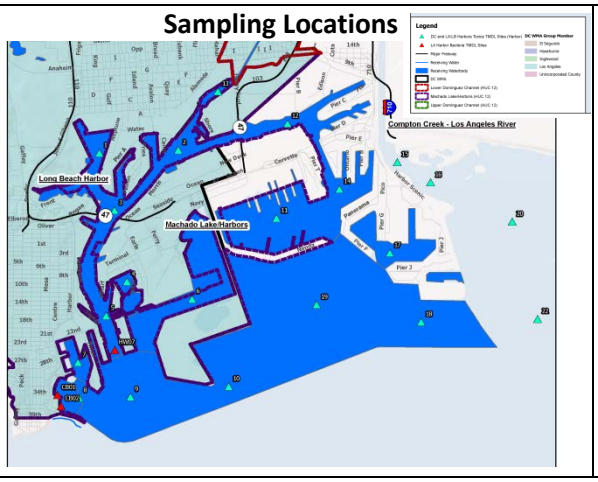
**Watershed Map**




**Site Location**




**Sampling Locations**



| **Site ID:** Various | **Watershed:** Dominguez | **Status:** Active Receiving Water Sites |
|---|---|---|

**Monitoring Locations Within Harbor Area**

| Site ID | Waterbody | Location Description | Latitude | Longitude |
|---|---|---|---|---|
| CB01 | Inner Cabrillo Beach | North End | 33.713432 | -118.283779 |
| CB02 | | South End | 33.711213 | -118.282911 |
| HW07 | Main Ship Channel | | 33.722607 | -118.269888 |
| 1 | Consolidated Slip | Center of Consolidated Slip | 33.77484789 | -118.2453739 |
| 2 | Los Angeles Inner Harbor | East Turning Basin | 33.76489964 | -118.2520890 |
| 3 | | Center of the Port of Los Angeles West Basin | 33.76228823 | -118.2740995 |
| 4 | | Main Turning Basin north of Vincent Thomas Bridge | 33.75184257 | -118.2709906 |
| 5 | | Between Pier 300 and Pier 400 | 33.73244349 | -118.2513428 |
| 6 | | Main Channel south of Port O'Call | 33.72572842 | -118.2714880 |
| 7 | Fish Harbor | Center of inner portion of Fish Harbor | 33.73580102 | -118.2672600 |
| 8 | Los Angeles Outer Harbor | Los Angeles Outer Harbor between Pier 400 and middle breakwater | 33.71466100 | -118.2423894 |
| 9 | | Los Angeles Outer Harbor between the southern end of the reservation point and the San Pedro breakwater | 33.71204959 | -118.2634051 |
| 10 | Cabrillo Marina | Center of West Channel | 33.71938642 | -118.2790736 |
| 11 | Inner Cabrillo Beach | Center of Inner Cabrillo Beach | 33.71180088 | -118.2810632 |
| 12 | Long Beach Inner Harbor | Cerritos Channel between the Heim Bridge and the Turning Basin | 33.76726235 | -118.2335604 |
| 13 | | Back of Channel between Turning Basin and West Basin | 33.75383222 | -118.2163996 |
| 14 | | Center of West Basin | 33.74898245 | -118.2308246 |
| 15 | | Center of Southeast Basin | 33.74214303 | -118.1994876 |
| 16 | Long Beach Outer Harbor | Center of Long Beach Outer Harbor | 33.73144867 | -118.2210007 |
| 17 | | Between the southern end of Pier J and the Queens Gate | 33.72759372 | -118.1860575 |
| 18 | San Pedro Bay | Northwest of San Pedro Bay near Los Angeles River Estuary | 33.75383222 | -118.1813321 |
| 19 | | East of San Pedro Bay | 33.73667149 | -118.1315908 |
| 20 | | South of San Pedro Bay inside the breakwater | 33.72547972 | -118.1573319 |
| 21 | Los Angeles River Estuary | Los Angeles River Estuary Queensway Bay | 33.75644363 | -118.1933943 |
| 22 | | Los Angeles River Estuary | 33.76101300 | -118.2021110 |

Note: Harbor TMDL Sites 12 – 22 provide for reference as the sites are identified in the TMDL, however as they relate to other watershed discharges they would not be incorporated into the receiving water sites for the Dominguez Channel Watershed Management Area.

| | | |
|---|---|---|
| **Site ID:** DOM-OF-001 | **Watershed:** Dominguez | **Status:** Active NPDES Outfall Site |
| **Historical Site ID:** TS23 | **HUC 12:** Upper Dominguez Channel | **Catchment Area:** 1,448.9 Acres |
| **Other IDs:** DDI 8 | **Latitude:** 33.912677 | **DCWMA Group Area:** 1,443.3 Acres |
| | **Longitude:** -118.326035 | **DCMWA Area Ratio:** 99.6% |

| **DCWMA Land Use (Catchment/HUC)** | | |
|---|---|---|
| Agricultural | 0.0% | 0.0% |
| Commercial / Institutional | 16.6% | 18.4% |
| Industrial | 17.5% | 8.8% |
| Residential | 37.7% | 39.2% |
| Transportation | 28.0% | 32.2% |
| Vacant | 0.2% | 1.4% |

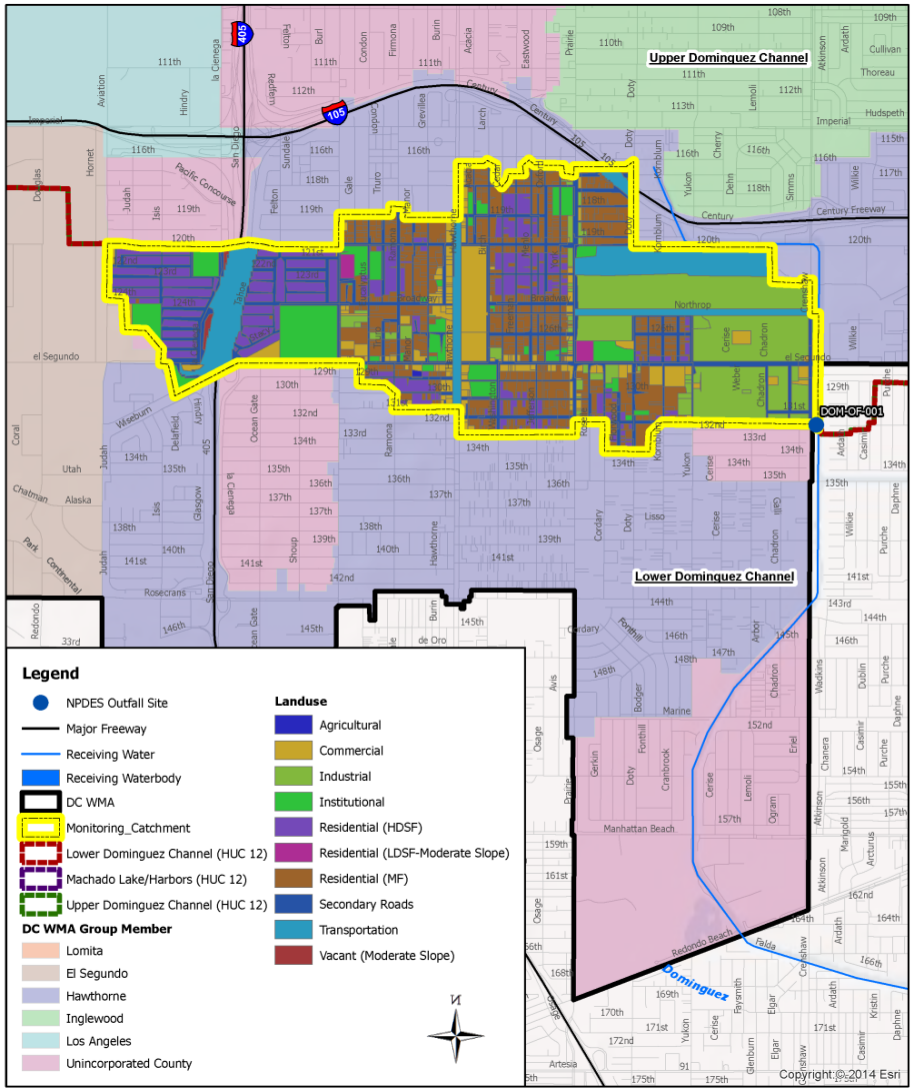
**DCWMA Group(s) in Catchment:**
County of Los Angeles; City of El Segundo, City of Hawthorne

**Non-DCWMA Group(s) in Catchment:**
City of Gardena

**Comments:** This site was previously used as part of the County of Los Angeles Core Monitoring Program.

Site access is via the Los Angeles County Flood Control District Right of Way that can be accessed at the SW Corner of El Segundo Blvd. at Dominguez Channel or at the NW corner of W. 135th St. at Dominguez Channel.

**Watershed Map**




**Site Location**


**Upstream Channel**

**Discharge to Dominguez Channel**

| | | |
|---|---|---|
| **Site ID:** DOM-OF-002 | **Watershed:** Dominguez | **Status:** Active NPDES/TMDL Outfall Site |
| **Historical Site ID:** None | **HUC 12:** Lower Dominguez Channel | **Catchment Area:** 213.7 Acres |
| **Other ID:** PD 183 | **Latitude:** 33.840155 | **DCWMA Group Area:** 212.4 Acres |
| | **Longitude:** -118.291507 | **DCMWA Area Ratio:** 99.4% |

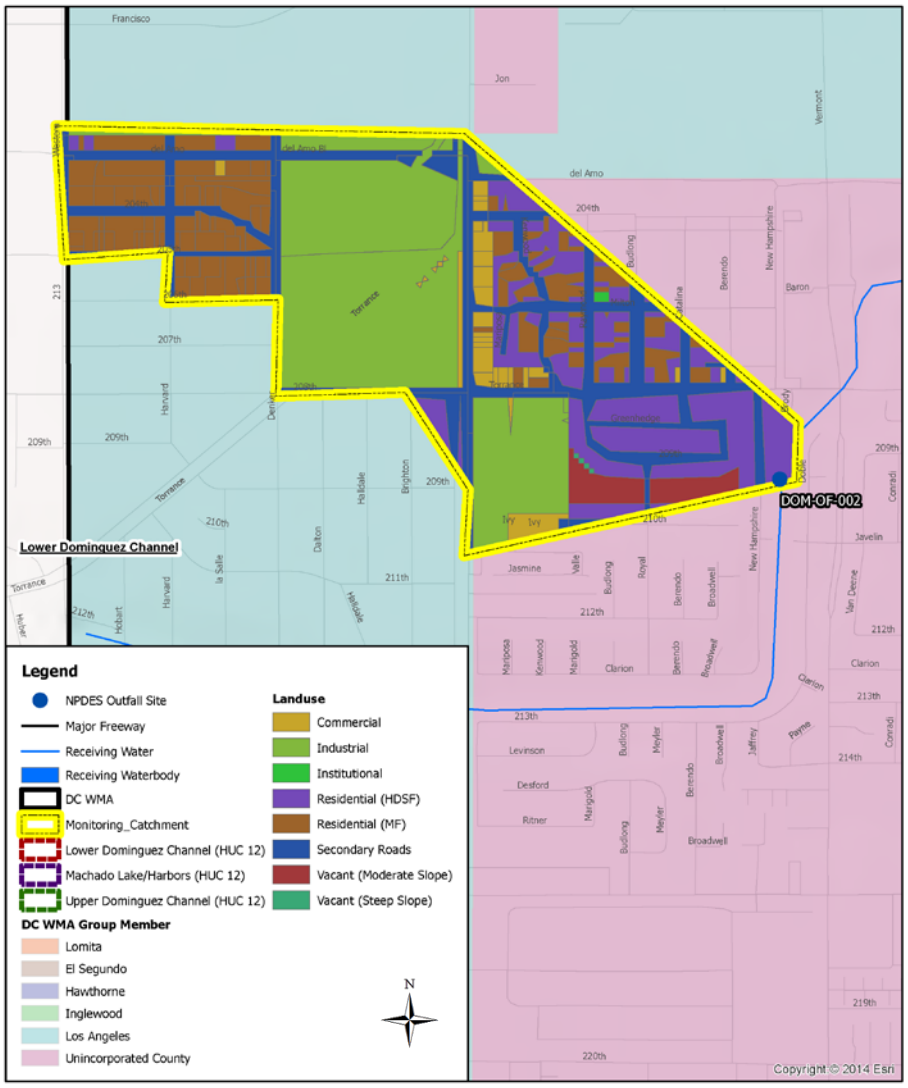
| **Catchment Land Use (DCWMA/HUC)** | | |
|---|---|---|
| Agricultural | 0.0% | 0.5% |
| Commercial / Institutional | 4.3% | 14.4% |
| Industrial | 35.3% | 29.4% |
| Residential | 36.7% | 31.1% |
| Transportation | 20.9% | 22.1% |
| Vacant | 2.9% | 2.0% |
| Water | 0.0% | 0.5% |

**DCWMA Group(s) in Catchment:**
County of Los Angeles; City of Los Angeles

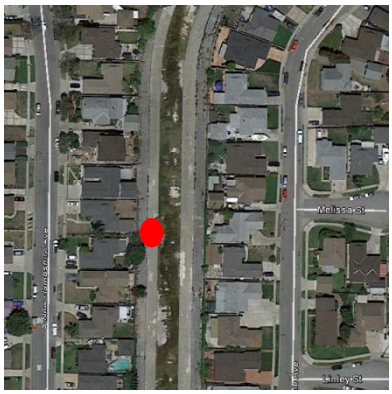
**Non-DCWMA Group(s) in Catchment:**
City of Torrance

**Comments:** Site access is via the Los Angeles County Flood Control District Right of Way that can be accessed at the SW Corner of Torrance Blvd. and Vermont Ave. or via the north east corner of the Normandie Ave. bridge over Torrance Lateral.

**Watershed Map**




**Site Location**



**Discharge to Torrance Lateral**

| | | |
|---|---|---|
| **Site ID:** DOM-OF-003 | **Watershed:** Dominguez | **Status:** Active NPDES/TMDL Outfall Site |
| **Historical Site ID:** TS-21 | **HUC 12:** Lower Dominguez Channel | **Catchment Area:** 103 Acres |
| **Other ID:** Project 5246/74 169th Street Drain | **Latitude:** 33.878179 | **DCWMA Group Area:** 79 Acres |
| | **Longitude:** -118.288933 | **DCMWA Area Ratio:** 76.7% |

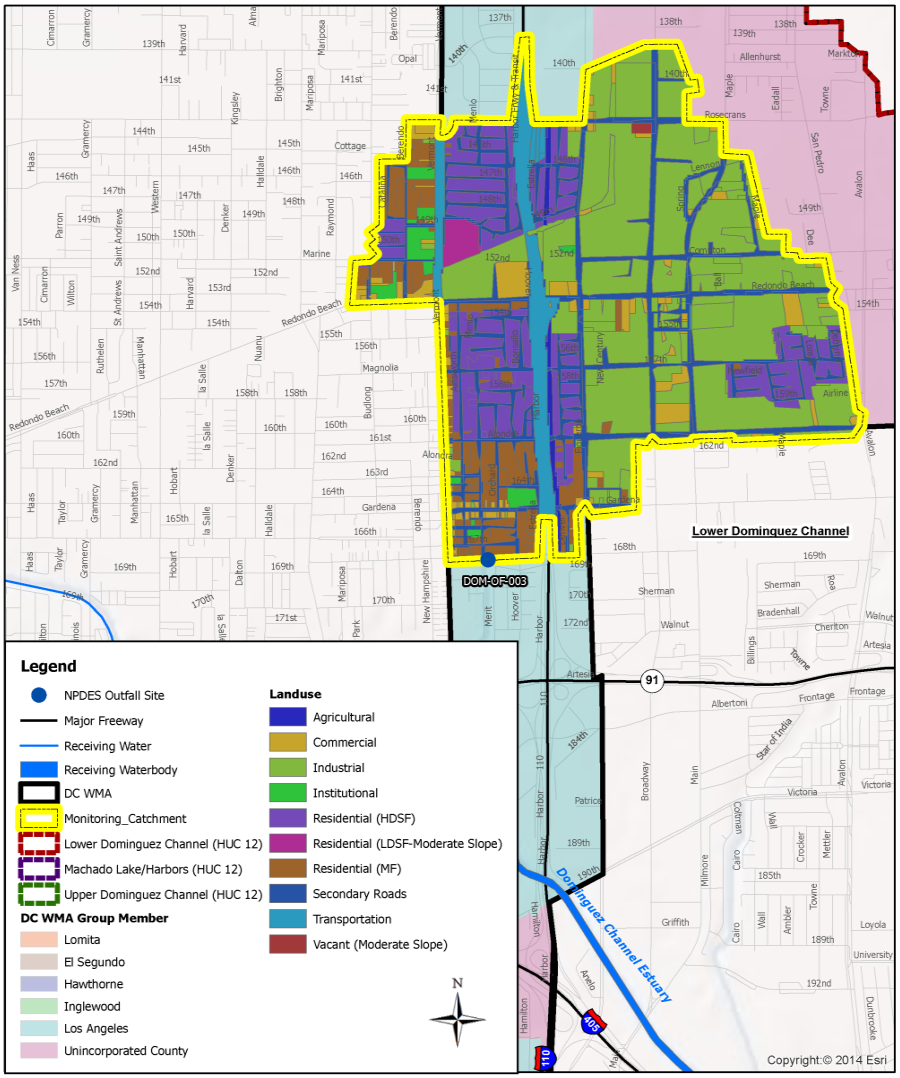
| **DCWMA Land Use (Catchment/HUC)** | | |
|---|---|---|
| Agricultural | 5.1% | 0.5% |
| Commercial / Institutional | 20.3% | 14.4% |
| Industrial | 16.5% | 29.4% |
| Residential | 19.0% | 31.1% |
| Transportation | 36.7% | 22.1% |
| Vacant | 2.5% | 2.0% |
| Water | 0.0% | 0.5% |

**DCWMA Group(s) in Catchment:**
County of Los Angeles; City of Los Angeles

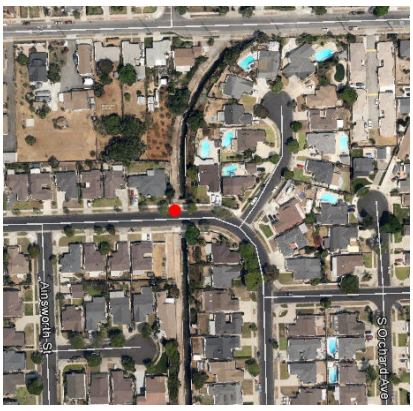
**Non-DCWMA Group(s) in Catchment:**
City of Gardena; City of Carson

**Comments:** Site access is via the Los Angeles County Flood Control District Right of Way that can be accessed through the North side of 169th Street, between Meritt Avenue and Ainsworth Street.

## Watershed Map




## Site Location




## Downstream View

## Upstream View

| | | |
|---|---|---|
| **Site ID:** DOM-OF-004 | **Watershed:** Dominguez | **Status:** Active NPDES Outfall Site |
| **Historical Site ID:** None | **HUC 12:** Machado Lake / Harbors | **Catchment Area:** 12,155.6 Acres |
| **Other ID:** WD-1 | **Latitude:** 33.790864 | **DCWMA Group Area:** 2,690.6 Acres |
| | **Longitude:** -118.287574 | **DCMWA Area Ratio:** 22.1% |

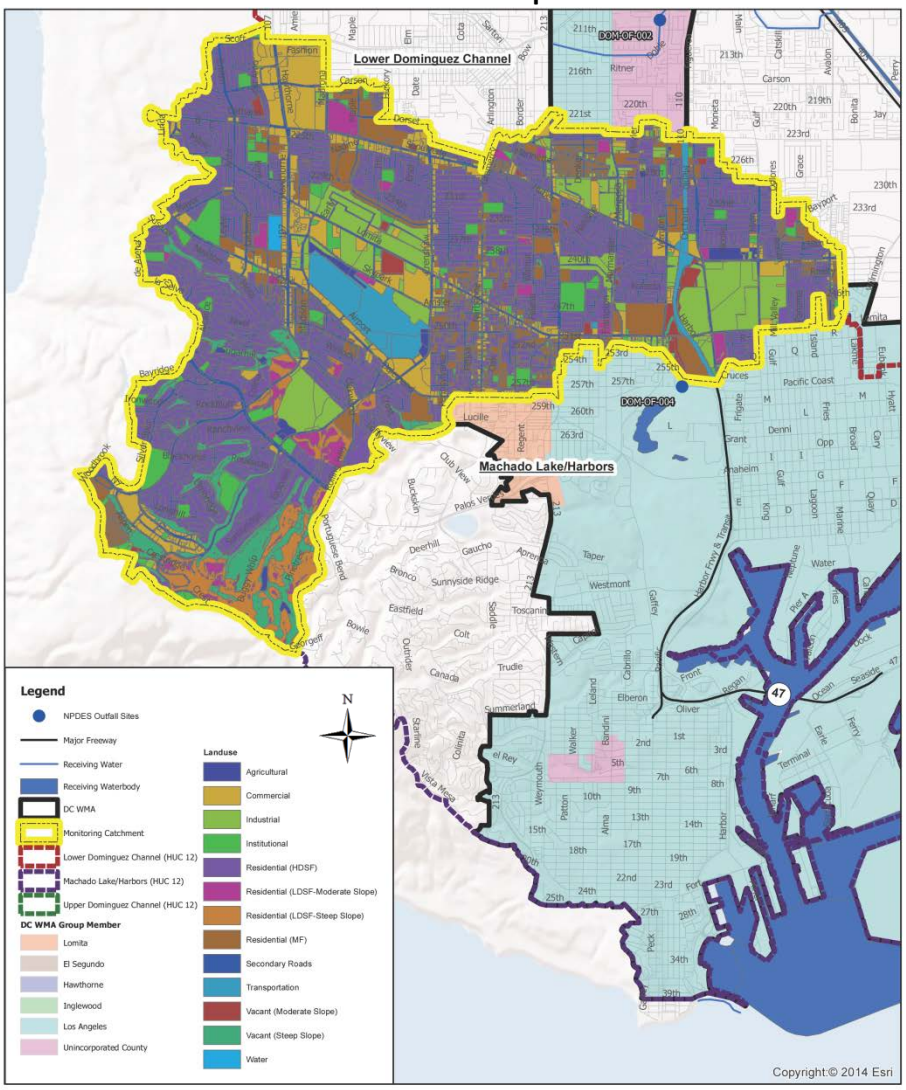
| **DCWMA Land Use (Catchment/HUC)** | | |
|---|---|---|
| Agricultural | 0.2% | 0.1% |
| Commercial / Institutional | 11.9% | 16.7% |
| Industrial | 9.3% | 24.6% |
| Residential | 54.7% | 32.3% |
| Transportation | 22.0% | 20.5% |
| Vacant | 1.9% | 5.6% |
| Water | 0.0% | 0.2% |

**DCWMA Group(s) in Catchment:**
Cities of Los Angeles; Lomita; County of Los Angeles

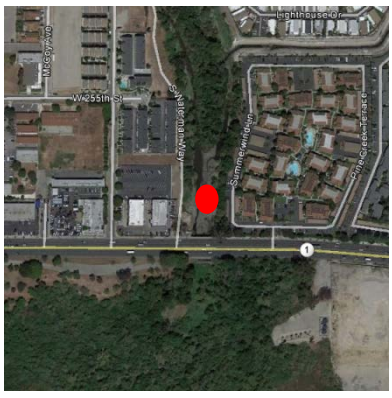
**Non-DCWMA Group(s) in Catchment:**
Cities of Torrance; Rolling Hills Rolling Hills Estates; Palos Verdes; Carson

**Comments:** Site access is via the Los Angeles Flood Control District Right of Way at the northwest corner of the Pacific Coast Highway crossing over Wilmington Drain.

**Watershed Map**

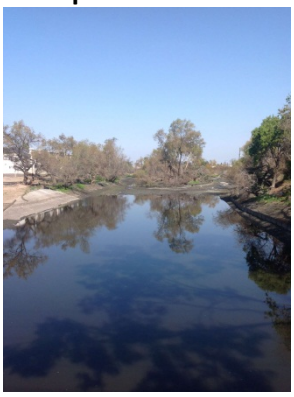



**Site Location**




**Downstream View**

**Upstream View**



| | | |
|---|---|---|
| **Site ID:** P-77 | **Watershed:** Dominguez | **Status:** Active TMDL Outfall Site |
| **Historical Site ID:** None | **HUC 12:** Machado Lake / Harbors | **Catchment Area:** 1,632.0 Acres |
| **Other ID:** Project 77 | **Latitude:** 33.785155 | **DCWMA Group Area:** 679.3 Acres |
| | **Longitude:** -118.296207 | **DCMWA Area Ratio:** 41.6% |

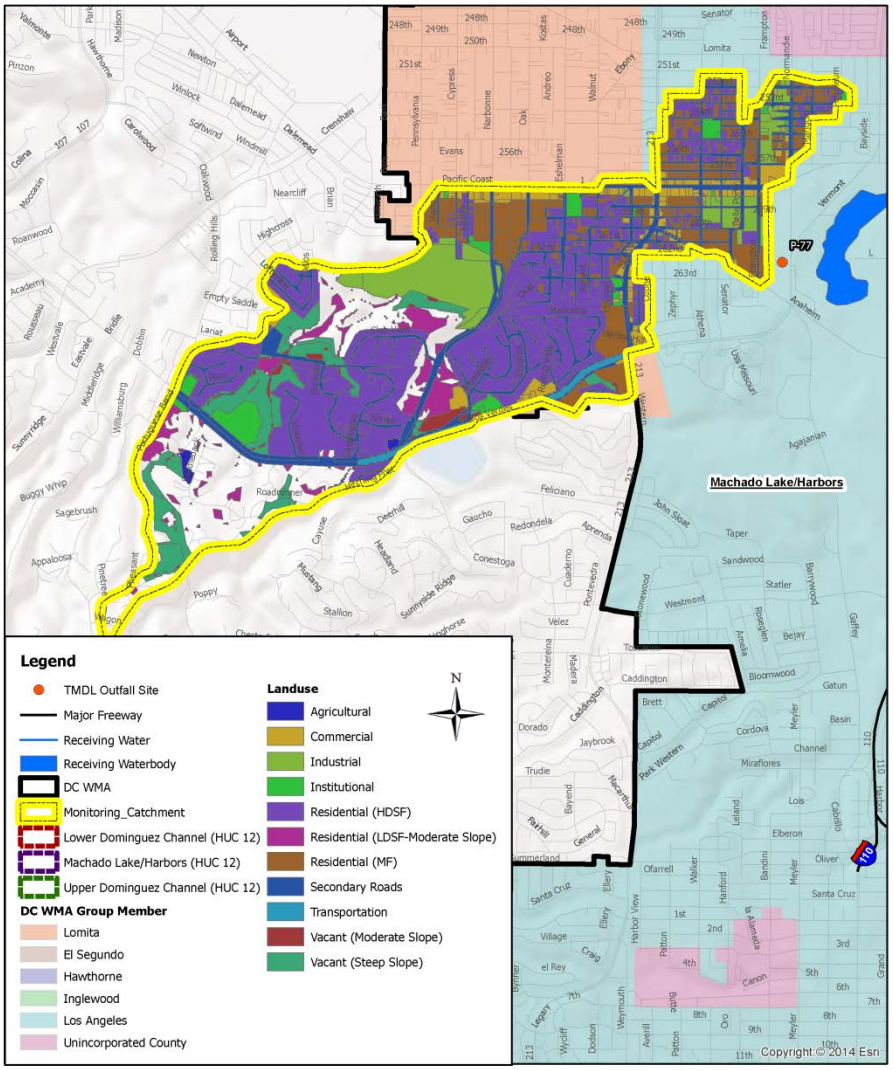
| **DCWMA Land Use (Catchment/HUC)** | | |
|---|---|---|
| Agricultural | 0.0% | 0.1% |
| Commercial / Institutional | 13.0% | 16.7% |
| Industrial | 5.6% | 24.6% |
| Residential | 57.9% | 32.3% |
| Transportation | 23.1% | 20.5% |
| Vacant | 0.4% | 5.6% |
| Water | 0.0% | 0.2% |

**DCWMA Group(s) in Catchment:**
Cities of Los Angeles; Lomita

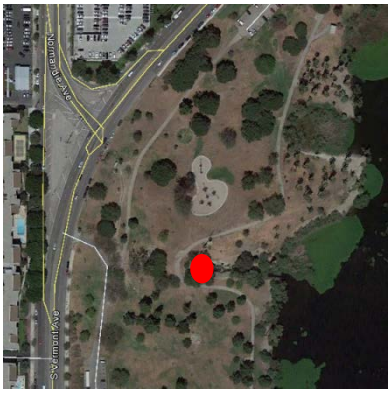
**Non-DCWMA Group(s) in Catchment:**
Cities of Rolling Hills Estates; Rolling Hills

**Comments:** Site access is via the Ken Mallory Harbor Regional Park at the intersection on Vermont Ave and Normandie Ave.

**Watershed Map**




**Site Location**



**Downstream View**

**Upstream View**

| | | |
|---|---|---|
| **Site ID:** P-510 | **Watershed:** Dominguez | **Status:** Active TMDL Outfall Site |
| **Historical Site ID:** None | **HUC 12:** Machado Lake / Harbors | **Catchment Area:** 474.0 Acres |
| **Other ID:** Project 510 | **Latitude:** 33.784115 | **DCWMA Group Area:** 460.4 Acres |
| | **Longitude:** -118.295671 | **DCMWA Area Ratio:** 97.1% |

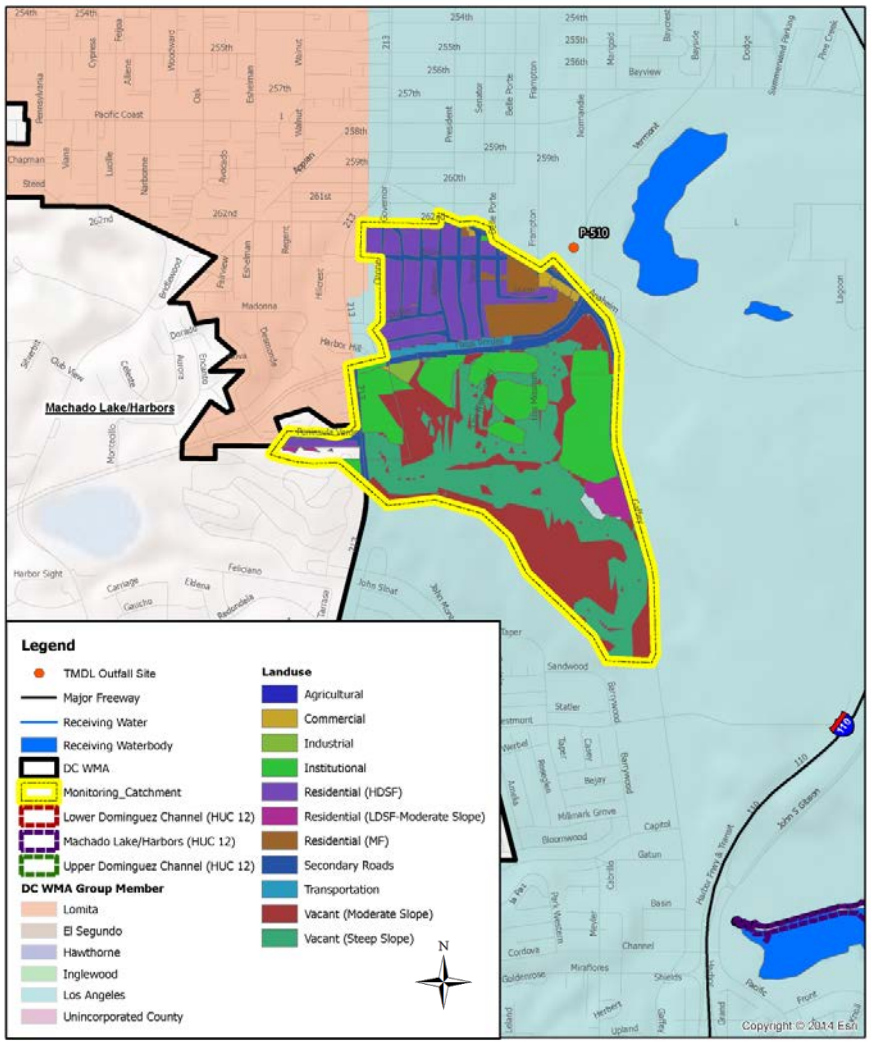
| **DCWMA Land Use (Catchment/HUC)** | | |
|---|---|---|
| Agricultural | 0.0% | 0.1% |
| Commercial / Institutional | 17.2% | 16.7% |
| Industrial | 0.7% | 24.6% |
| Residential | 20.3% | 32.3% |
| Transportation | 13.0% | 20.5% |
| Vacant | 48.8% | 5.6% |
| Water | 0.0% | 0.2% |

**DCWMA Group(s) in Catchment:**
Cities of Los Angeles; Lomita

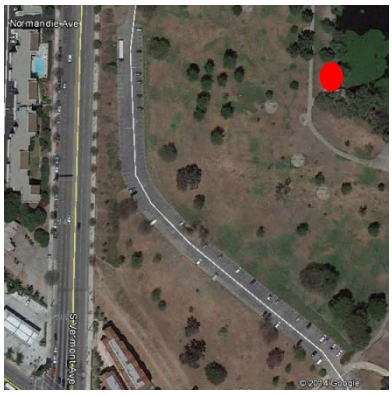
**Non-DCWMA Group(s) in Catchment:**
City of Rancho Palos Verdes

**Comments:** Site access is via the Ken Mallory Harbor Regional Park at the intersection on Vermont Ave and Normandie Ave.

**Watershed Map**




**Site Location**




**Downstream View**

**Upstream View**

# Attachment C:
# Analytical and Monitoring Procedures

# Attachment C
# Table of Contents

# SWAMP QAPP Elements

The DCWMA CIMP includes the key elements of a SWAMP QAPP. The following table lists the required elements of a SWAMP QAPP and the corresponding location in the DCWMA CIMP.

| Attachment C Guide<br>DCWMA CIMP-SWAMP QAPP Crosswalk | | | | |
|---|---|---|---|---|
| **SWAMP QAPP Element** | **Title** | **DCWMA CIMP** | | |
| | | **Section** | **Title** | **Page No.** |
| **A** | **Project Management** | | | |
| A1 | Title and Approval Sheet (s) | | | |
| A2. | Table of Contents | i | TABLE OF CONTENTS | i |
| A3. | Distribution List | | | |
| A4. | Project/Task Organization | 1.1 | WATERSHED MANAGEMENT PLAN AREA | 2 |
| A5. | Problem Definition/Background | 1 | INTRODUCTION | 1 |
| A6. | Project/Task Description | 1.3 | CIMP OVERVIEW | 6 |
| A7. | Quality Objectives and Criteria | C.3 | QUALITY ASSURANCE/QUALITY CONTROL | C-49 |
| A8. | Special Training/Certifications | C.1.7 | LIST OF LABORATORIES CONDUCTING ANALYSIS | C-28 |
| | | C.2.3 | FIELD PROTOCOLS | C-36 |
| A9. | Documentation and Records | D.1 | REQUIRED REPORTING | D-1 |
| **B** | **Data Generation and Acquisition** | **C** | **ATTACHMENT C: ANALYTICAL AND MONITORING PROCEDURES** | **C** |
| B01. | Sampling Process Design (Sampling Design and Logistics) | C.2.4 | SAMPLE COLLECTION | C-37 |
| B02. | Sampling (sample collection) Methods | C.2.4 | SAMPLE COLLECTION | C-37 |
| B03. | Sample Handling and Custody | C.2.2 | SAMPLE HANDLING | C-33 |
| B04. | Analytical Methods and Field Measurements | C.1 | ANALYTICAL PROCEDURES | C-2 |
| B05. | Quality Control | C.3 | QUALITY ASSURANCE/QUALITY CONTROL | C-49 |

| Attachment C Guide<br>DCWMA CIMP-SWAMP QAPP Crosswalk | | | | |
|---|---|---|---|---|
| **SWAMP QAPP Element** | **Title** | **DCWMA CIMP** | | |
| | | **Section** | **Title** | **Page No.** |
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# Attachment C
# Analytical and Monitoring Procedures

Attachment C details the monitoring procedures that will be utilized to collect and analyze samples to meet the goals and objectives of the CIMP and in turn the Permit. The details contained herein serve as a guide for ensuring that consistent protocols and procedures are in place for successful sample collection and analysis. An additional guide is provided at the end of Attachment C. This attachment is divided into the following six sections:

1. Analytical Procedures
2. Sample Methods and Handling
3. Quality Assurance/Quality Control
4. Instrument/Equipment Calibration and Frequency
5. Data Management, Validation, and Usability
6. Monitoring Procedures References

## C.1 Analytical Procedures

The following subsections detail the analytical procedures for data generated in the field and in the laboratory.

### C.1.1 Field Parameters

Portable field meters will measure within specifications outlined in Table C-1.

**Table C-1. Analytical Methods and Project Reporting Limits for Field Measurements**

| Parameter/Constituent | Method | Range | Project RL |
|---|---|---|---|
| Water velocity | Electromagnetic | -0.5 to +20 ft/s | 0.05 ft/s |
| pH | Electrometric | 0 – 14 pH units | ±0.2 pH |
| Temperature | High stability thermistor | -5 – 50 $^{o}$C | NA |
| Dissolved oxygen | Membrane or Optical | 0 – 50 mg/L | 0.5 mg/L |
| Turbidity | Nephelometric | 0 – 3000 NTU | 0.2 NTU |
| Conductivity | Graphite electrodes | 0 – 10 mmhos/cm | 2.5 µmhos/cm |

RL – Reporting Limit NA – Not applicable

## C.1.2 Methods and Detection and Reporting Limits

Method detection limits (MDL) and reporting limits (RLs) must be distinguished for proper understanding and data use. The MDL is the minimum analyte concentration that can be measured and reported with a 99 percent confidence that the concentration is greater than zero. The RL represents the concentration of an analyte that can be routinely measured in the sampled matrix within stated limits and with confidence in both identification and quantitation. For this CIMP, the term RL is equivalent to the term "Minimum Levels" presented in Table E-2 of the MRP (pages E-17 through E-20).

For this program, RLs must be verifiable by having the lowest non-zero calibration standard or calibration check sample concentration at or less than the RL. RLs have been established in this CIMP based on the verifiable levels and general measurement capabilities demonstrated for each method. These RLs should be considered as maximum allowable reporting limits to be used for laboratory data reporting. Note that samples diluted for analysis may have sample-specific RLs that exceed these RLs. This will be unavoidable on occasion. However, if samples are consistently diluted to overcome matrix interferences, the analytical laboratory will be required to notify the Project Manager how the sample preparation or test procedure in question will be modified to reduce matrix interferences so that project RLs can be met consistently.

Analytical methods, MDLs, and RLs required for samples analyzed in the laboratory are summarized in Tables C-2, C-3 and C-4 for analysis in water, sediment, and tissue, respectively. For organic constituents, environmentally relevant detection limits will be used to the extent practicable. The MDLs and/or RLs listed in Table C-2 for several OC pesticides (aldrin, alpha-BHC, chlordane, the DDTs, dieldrin and toxaphene) are higher than some targets/allocations specified in TMDLs. However, the MDLs and/or RLs listed in Table C-2 are consistent with the requirements of the available minimum levels provided in the Permit. Commercially available methods with MDLs and/or RLs that at or below those presented in Tables C-2, C-3 and C-4 are considered equivalent and can be used in place of the methods presented in Tables C-2, C-3 and C-4. Some constituents of concern will have numeric targets that are lower than the readily available detection limits. As analytical methods and detection limits continue to improve (i.e., development of lower detection limits) and become commercially viable and widely accepted, the DCWMA will evaluate the how to incorporate those improved methods into the CIMP.

Prior to the analysis of any environmental samples, the laboratory must have demonstrated the ability to meet the minimum performance requirements for each analytical method presented in Table C-2. The initial demonstration of capability includes the ability to meet the project-specified Method Detection Limits and Reporting Limits, the ability to generate acceptable precision and accuracy, and other analytical and quality control parameters documented in this CIMP. Data quality objectives for precision and accuracy are summarized in Table C-6.

| Table C-2. Analytical Methods, Project Method Detection, and Reporting Limits for Laboratory Analysis of Water Samples | | | | | |
|---|---|---|---|---|---|
| **Parameter/Constituent** | **Method1** | **Units** | **MRP Table E-2 ML** | **TMDL Target[4]** | **Target RL[5]** |
| **Toxicity** | | | | | |
| Freshwater: *Ceriodaphnia dubia* | EPA-821-R-02-013 (1002.0) and EPA-821-R-02-012 (2002.0) | NA | NA | NA | NA |
| Marine and Estuarine: *Strongylocentrotus purpuratus* | EPA-600-R-95-136 (1002.0) | NA | NA | NA | NA |
| Marine and Estuarine: *Haliotis rufescens* | EPA-600-R-95-136 | NA | NA | NA | NA |
| **Bacteria** | | | | | |
| Total coliform (marine waters) | SM 9221/SM 9223 B | MPN/100mL | 10,000 | 10,000 | 10,000 |
| Enterococcus (marine waters) | SM 9230/SM 9223 B | MPN/100mL | 104 | 104 | 104 |
| Fecal coliform (marine and fresh waters) | SM 9221/SM 9223 B | MPN/100mL | 400 | 400 | 400 |
| Escherichia coli (fresh waters) | SM 9221/SM 9223 B | MPN/100mL | 235 | NA | 235 |
| Fecal coliform (fresh waters) | SM 9222 | CFU/100mL | 400 | NA | 10 |
| **Conventionals** | | | | | |
| Oil and Grease | EPA 1664 | mg/L | 5 | NA | 10 |
| Cyanide | SM 4500-CN C | µg/L | 5 | NA | 5 |
| pH | SM 4500 H+B/ EPA 9040/ EPA 9045D | NA | 0-14 | NA | 0-14 |
| Dissolved Oxygen | NA | mg/L | Sensitivity to 5 mg/L | 5 | 0.5 |
| Specific Conductance | EPA 120.1 | µs/cm | 1 | NA | 1 |
| Turbidity | EPA 180.1 or SM 2130 B | NTU | 0.1 | NA | 0.1 |
| Total Hardness | SM 2340B | mg/L | 2 | NA | 4 |
| Dissolved Organic Carbon | SM 5310B | mg/L | NA | NA | 0.6 |
| Total Organic Carbon | SM 5310B | mg/L | 1 | NA | 5 |
| Total Petroleum Hydrocarbon | EPA 1664 | mg/L | 5 | NA | 5 |
| Biochemical Oxygen Demand | SMOL-5210 | mg/L | 2 | NA | 5 |

| Table C-2. Analytical Methods, Project Method Detection, and Reporting Limits for Laboratory Analysis of Water Samples | | | | | |
|---|---|---|---|---|---|
| **Parameter/Constituent** | **Method1** | **Units** | **MRP Table E-2 ML** | **TMDL Target[4]** | **Target RL[5]** |
| Chemical Oxygen Demand | SM 5220D | mg/L | 20-900 | NA | 50 |
| MBAS | SM 5540C | mg/L | 0.5 | NA | 2 |
| Chloride | EPA 300.0 | mg/L | 2 | NA | 4 |
| Fluoride | EPA 300.0 | mg/L | 0.1 | NA | 0.2 |
| Perchlorate | EPA 314.0 | µg/L | 4 | NA | 8 |
| Dissolved Phosphorus (as P) | SM 4500-P C | mg/L | 0.05 | 0.1 | 0.1 |
| Total Phosphorus (as P) | SM 4500-P C | mg/L | 0.05 | 0.1 | 0.1 |
| Orthophosphate-P (as P) | EPA 300.0 | mg/L | NA | 0.1 | 0.2 |
| Ammonia (as N) | SM 4500-NH3 F | mg/L | 0.1 | 2.15 | 0.2 |
| Nitrate + Nitrite (as N) | SM 4500-NO3 | mg/L | 0.1 | 1.0 | 0.2 |
| Nitrate (as N) | EPA 300.0 | mg/L | 0.1 | 1.0 | 1 |
| Nitrite (as N) | EPA 300.0 | mg/L | 0.1 | 1.0 | 0.05 |
| Total Kjeldahl Nitrogen (TKN) | SM 4500-NH3 F | mg/L | 0.1 | 1.0 | 0.2 |
| Total Alkalinity | SM 2320B | mg/L | 2 | NA | 10 |
| Chlorophyll-a | SM 10200H | µg/L | NA | 20 | 10 |
| **Solids** | | | | | |
| Total Suspended Solids (TSS) | SM 2540D | mg/L | 2 | 1.0 | 3 |
| Suspended Sediment Concentration (SSC) | ASTM D3977-97C | mg/L | NA | 1.0 | 3 |
| Total Dissolved Solids (TDS) | SM 2540C | mg/L | 2 | 28.0 | 10 |
| Volatile Suspended Solids | EPA 1684 | mg/L | 2 | NA | 4 |
| **Metals in Freshwater (dissolved and total)** | | | | | |
| Aluminum | EPA 200.8 | µg/L | 100 | NA | 100 |
| Antimony | EPA 200.8 | µg/L | 0.5 | NA | 1 |
| Arsenic | EPA 200.8 | µg/L | 1 | NA | 2 |
| Beryllium | EPA 200.8 | µg/L | 0.5 | NA | 1 |
| Cadmium | EPA 200.8 | µg/L | 0.25 | NA | 1 |
| Chromium (total) | EPA 200.8 | µg/L | 0.5 | NA | 2 |
| Chromium (Hexavalent) | EPA 218.6 | µg/L | 5 | NA | 10 |
| Copper | EPA 200.8 | µg/L | 0.5 | NA | 1 |
| Iron | EPA 200.8 | µg/L | 100 | NA | 200 |
| Lead | EPA 200.8 | µg/L | 0.5 | NA | 1 |
| Mercury | EPA 1631 | µg/L | 0.5 | NA | 1 |

| Table C-2. Analytical Methods, Project Method Detection, and Reporting Limits for Laboratory Analysis of Water Samples | | | | | |
|---|---|---|---|---|---|
| **Parameter/Constituent** | **Method1** | **Units** | **MRP Table E-2 ML** | **TMDL Target[4]** | **Target RL[5]** |
| Methylmercury | EPA 1630 | ng/L | NA | NA | 0.05 |
| Nickel | EPA 200.8 | µg/L | 1 | NA | 2 |
| Selenium | EPA 200.8 | µg/L | 1 | NA | 2 |
| Silver | EPA 200.8 | µg/L | 0.25 | NA | 1 |
| Thallium | EPA 200.8 | µg/L | 1 | NA | 2 |
| Zinc | EPA 200.8 | µg/L | 1 | NA | 2 |
| **Metals in Seawater (dissolved and total)** | | | | | |
| Cadmium | EPA 1640 | µg/L | NA | 9.3 | 1 |
| Chromium (Hexavalent) | EPA 1640 | µg/L | NA | 50 | 10 |
| Copper | EPA 1640 | µg/L | NA | 3.1 | 0.02 |
| Lead | EPA 1640 | µg/L | NA | 8.1 | 0.02 |
| Mercury | EPA 1631 | µg/L | NA | NA | 1 |
| Nickel | EPA 1640 | µg/L | NA | 8.2 | 0.02 |
| Selenium | EPA 1640 | µg/L | NA | 71 | 0.02 |
| Silver | EPA 1640 | µg/L | NA | 1.9 | 0.02 |
| Zinc | EPA 1640 | µg/L | NA | 81 | 0.02 |
| **Organochlorine Pesticides[2]** | | | | | |
| Aldrin | EPA 608 | ng/L | 5 | NA | 10 |
| alpha-BHC | EPA 608 | ng/L | 10 | NA | 20 |
| beta-BHC | EPA 608 | ng/L | 5 | NA | 10 |
| delta-BHC | EPA 608 | ng/L | 5 | NA | 10 |
| gamma-BHC (Lindane) | EPA 608 | ng/L | 20 | NA | 40 |
| cis-Chlordane (alpha-Chlordane) | EPA 8270 | ng/L | 100 | 0.59 | 0.5 |
| trans-Chlordane (gamma-Chlordane) | EPA 8270 | ng/L | 100 | 0.59 | 0.5 |
| oxychlordane | EPA 8270 | ng/L | NA | 0.59 | 0.5 |
| cis-nonachlor | EPA 8270 | ng/L | NA | 0.59 | 0.5 |
| trans-nonachlor | EPA 8270 | ng/L | NA | 0.59 | 0.5 |
| 2,4'-DDD | EPA 8270 | ng/L | NA | 0.84 | 2 |
| 2,4'-DDE | EPA 8270 | ng/L | NA | 0.59 | 2 |
| 2,4'-DDT | EPA 8270 | ng/L | NA | 0.59 | 2 |
| 4,4'-DDD | EPA 8270 | ng/L | 50 | 0.84 | 100 |
| 4,4'-DDE | EPA 8270 | ng/L | 50 | 0.59 | 100 |
| 4,4'-DDT | EPA 8270 | ng/L | 10 | 0.59 | 100 |

| Table C-2. Analytical Methods, Project Method Detection, and Reporting Limits for Laboratory Analysis of Water Samples | | | | | |
|---|---|---|---|---|---|
| **Parameter/Constituent** | **Method1** | **Units** | **MRP Table E-2 ML** | **TMDL Target[4]** | **Target RL[5]** |
| Dieldrin | EPA 608 | ng/L | 10 | 0.14 | 2 |
| Endosulfan I | EPA 608 | ng/L | 20 | NA | 2 |
| Endosulfan II | EPA 608 | ng/L | 10 | NA | 2 |
| Endosulfan Sulfate | EPA 608 | ng/L | 50 | NA | 2 |
| Endrin | EPA 608 | ng/L | 10 | NA | 2 |
| Endrin Aldehyde | EPA 608 | ng/L | 10 | NA | 2 |
| Heptachlor | EPA 608 | ng/L | 10 | NA | 20 |
| Heptachlor Epoxide | EPA 608 | ng/L | 10 | NA | 20 |
| Toxaphene | EPA 608 | ng/L | 500 | NA | 100 |
| **PCBs** | | | | | |
| Congeners3 | EPA 8270C | ng/L | NA | 0.17 | 2 |
| Aroclors (1016, 1221, 1232, 1242, 1248, 1254, 1260) | EPA 608 | ng/L | 500 | 0.17 | 100 |
| **Organophosphorus Pesticides** | | | | | |
| Chlorpyrifos | EPA 8141A/B | ng/L | 50 | NA | 50 |
| Diazinon | EPA 8141A/B | ng/L | 10 | NA | 20 |
| Malathion | EPA 8141A/B | ng/L | 1000 | NA | 100 |
| Triazine | EPA 8141A/B | | | | |
| Atrazine | EPA 8141A/B | µg/L | 2 | NA | 4 |
| Cyanazine | EPA 8141A/B | µg/L | 2 | NA | 4 |
| Prometryn | EPA 8141A/B | µg/L | 2 | NA | 4 |
| Simazine | EPA 8141A/B | µg/L | 2 | NA | 4 |
| **Herbicides** | | | | | |
| 2,4-D | EPA 8151A | µg/L | 10 | NA | 20 |
| Glyphosate | EPA 8151A | µg/L | 5 | NA | 10 |
| 2,4,5-TP-SILVEX | EPA 8151A | µg/L | 0.5 | NA | 2 |
| **Semivolatile Organic Compounds** | | | | | |
| 1,2-Diphenylhydrazine | EPA 625 | µg/L | 1 | NA | 1 |
| 2,4,6-Trichlorophenol | EPA 625 | µg/L | 10 | NA | 10 |
| 2,4-Dichlorophenol | EPA 625 | µg/L | 1 | NA | 1 |
| 2,4-Dimethylphenol | EPA 625 | µg/L | 2 | NA | 2 |
| 2,4-Dinitrophenol | EPA 625 | µg/L | 5 | NA | 5 |
| 2,4-Dinitrotoluene | EPA 625 | µg/L | 5 | NA | 5 |
| 2,6-Dinitrotoluene | EPA 625 | µg/L | 5 | NA | 5 |
| 2-Chloronaphthalene | EPA 625 | µg/L | 10 | NA | 10 |

| Table C-2. Analytical Methods, Project Method Detection, and Reporting Limits for Laboratory Analysis of Water Samples | | | | | |
|---|---|---|---|---|---|
| **Parameter/Constituent** | **Method1** | **Units** | **MRP Table E-2 ML** | **TMDL Target[4]** | **Target RL[5]** |
| 2-Chlorophenol | EPA 625 | µg/L | 2 | NA | 2 |
| 2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol) | EPA 625 | µg/L | 5 | NA | 5 |
| 2-Nitrophenol | EPA 625 | µg/L | 10 | NA | 10 |
| 3,3'-Dichlorobenzidine | EPA 625 | µg/L | 5 | NA | 5 |
| 4-Bromophenyl phenyl ether | EPA 625 | µg/L | 5 | NA | 5 |
| 4-Chloro-3-methylphenol | EPA 625 | µg/L | 1 | NA | 1 |
| 4-Chlorophenyl phenyl ether | EPA 625 | µg/L | 5 | NA | 5 |
| 4-Nitrophenol | EPA 625 | µg/L | 5 | NA | 5 |
| Acenaphthene | EPA 625 | µg/L | 1 | NA | 1 |
| Acenaphthylene | EPA 625 | µg/L | 2 | NA | 2 |
| Anthracene | EPA 625 | µg/L | 2 | NA | 2 |
| Benzidine | EPA 625 | µg/L | 5 | NA | 5 |
| Benzo(a)anthracene | EPA 625 | µg/L | 5 | NA | 5 |
| Benzo(a)pyrene | EPA 625 | µg/L | 2 | 0.0044 | 2 |
| Benzo(b)fluoranthene | EPA 625 | µg/L | 10 | NA | 10 |
| Benzo(g,h,i)perylene | EPA 625 | µg/L | 5 | NA | 5 |
| Benzo(k)fluoranthene | EPA 625 | µg/L | 2 | NA | 2 |
| Benzyl butyl phthalate | EPA 625 | µg/L | 10 | NA | 10 |
| bis(2-Chloroethoxy) methane | EPA 625 | µg/L | 5 | NA | 5 |
| bis(2-Chloroisopropyl) ether | EPA 625 | µg/L | 2 | NA | 2 |
| bis(2-Chloroethyl) ether | EPA 625 | µg/L | 1 | NA | 1 |
| bis(2-Ethylhexyl) phthalate | EPA 625 | µg/L | 5 | NA | 5 |
| Chrysene | EPA 625 | µg/L | 5 | NA | 5 |
| Dibenzo(a,h)anthracene | EPA 625 | µg/L | 0.1 | NA | 0.1 |
| Diethyl phthalate | EPA 625 | µg/L | 2 | NA | 2 |
| Dimethyl phthalate | EPA 625 | µg/L | 2 | NA | 2 |
| Di-n-butylphthalate | EPA 625 | µg/L | 10 | NA | 10 |
| Di-n-octylphthalate | EPA 625 | µg/L | 10 | NA | 10 |
| Fluoranthene | EPA 625 | µg/L | 0.05 | NA | 0.05 |
| Fluorene | EPA 625 | µg/L | 0.1 | NA | 0.1 |
| Hexachlorobenzene | EPA 625 | µg/L | 1 | NA | 1 |
| Hexachlorobutadiene | EPA 625 | µg/L | 1 | NA | 1 |
| Hexachloro-cyclo pentadiene | EPA 625 | µg/L | 5 | NA | 5 |
| Hexachloroethane | EPA 625 | µg/L | 1 | NA | 1 |

| Table C-2. Analytical Methods, Project Method Detection, and Reporting Limits for Laboratory Analysis of Water Samples | | | | | |
|---|---|---|---|---|---|
| **Parameter/Constituent** | **Method1** | **Units** | **MRP Table E-2 ML** | **TMDL Target[4]** | **Target RL[5]** |
| Indeno(1,2,3-cd)pyrene | EPA 625 | µg/L | 0.05 | NA | 0.05 |
| Isophorone | EPA 625 | µg/L | 1 | NA | 1 |
| Naphthalene | EPA 625 | µg/L | 0.2 | NA | 0.2 |
| Nitrobenzene | EPA 625 | µg/L | 1 | NA | 1 |
| N-Nitroso-dimethyl amine | EPA 625 | µg/L | 5 | NA | 5 |
| N-Nitrosodiphenylamine | EPA 625 | µg/L | 1 | NA | 1 |
| N-Nitroso-di-n-propyl amine | EPA 625 | µg/L | 5 | NA | 5 |
| Pentachlorophenol | EPA 625 | µg/L | 2 | NA | 2 |
| Phenanthrene | EPA 625 | µg/L | 0.05 | NA | 0.05 |
| Total Phenols | EPA 625 | mg/L | 0.1 | NA | 0.01 |
| Phenol | EPA 625 | µg/L | 1 | NA | 1 |
| Pyrene | EPA 625 | µg/L | 0.05 | NA | 0.05 |
| **Volatile Organic Compounds** | | | | | |
| 1,2,4-Trichlorobenzene | EPA 624 | µg/L | 1 | NA | 2 |
| 1,2-Dichlorobenzene | EPA 624 | µg/L | 1 | NA | 2 |
| 1,3-Dichlorobenzene | EPA 624 | µg/L | 1 | NA | 2 |
| 1,4-Dichlorobenzene | EPA 624 | µg/L | 1 | NA | 2 |
| 2-Chloroethyl vinyl ether | EPA 624 | µg/L | 1 | NA | 2 |
| Methyl tert-butyl ether (MTBE) | EPA 624 | µg/L | 1 | NA | 2 |

MDL – Method Detection Limit RL – Reporting Limit NA – Not applicable

1. Method may be substituted with an equivalent commercially available and widely accepted method that meets the project MDL and RL where practicable.
2. For Organochlorine Pesticides, the Chlordane compounds specified include the five parts as noted in the Bight '13 manual which also includes the three parts as noted in the SQO List (cis-Chlordane, trans-Chlordane, oxychlordane, cis-nonachlor, & trans-nonachlor).
3. Refer to Table C-5 for the list of PCB Congeners
4. TMDL Target shown is the lowest required compliance limit as set forth in the TMDLs within the Dominguez Channel Watershed Management Area. "NA" indicates no applicable MRP Table E-2 or TMDL requirement for the identified parameter.
5. The method detection limit (MDL) should be at least three times lower than the reporting limit (40 CFR 136) but will vary per instrument by MDL study. Detected data between the MDL and the RL will be reported and flagged by the lab as estimated. Non-detected data may be reported at the MDL.

| Table C-3. Analytical Methods, Project Method Detection, and Reporting Limits for Laboratory Analysis of Sediment | | | | |
|---|---|---|---|---|
| **Parameter/Constituent** | **Method[1]** | **Units** | **TMDL Target[5]** | **Target RL[6]** |
| **Toxicity** | | | | |
| *Eohaustorius estuarius* | EPA-600-R-94-025 (100.4) | NA | NA | NA |
| *Mytilus galloprovincialis* | EPA-600-R-95-136 | NA | NA | NA |
| Sulfate | EPA 9071B | µg/dry g | 0.01 | 0.05 |
| % Solids | EPA 1684 | % | NA | NA |
| Total Organic Carbon (TOC) | SM5310B | % Dry Weight | 0.01 | 0.05 |
| **Organics[2]** | | | | |
| cis-Chlordane (alpha-Chlordane) | EPA 8270C | ng/dry g | 1 | 2 |
| trans-Chlordane (gamma-Chlordane) | EPA 8270C | ng/dry g | 1 | 2 |
| oxychlordane | EPA 8270C | ng/dry g | 1 | 2 |
| cis-nonachlor | EPA 8270C | ng/dry g | 1 | 2 |
| trans-nonachlor | EPA 8270C | ng/dry g | 1 | 2 |
| 2,4'-DDD | EPA 8270C | ng/dry g | 1 | 2 |
| 2,4'-DDE | EPA 8270C | ng/dry g | 1 | 2 |
| 2,4'-DDT | EPA 8270C | ng/dry g | 1 | 3 |
| 4,4'-DDD | EPA 8270C | ng/dry g | 1 | 2 |
| 4,4'-DDE | EPA 8270C | ng/dry g | 1 | 2 |
| 4,4'-DDT | EPA 8270C | ng/dry g | 1 | 5 |
| Dieldrin | EPA 8270C | ng/dry g | 1 | 2 |
| PAHs[3] | EPA 8270C | µg/dry g | 20 | 20 |
| **PCBs** | | | | |
| Congeners[4] | EPA 8270C | ng/dry g | 1 | 5 |
| Aroclors (1016, 1221, 1232, 1242, 1248, 1254, 1260) | EPA 8270C | ng/dry g | 10 | 20 |
| **Metals** | | | | |
| Cadmium | EPA 6020 | µg/dry g | 0.03 | 0.05 |
| Copper | EPA 6020 | µg/dry g | 0.03 | 0.05 |
| Lead | EPA 6020 | µg/dry g | 0.03 | 0.05 |
| Silver | EPA 6020 | µg/dry g | 0.03 | 0.05 |
| Zinc | EPA 6020 | µg/dry g | 0.03 | 0.05 |

MDL – Method Detection Limit RL – Reporting Limit NA – Not applicable

1. Method may be substituted with an equivalent commercially available method that meets the project MDL and RL where practical. L.
2. For Organochlorine Pesticides, the Chlordane compounds specified include the five parts as noted in the Bight '13 manual which also includes the 3 parts as noted in the SQO List.
3. PAHs include: acenaphthene, anthracene, biphenyl, naphthalene, 2,6-dimethylnaphthalene, fluorene, 1-methylnaphthalene, 2-methylnaphthalene, 1-methylphenanthrene, phenanthrene, benzo(a)anthracene, benzo(a)pyrene, benzo(e)pyrene, chrysene, dibenz(a,h)anthracene, fluoranthene, perylene, and pyrene..
4. Refer to Table C-5 for the list of PCB Congeners.

5. TMDL Target shown is the lowest required compliance limit as set forth in the TMDLs within the Dominguez Channel Watershed Management Area. "NA" indicates no applicable TMDL requirement for the identified parameter.
6. The method detection limit (MDL) should be at least three times lower than the reporting limit (40 CFR 136) but will vary per instrument by MDL study. Detected data between the MDL and the RL will be reported and flagged by the lab as estimated. Non-detected data may be reported at the MDL.

**Table C-4. Analytical Methods, Project Method Detection, and Reporting Limits for Laboratory Analysis of Tissue**

| Parameter/Constituent | Method[1] | Units | TMDL Target[4] | Target RL[5] |
|---|---|---|---|---|
| cis-Chlordane (alpha-Chlordane)[2] | EPA 8270C | ng/dry g | 1 | 5 |
| trans-Chlordane (gamma-Chlordane) | EPA 8270C | ng/dry g | 1 | 5 |
| oxychlordane | EPA 8270C | ng/dry g | 1 | 5 |
| cis-nonachlor | EPA 8270C | ng/dry g | 1 | 5 |
| trans-nonachlor | EPA 8270C | ng/dry g | 1 | 5 |
| 2,4'-DDD | EPA 8270C | ng/dry g | 1 | 5 |
| 2,4'-DDE | EPA 8270C | ng/dry g | 1 | 5 |
| 2,4'-DDT | EPA 8270C | ng/dry g | 1 | 5 |
| 4,4'-DDD | EPA 8270C | ng/dry g | 1 | 5 |
| 4,4'-DDE | EPA 8270C | ng/dry g | 1 | 5 |
| 4,4'-DDT | EPA 8270C | ng/dry g | 1 | 5 |
| PCBs[3] | EPA 8270C | ng/dry g | 1 | 5 |

MDL – Method Detection Limit RL – Reporting Limit NA – Not applicable

1. Method may be substituted with an equivalent commercially available method that meets the project MDL and RL where practical.
2. For Organochlorine Pesticides, the Chlordane compounds specified include the five parts as noted in the Bight '13 manual, which also includes the 3 parts as noted in the SQO List.
3. Refer to Table C-5 for the list of PCB Congeners
4. TMDL Target shown is the lowest required compliance limit as set forth in the TMDLs within the Dominguez Channel Watershed. "NA" indicates no applicable TMDL requirement for the identified parameter.
5. The method detection limit (MDL) should be at least three times lower than the reporting limit (40 CFR 136) but will vary per instrument by MDL study. Detected data between the MDL and the RL will be reported and flagged by the lab as estimated. Non-detected data may be reported at the MDL.

| Table C-5. PCB Congener Analyte List | | |
|---|---|---|
| **CASRN** | **Congener Number** | **Compound Name** |
| 34883-43-7 | 8 | 2,4'-Dichlorobiphenyl |
| 37680-65-2 | 18 | 2,2',5-Trichlorobiphenyl |
| 7012-37-5 | 28 | 2,4,4'-Trichlorobiphenyl |
| 38444-90-5 | 37 | 3,4,4'-Trichlorobiphenyl |
| 41464-39-5 | 44 | 2,2',3,5'-Tetrachlorobiphenyl |
| 41464-40-8 | 49 | 2,2',4,5'-Tetrachlorobiphenyl |
| 35693-99-3 | 52 | 2,2',5,5'-Tetrachlorobiphenyl |
| 32598-10-0 | 66 | 2,3',4,4'-Tetrachlorobiphenyl |
| 32598-11-1 | 70 | 2,3',4',5-Tetrachlorobiphenyl |
| 32690-93-0 | 74 | 2,4,4',5-Tetrachlorobiphenyl |
| 32598-13-3 | 77 | 3,3',4,4'-Tetrachlorobiphenyl |
| 70362-50-4 | 81 | 3,4,4',5-Tetrachlorobiphenyl |
| 38380-02-8 | 87 | 2,2',3,4,5'-Pentachlorobiphenyl |
| 38380-01-7 | 99 | 2,2',4,4',5-Pentachlorobiphenyl |
| 37680-73-2 | 101 | 2,2',4,5,5'-Pentachlorobiphenyl |
| 32598-14-4 | 105 | 2,3,3',4,4'-Pentachlorobiphenyl |
| 38380-03-9 | 110 | 2,3,3',4',6-Pentachlorobiphenyl |
| 74472-37-0 | 114 | 2,3,4,4',5-Pentachlorobiphenyl |
| 31508-00-6 | 118 | 2,3',4,4',5-Pentachlorobiphenyl |
| 56558-17-9 | 119 | 2,3',4,4',6-Pentachlorobiphenyl |
| 65510-44-3 | 123 | 2,3',4,4',5'-Pentachlorobiphenyl |
| 57465-28-8 | 126 | 3,3',4,4',5-Pentachlorobiphenyl |
| 38380-07-3 | 128 | 2,2',3,3',4,4'-Hexachlorobiphenyl |
| 35065-28-2 | 138 | 2,2',3,4,4',5'-Hexachlorobiphenyl |
| 38380-04-0 | 149 | 2,2',3,4',5',6-Hexachlorobiphenyl |
| 52663-63-5 | 151 | 2,2',3,5,5',6-Hexachlorobiphenyl |
| 35065-27-1 | 153 | 2,2',4,4',5,5'-Hexachlorobiphenyl |
| 38380-08-4 | 156 | 2,3,3',4,4',5-Hexachlorobiphenyl |
| 69782-90-7 | 157 | 2,3,3',4,4',5'-Hexachlorobiphenyl |
| 74472-42-7 | 158 | 2,3,3',4,4',6-Hexachlorobiphenyl |
| 52663-72-6 | 167 | 2,3',4,4',5,5'-Hexachlorobiphenyl |
| 59291-65-5 | 168 | 2,3',4,4',5',6-Hexachlorobiphenyl |
| 32774-16-6 | 169 | 3,3',4,4',5,5'-Hexachlorobiphenyl |
| 35065-30-6 | 170 | 2,2',3,3',4,4',5-Heptachlorobiphenyl |
| 52663-70-4 | 177 | 2,2',3,3',4,5',6'-Heptachlorobiphenyl |
| 35065-29-3 | 180 | 2,2',3,4,4',5,5'-Heptachlorobiphenyl |
| 52663-69-1 | 183 | 2,2',3,4,4',5',6-Heptachlorobiphenyl |
| 52663-68-0 | 187 | 2,2',3,4',5,5',6-Heptachlorobiphenyl |
| 39635-31-9 | 189 | 2,3,3',4,4',5,5'-Heptachlorobiphenyl |
| 35694-08-7 | 194 | 2,2',3,3',4,4',5,5'-Octachlorobiphenyl |
| 52663-78-2 | 195 | 2,2',3,3',4,4',5,6-Octachlorobiphenyl |

| Table C-5. PCB Congener Analyte List | | |
|---|---|---|
| **CASRN** | **Congener Number** | **Compound Name** |
| 40186-71-8 | 201 | 2,2',3,3',4,5',6,6'-Octachlorobiphenyl |
| 40186-72-9 | 206 | 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl |
| 2051-24-3 | 209 | Decachlorobiphenyl |

Note: The listed PCB Congeners is a hybrid list derived from the 41 PCB Congeners listed in the Bight '13 QA Manual issued by SCCWRP in 2013 and the 18 PCB Congeners in the SWRCB's SQO List. The resulting list contains 44 Congeners. Total PCBs would be reported as the sum of the 44 Congeners.

| Table C-6. Data Quality Objectives | | | | |
|---|---|---|---|---|
| **Parameter** | **Accuracy** | **Precision** | **Recovery** | **Completeness** |
| **Field Measurements** | | | | |
| Water Velocity (for Flow calc.) | 2% | NA | NA | 90% |
| pH | ± 0.2 pH units | ± 0.5 pH units | NA | 90% |
| Temperature | ± 0.5 °C | ± 5% | NA | 90% |
| Dissolved Oxygen | ± 0.5 mg/L | ± 10% | NA | 90% |
| Turbidity | 10% | 10% | NA | 90% |
| Conductivity | 5% | 5% | NA | 90% |
| **Laboratory Analyses – Water** | | | | |
| Conventionals | 80 – 120% | 0 – 25% | 80 – 120% | 90% |
| Nutrients | 80 – 120% | 0 – 25% | 90 – 110% | 90% |
| Metals[3] | 75 – 125% | 0 – 25% | 75 – 125% | 90% |
| Semi-Volatile Organics | 50 – 150% | 0 – 25% | 50 – 150% | 90% |
| Volatile Organics | 50 – 150% | 0 – 25% | 50 – 150% | 90% |
| Triazines | 50 – 150% | 0 – 25% | 50 – 150% | 90% |
| Herbicides | 50 – 150% | 0 – 25% | 50 – 150% | 90% |
| OC Pesticides | 50 – 150% | 0 – 25% | 50 – 150% | 90% |
| PCB Congeners | 50 – 150% | 0 – 25% | 50 – 150% | 90% |
| PCB Aroclors | 50 – 150% | 0 – 25% | 50 – 150% | 90% |
| OP Pesticides | 50 – 150% | 0 – 25% | 50 – 150% | 90% |
| **Laboratory Analyses – Sediment** | | | | |
| Sediment Toxicity | [1] | [2] | NA | 90% |
| Sulfate | 80 – 120% | 0 – 25% | 80 – 120% | 90% |
| % Solids | NA | NA | NA | 90% |
| Total Organic Carbon (TOC) | 80 – 120% | 0 – 25% | 80 – 120% | 90% |
| OC Pesticides | 50 – 150% | 0 – 25% | 50 – 150% | 90% |
| PCB Congeners | 50 – 150% | 0 – 25% | 50 – 150% | 90% |
| PCB Aroclors | 50 – 150% | 0 – 25% | 50 – 150% | 90% |
| Metals | 80 – 120% | 0 – 25% | 80 – 120% | 90% |

| Table C-6. Data Quality Objectives | | | | |
|---|---|---|---|---|
| **Laboratory Analyses – Tissue** | | | | |
| Metals | 80 – 120% | 0 – 25% | 80 – 120% | 90% |
| OC Pesticides | 50 – 150% | 0 – 25% | 50 – 150% | 90% |
| PCB Congeners | 50 – 150% | 0 – 25% | 50 – 150% | 90% |

1. Must meet all method performance criteria relative to the reference toxicant test.
2. Must meet all method performance criteria relative to sample replicates.
3. Please see Table C-2, C-3, C-4 and C-5 for a list of individual constituents in each suite.

### C.1.2.1 Method Detection Limit Studies

Any laboratory performing analyses under this program must routinely conduct MDL studies to document that the MDLs are less than or equal to the project-specified RLs. If any analytes have MDLs that do not meet the project RLs, the following steps must be taken:

- Perform a new MDL study using concentrations sufficient to prove analyte quantitation at concentrations less than or equal to the project-specified RLs per the procedure for the Determination of the Method Detection Limit presented in Revision 1.1, 40 Code of Federal Regulations (CFR) 136, 1984.
- No samples may be analyzed until the issue has been resolved. MDL study results must be available for review during audits, data review, or as requested. Current MDL study results must be reported for review and inclusion in project files.

An MDL is developed from seven aliquots of a standard containing all analytes of interest spiked at five times the expected MDL. These aliquots are processed and analyzed in the same manner as environmental samples. The results are then used to calculate the MDL. If the calculated MDL is less than 0.33 times the spiked concentration, another MDL study should be performed using lower spiked concentrations.

### C.1.2.2 Project Reporting Limits

Laboratories generally establish RLs that are reported with the analytical results—these may be called reporting limits, detection limits, reporting detection limits, or several other terms by the reporting laboratory. These laboratory limits must be less than or equal to the project RLs listed in Table C-2. Wherever possible, project RLs are lower than the relevant numeric criteria or toxicity thresholds. Laboratories performing analyses for this project must have documentation to support quantitation at the required levels.

### C.1.2.3 Laboratory Standards and Reagents

All stock standards and reagents used for standard solutions and extractions must be tracked through the laboratory. The preparation and use of all working standards must be documented according to procedures outlined in each laboratory's Quality Assurance Manual; standards must be traceable according to U.S. EPA, A2LA or National Institute for Standards and Technology (NIST) criteria. Records must have sufficient detail to allow determination of the identity, concentration, and viability of the standards, including any dilutions performed to obtain the working standard. Date of preparation, analyte or mixture, concentration, name of preparer, lot or cylinder number, and expiration date, if applicable, must be recorded on each working standard.

### C.1.3 Sample Containers, Storage, Preservation, and Holding Times

Sample containers must be pre-cleaned and certified free of contamination according to the USEPA specification for the appropriate methods. Sample container, storage and preservation, and holding time requirements are provided in Table C-7. The analytical laboratories will supply sample containers that already contain preservative (Table C-7), including ultra-pure hydrochloric and nitric acid, where applicable. After collection, samples will be stored at 4°C until arrival at the contract laboratory. Note that sample containers, volumes, storage, processing, and holding requirements may vary according to analytical method and laboratory. Typical requirements based on the methods listed in Tables C-3, C-4 and C-5 are provided in Table C-7, but are subject to change upon selection and consultation with the analytical laboratory.

**Table C-7. Sample Container, Volume, Initial Preservation, and Holding Time Requirements**

| Parameter | Sample Container | Sample Volume[1] | Immediate Processing and Storage | Holding Time |
|---|---|---|---|---|
| **Water** | | | | |
| Toxicity | | | | |
| Initial Screening | Glass or FLPE-lined jerrican | 40 L | Store at $4^0$C | 36 hours[2] |
| Follow-Up Testing | | | | |
| Phase I TIE | | | | |
| Total coliform, fecal coliform, and Enterococcus (marine waters) | PE or PP | 120 mL | $Na_2S_2O_3$ and Store at 4ºC | 8 hours |
| *E. coli* (fresh) | PE | 120 mL | | |
| Fecal coliform (fresh) | PE | 120 mL | | |
| Hardness | PE | 1 L<br>500 mL | $HNO_3$ to pH<2 (or $H_2SO_4$ to pH<2 for Hardness) and Store at 4°C | 180 days |
| Metals | | | | 6 onths[6] |
| Oil and Grease | PE or Glass | 1 L<br>250 mL | HCl or $H_2SO_4$ to pH<2 and Store at 4°C | 28 days |
| Total Suspended Solids (TSS) | PE | 250 L | Store at $4^0$C | 7 days |
| Total Dissolved Solids (TDS) | PE | 250 L | Store at $4^0$C | 7 days |
| Dissolved Organic Carbon (DOC) | PE | 250 L | Store at $4^0$C | Filter/28 days |
| Total Organic Carbon (TOC) | PE | 250 L | $H_2SO_4$ to pH<2 and Store at 4°C | 728 days |
| Nitrate Nitrogen | PE | 250 mL | Store at $4^0$C | 48 hours |
| Nitrite Nitrogen | | | | |
| Orthophosphate-P | | | | |

| Table C-7. Sample Container, Volume, Initial Preservation, and Holding Time Requirements | | | | |
|---|---|---|---|---|
| **Parameter** | **Sample Container** | **Sample Volume[1]** | **Immediate Processing and Storage** | **Holding Time** |
| Ammonia Nitrogen | Glass | 250-mL | $H_2SO_4$ to pH<2 and Store at $4^0C$ | 28 days |
| Total and Dissolved Phosphorus | | | | |
| Organic Nitrogen | | | | |
| Nitrate + Nitrite (as N) | | | | |
| Total Kjeldahl Nitrogen (TKN) | PE | 250-mL | $H_2SO_4$ to pH<2 and Store at $4^0C$ | 28 days |
| Mercury | Glass | 500 mL | Store at $4^0C$ | 48 Hours |
| Methylmercury | Amber Glass | 500 mL | Store at $4^0C$ | 48 Hours |
| Dissolved Organic Carbon | VOA | 40 mL | Store at $4^0C$ | 28 days |
| Organics- PCBs, OPs, OCs in water | Amber glass | 2 x 1 gallon | Store at $4^0C$ | 7/40 days[4] |
| Total Dissolved Solids (TDS) | PE | 1-Pint | Store at $4^0C$ | 7 days |
| Chloride | PE | 250 mL | Store at $4^0C$ | 28 days |
| Sulfate | | | | 28 days |
| Boron | PE | 250 mL | Store at $4^0C$ | 180 days |
| **Sediment** | | | | |
| Toxicity | | | | |
| Initial Screening | 4–mil poly bag | 10 L[3] | Store at $4^0C$ | 14 days |
| Follow-Up Testing | | | | |
| Sulfate | Glass | 8 oz jar | Store at $4^0C$ | 28 days |
| Total Organic Carbon | | | | 28 days |
| Organics | | | | 1 year[5] |
| Metals | | | | 6 months |

| Table C-7. Sample Container, Volume, Initial Preservation, and Holding Time Requirements | | | | |
|---|---|---|---|---|
| **Parameter** | **Sample Container** | **Sample Volume[1]** | **Immediate Processing and Storage** | **Holding Time** |
| **Tissue** | | | | |
| Metals | teflon sheet | 200 g | Store on dry ice | 1 year if frozen |

PE – Polyethylene

1. Sample volumes provided for reference. Required sample volumes should be verified with the laboratory prior to sample collection event. Additional volume may be required for analyses, QC analyses and/or equivalent substitute method or for multiple species toxicity testing.
2. Tests should be initiated within 36 hours of collection. The 36-hour hold time does not apply to subsequent analyses for TIEs. For interpretation of toxicity results, samples may be split from toxicity samples in the laboratory and analyzed for specific chemical parameters. All other sampling requirements for these samples are as specified in this document for the specific analytical method. Results of these analyses are not for any other use (e.g. characterization of ambient conditions) because of potential holding time exceedances and variance from sampling requirements.
3. Sample volumes for follow-up testing and Phase I TIEs for sediments may change based on percent solids in previous samples. In addition, collection of sediment for follow-up testing and Phase I TIEs may change based on observations of toxicity in previous sampling events.
4. 7/40 = 7 days to extract and 40 days from extraction to analysis.
5. One year if frozen, otherwise 14 days to extract and 40 days from extraction to analysis.
6. Six months after preservation.

### C.1.4 Aquatic Toxicity Testing and Toxicity Identification Evaluations

Aquatic toxicity testing supports the identification of best management practices (BMPs) to address sources of toxicity in urban runoff. The following outlines the approach for conducting aquatic toxicity monitoring and evaluating results. Control measures and management actions to address confirmed toxicity caused by urban runoff are addressed by the EWMP, either via currently identified management actions or those that are identified via adaptive management of the EWMP.

The approach to conducting aquatic toxicity monitoring is presented in Figure C-1, which describes a general evaluation process for each sample collected as part of routine sampling conducted twice per year in wet weather and once per year in dry weather. Monitoring begins in the receiving water and the information gained is used to identify constituents for monitoring at outfalls to support the identification of pollutants that need to be addressed in the EWMP. The sub-sections below describe the process and its technical and logistical rationale.

Although not proposed for testing at this time, the following details the saltwater toxicity testing approach if such testing is initiated in the Los Angeles Harbor and Dominguez Channel Estuary.

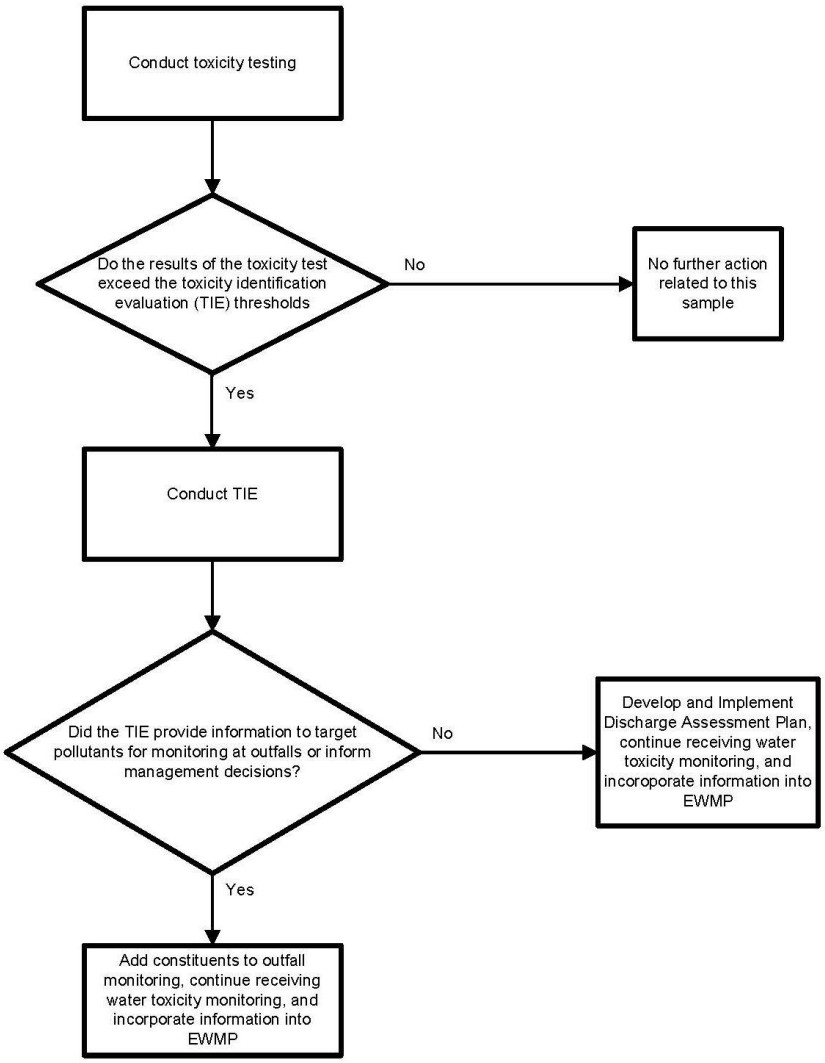



**Figure C-1. Generalized Aquatic Toxicity Assessment Process**

### C.1.4.1 Sensitive Species Selection

The MRP (page E-32) states that a sensitivity screening to select the most sensitive test species should be conducted unless "a sensitive test species has already been determined, or if there is prior knowledge of potential toxicant(s) and a test species is sensitive to such toxicant(s), then monitoring shall be conducted using only that test species." Previous relevant studies conducted in the watershed should be considered. Such studies may have been completed via previous MS4 sampling, wastewater NPDES sampling, or special studies conducted within the watershed. The following sub-sections discuss the species section process for assessing aquatic toxicity in receiving waters.

**Freshwater Sensitive Species Selection**

As described in the MRP (page E-31), if samples are collected in receiving waters with salinity less than1 part per thousand (ppt), or from outfalls discharging to receiving waters with salinity less than 1 ppt, 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 Freshwater Organisms (EPA/821/R-02/013, 2002; Table IA, 40 CFR Part 136). The freshwater test species identified in the MRP are:

- A static renewal toxicity test with the fathead minnow, *Pimephales promelas* (Larval Survival and Growth Test Method 1000.04).
- A static renewal toxicity test with the *daphnid*, *Ceriodaphnia dubia* (Survival and Reproduction Test Method 1002.05).
- A static non-renewal toxicity test with the green alga, *Selenastrum capricornutum* (also named *Raphidocelis subcapitata*) (Growth Test Method 1003.0).

The three test species were evaluated to determine if either a sensitive test species had already been determined, or if there is prior knowledge of potential toxicant(s) and a test species is sensitive to such toxicant(s). In reviewing the available data in the Dominguez Channel watershed, metals, historical organics, and pyrethroids have been identified as problematic and are generally considered the primary aquatic life toxicants of concern found in urban runoff. Given the knowledge of the presence of these potential toxicants in the watershed, the sensitivities of each of the three species were considered to evaluate which is the most sensitive to the potential toxicants in the watersheds.

*Ceriodaphnia dubia (C. dubia)* has been reported as a sensitive test species for historical and current use pesticides and metals, and studies indicate that it is more sensitive to the toxicants of concern than *P. promelas* or *S. capricornutum*. In its aquatic life copper criteria document, the USEPA reports greater sensitivity of *C. dubia* to copper (species mean acute value of 5.93 µg/l) compared to *Pimephales promelas* (species mean acute value of 69.93 µg/l; EPA, 2007). *C. dubia*'s relatively higher sensitive to metals is common across multiple metals. Additionally, researchers at the University of California, Davis reviewed available reported species sensitivity values in developing pesticide criteria for the Central Valley Regional Water Quality Control Board. The UC Davis researchers reported higher sensitivity of *C. dubia* to diazinon and bifenthrin (species mean acute value of 0.34 µg/l and 0.105 µg/l) compared to *P. promelas* (species mean acute value of 7804 µg/l and 0.405 µg/l; Palumbo et al., 2010a,b). Additionally, a study of the City of Stockton urban storm water runoff found acute and chronic toxicity to *C. dubia*, with no toxicity to *S. capricornutum* or *P. promelas* (Lee and Lee, 2001). The toxicity was attributed to organophosphate pesticides, indicating a higher sensitivity of *C. dubia* compared to *S. capricornutum* or *P. promelas*. While *P. promelas* is generally less sensitive to metals and pesticides, it can be more sensitive to ammonia than *C. dubia*. However, as ammonia is not typically a constituent of concern for urban runoff and ammonia is not consistently observed above the toxic thresholds in the watershed, *P. promelas* is not considered a particularly sensitive species for evaluating the impacts of urban runoff in receiving waters in the watershed.

While *Selenastrum capricornutum* is a species sensitive to herbicides; however, while sometimes present in urban runoff, herbicides are not identified as a potential toxicant in the watershed. Additionally, *S. capricornutum* is not considered the most sensitive species as it is not sensitive to pyrethroids or organophosphate pesticides and is not as sensitive to metals as *C. dubia*. Additionally, the *S. capricornutum* growth test can be affected by high concentrations of suspended and dissolved solids, color, and pH extremes, which can interfere with the determination of sample toxicity. As a result, it is common to manipulate the sample by

centrifugation and filtration to remove solids to conduct the test; however, this process may affect the toxicity of the sample. In a study of urban highway storm water runoff (Kayhanian et. al, 2008), the green alga response to the storm water samples was more variable than the *C. dubia* and the *P. promelas* and in some cases the alga growth was possibly enhanced due to the presence of stimulatory nutrients. Also, in a study on the City of Stockton urban storm water runoff (Lee and Lee, 2001) the *S. capricornutum* tests rarely detected toxicity where the *C. dubia* and the *P. promelas* regularly detected toxicity.

As *C. dubia* is identified as the most sensitive to known potential toxicant(s) typically found in receiving waters and urban runoff in the freshwater potions of the watershed, *C. dubia* is selected as the most sensitive species. The species also has the advantage of being easily maintained by means of in-house mass cultures. The simplicity of the test, the ease of interpreting results, and the smaller volume necessary to run the test, make the test a valuable screening tool. The ease of sample collection and higher sensitivity will support assessing the presence of ambient receiving water toxicity or long term effects of toxic storm water over time. As such, toxicity testing in the freshwater portions of the watershed will be conducted using *C. dubia*. However, *C. dubia* test organisms are typically cultured in moderately hard waters (80-100 mg/L CaCO3) and can have increased sensitivity to elevated water hardness greater than 400 mg/L CaCO3), which is beyond their typical habitat range. Because of this, in instances where hardness in site waters exceeds 400 mg/L (CaCO3), an alternative test species may be used. Daphnia magna is more tolerant to high hardness levels and is a suitable substitution for *C. dubia* in these instances (Cowgill and Milazzo, 1990).

**Saltwater Sensitive Species Selection**

Although not proposed for testing at this time, the following details the species selection process if saltwater toxicity testing is initiated in the Los Angeles Harbor and Dominguez Channel Estuary. As described in the MRP (page E-31), if samples are collected in receiving waters with salinity equal to or greater than 1 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:

- A static renewal toxicity test with the topsmelt, *Atherinops affinis* (Larval Survival and Growth Test Method 1006.015).
- A static non-renewal toxicity test with the purple sea urchin, *Strongylocentrotus purpuratus* (Fertilization Test Method 1008.0).
- A static non-renewal toxicity test with the giant kelp, *Macrocystis pyrifera* (Germination and Growth Test Method 1009.0).

In addition to considering the three species identified in the MRP, the *Haliotis rufescens*, larval development test was also considered given the extensive use in region.

Although all the species mentioned have been demonstrated as sensitive to a wide variety of toxicants and have been subject to numerous inter- and intra-laboratory testing using standardized toxicants, two species--the giant kelp and the topsmelt--have limitations when used to assess the toxicity of storm water compared to the sea urchin fertilization test and the red abalone larval development test.

The method for giant kelp 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 the giant kelp as a test species for storm water monitoring may not be ideal. Obtaining *sporophylls* for storm water testing could also be a limiting factor for selecting this test. Collection of the giant kelp *sporophylls* from the field is necessary prior to initiating the test and the target holding time for any receiving water or storm water sample is 36 hours; however, 72 hours is the maximum time a sample may be held prior to test initiation. During dry season meeting the 36-72 hour 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 the giant kelp *sporophylls* during the storm season may include increased safety risks that can be avoided by selection of a different species.

The topsmelt test measures the survival and growth test of a larval fish over seven days. At the end of seven days of exposure to a suspected 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 topsmelt 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 storm water by the addition of artificial sea salts to within the range of marine receiving waters. Unfortunately, the tolerance of topsmelt 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. 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 sea urchin fertilization test measures the ability of sea urchin sperm to fertilize an egg when exposed to a suspected toxicant. The sea urchin fertilization has been selected as a chronic toxicity test organism in previous MS4 permits and has been used to assess ambient receiving water toxicity, sediment pore water toxicity, as well as storm water toxicity. The sea urchin 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. The red abalone larval development test measures the percent of abnormal shell development in larvae exposed to toxic samples for 48 hrs. The red abalone is commonly used to test treatment plant effluent, but has had limited use in storm water compared to the sea urchin fertilization test. The advantages of the red abalone test include a sensitive endpoint, the ability to purchase abalone from commercial suppliers and hold test organisms prior to spawning, and low variability in results compared to other species (e.g., sea urchin fertilization test). Further, the red abalone development test has been used to assess the toxicity of storm water and was the most sensitive species to storm water samples collected from the Ashland storm drain and the Pico-Kentor storm drain. Thus, though not listed as a potential test species for use in storm water monitoring in the MS4 permit, it was considered as a potentially sensitive species for the purposes of selecting the most sensitive species.

Due to the limitations of the giant kelp germination and growth test and the topsmelt survival and growth test, in addition to not being particularly sensitive to the constituents identified as problematic in storm water runoff from the watershed these tests are not considered particularly helpful in supporting the identification of pollutants of concern. Based on the sensitivity, smaller test volume requirements, their ability to be housed in the lab prior to testing, and shorter exposure times, the sea urchin fertilization test and the red abalone development test will be considered during sensitive species selection to measure toxicity in marine and estuarine

environments. Based on historical data of the sensitivity of the sea urchin and red abalone tests, and the limiting factors associated with the topsmelt and giant kelp tests, the sensitive species test for marine and estuarine species will be conducted with the sea urchin and red abalone tests. Species screening was determined to be appropriate for these two species (as opposed to selecting just one) as testing conducted within the region with both species have shown varying sensitivity. Thus, it is appropriate to test both to determine sensitivity at a given site. After the screening testing is completed, monitoring will be conducted with the most-sensitive species.

### C.1.4.2 Testing Period

The following describes the testing periods to assess toxicity in samples collected in the watershed during dry and wet weather conditions.

**Freshwater Testing Periods**

Although wet weather conditions (typically 48 hours) in the region generally persist for less than the chronic testing periods (7 days), the *C. dubia* chronic test will be used for wet weather toxicity testing in accordance with Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms (EPA, 2002b). Utilization of chronic tests on wet weather samples are not expected to generate results representative of the typical conditions found in the receiving water intended to be simulated by toxicity testing.

Chronic toxicity tests will be used to assess both survival and reproductive/growth endpoints for *C. dubia* in dry weather samples. Chronic testing will be conducted on undiluted grab samples in accordance with *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms* (USEPA, 2002a).

**Saltwater Testing Period**

While not proposed for testing at this time, the following details the testing period if saltwater toxicity testing is initiated in the Los Angeles Harbor and Dominguez Channel Estuary. Although the two proposed marine and estuarine toxicity species utilize test methods that have short durations (20 minutes for the sea urchin fertilization test and 48 hours for the red abalone development test), the end points are sub-lethal and can be considered representative of acute and chronic effects. Both test species and test methods are suitable for storm water and non-storm water monitoring.

### C.1.4.3 Toxicity Endpoint Assessment and Toxicity Identification Evaluation Triggers

Per the MRP, toxicity test endpoints will be analyzed using the Test of Significant Toxicity (TST) t-test approach specified by the USEPA (USEPA, 2010). The Permit specifies that the chronic in-stream waste concentration (IWC) is set at 100% receiving water for receiving water samples and 100% effluent for outfall samples. Using the TST approach, a t-value is calculated for a test result and compared with a critical t-value from USEPA's TST Implementation Document (USEPA, 2010). Follow-up triggers are generally based on the Permit specified statistical assessment as described below.

For chronic *C. dubia* toxicity testing, if a ≥50 percent reduction in survival or reproduction is observed between the sample and laboratory control that is statistically significant, a toxicity identification evaluation (TIE) will be performed.

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 ≥50% are observed in the original sample, but the follow-up TIE baseline "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.

### C.1.4.4 Toxicity Identification Evaluation Approach

The results of toxicity testing will be used to trigger further investigations to determine the cause of observed laboratory toxicity. The primary purpose of conducting TIEs is to support the identification of management actions that will result in the removal of pollutants causing toxicity in receiving waters. Successful TIEs will direct monitoring at outfall sampling sites to inform management actions. As such, the goal of conducting TIEs is to identify pollutant(s) that should be sampled during outfall monitoring so that management actions can be identified to address the pollutant(s).

The TIE approach is divided into three phases as described in USEPA's 1991 Methods for Aquatic Toxicity Identification and briefly summarized as follows:

- Phase I utilizes methods to characterize the physical/chemical nature of the constituents which cause 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.
- Phase II utilizes methods to specifically identify toxicants.
- Phase III utilizes methods to confirm the suspected toxicants.

A Phase I TIE will be conducted on samples that exceed a TIE trigger described above. Water quality data will be reviewed to further support evaluation of potential toxicants. TIEs will perform the manipulations described in Table C-8. TIE methods will generally adhere to USEPA procedures documented in conducting TIEs (USEPA, 1991, 1992, 1993a-b).

| Table C-8. Aquatic Toxicity Identification Evaluation Sample Manipulations | |
|---|---|
| **TIE Sample Manipulation** | **Expected Response** |
| 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 |
| Piperonyl Butoxide (PBO) | Reduces toxicity from organophosphate pesticides such as diazinon, chlorpyrifos and malathion, and enhances pyrethroid toxicity |
| Carboxylesterase addition(1) | Hydrolyzes pyrethroids |
| 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 |
| No Manipulation | Baseline test for comparing the relative effectiveness of other manipulations |

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).

The DCWMA Group will identify the cause(s) of toxicity using the treatments in Table C-8 and, if possible, using the results of water column chemistry analyses. After any initial determinations of the cause of toxicity, the information may be used during future events to modify the targeted treatments to more closely target the expected toxicant or to provide additional treatments to narrow the toxicant cause(s). Moreover, if the toxicant or toxicant class is not initially identified, toxicity monitoring during subsequent events will confirm if the toxicant is persistent or a short-term episodic occurrence.

As the primary goals of conducting TIEs is to identify pollutants for incorporation into outfall monitoring, narrowing the list of toxicants following Phase I TIEs via Phase II or III TIEs is not necessary if the toxicant class determined during the Phase I TIE is sufficient for 1) identifying additional pollutants for outfall monitoring and/or 2) identifying control measures. Thus, if the specific pollutant(s) or the analytical class of pollutant (e.g., metals that are analyzed via EPA Method 200.8) are identified then sufficient information is available to inform the addition of pollutants to outfall monitoring.

Phase II TIEs may be utilized to identify specific constituents causing toxicity in a given sample if information beyond what is gained via the Phase I TIE and review of chemistry data provide is needed to identify constituents to monitor or management actions. Phase III TIEs will be conducted following any Phase II TIEs.

For the purposes of determining whether a TIE is inconclusive, TIEs will be considered inconclusive if:

- The toxicity is persistent (i.e., observed in the positive control), and
- The cause of toxicity cannot be attributed to a class of constituents (e.g., insecticides, metals, etc.) that can be targeted for monitoring.

Per the MRP (pages E-23 and E-27), pollutants identified in a TIE conducted at the downstream receiving water monitoring station during the most recent sample event, or where the TIE conducted on the receiving water sample was inconclusive, aquatic toxicity. If the discharge exhibits aquatic toxicity, then a TIE shall be conducted. Reference Section C.1.4.5 Discharge Assessment for additional details on how the DCWMA Group proposes conducting the discharge assessment.

If a combination of causes that act in a synergistic or additive manner are identified or if the toxicity can be removed with a treatment or via a combination of the TIE treatments or the analysis of water quality data collected during the same event identify the pollutant or analytical class of pollutants, the result of a TIE is considered conclusive.

Note that the MRP (page E-33) allows a TIE Prioritization Metric (as described in Appendix E of the Stormwater Monitoring Coalition's Model Monitoring Program) for use in ranking sites for TIEs. However, as the extent to which TIEs will be conducted is unknown, prioritization cannot be conducted at this time. However, prioritization may be utilized in the future based on the results of toxicity monitoring and an approach to prioritization will be developed through the CIMP adaptive management process and will be described in future versions of the CIMP.

### C.1.4.5 Discharge Assessment

The DCWMA Group will prepare a Discharge Assessment Plan if TIEs conducted on consecutive sampling events are inconclusive. The discharge assessment will be conducted after consecutive inconclusive TIEs, rather than after one, because of the inherit variability associated with the toxicity and TIE testing methods.

The Discharge Assessment Plan will consider the observed potential toxicants in the receiving water and associated urban runoff discharge above known species effect levels and the relevant exposure periods compared to the duration of the observed toxicity. The Discharge Assessment Plan will identify:

- If desired, additional receiving water toxicity monitoring to be conducted to further evaluate the spatial extent of receiving water toxicity.
- The test species to be utilized. If a species is proposed that is different than the species utilized when receiving water toxicity was observed, justification for the substitution will be provided.
- The number and location of monitoring sites and their spatial relation to the observed receiving water toxicity.
- The number of monitoring events that will be conducted, a schedule for conducting the monitoring, and a process for evaluating the completion of the assessment monitoring.

The Discharge Assessment Plan will be submitted to Los Angeles Regional Board staff for comment within 60 days of receipt of notification of the second consecutive inconclusive result. If no comments are received within 30-days, it will be assumed that the approach is appropriate for the given situation and the Plan should be implemented within 90-days of submittal.

### C.1.4.6 Follow-Up on Toxicity Testing Results

Per Parts VIII.B.c.vi and XI.G.1.d of the MRP, if the results of a TIE on a receiving sample are inconclusive, a toxicity test conducted during the same condition (i.e., wet or dry weather), using the same test species, will be conducted at applicable upstream outfalls as soon as feasible (i.e., the next monitoring event that is at least 45 days following the toxicity laboratory's report transmitting the results of an inconclusive TIE). The same TIE evaluation triggers and TIE approach presented in Sections C.1.4.3 and C.1.4.4, respectively, will be followed based on the results of the outfall sample.

The MRP (page E-33) indicates the following actions should be taken when a toxicant or class of toxicants is identified through a TIE:

1. Group Members shall analyze for the toxicant(s) during the next scheduled sampling event in the discharge from the outfall(s) upstream of the receiving water location.

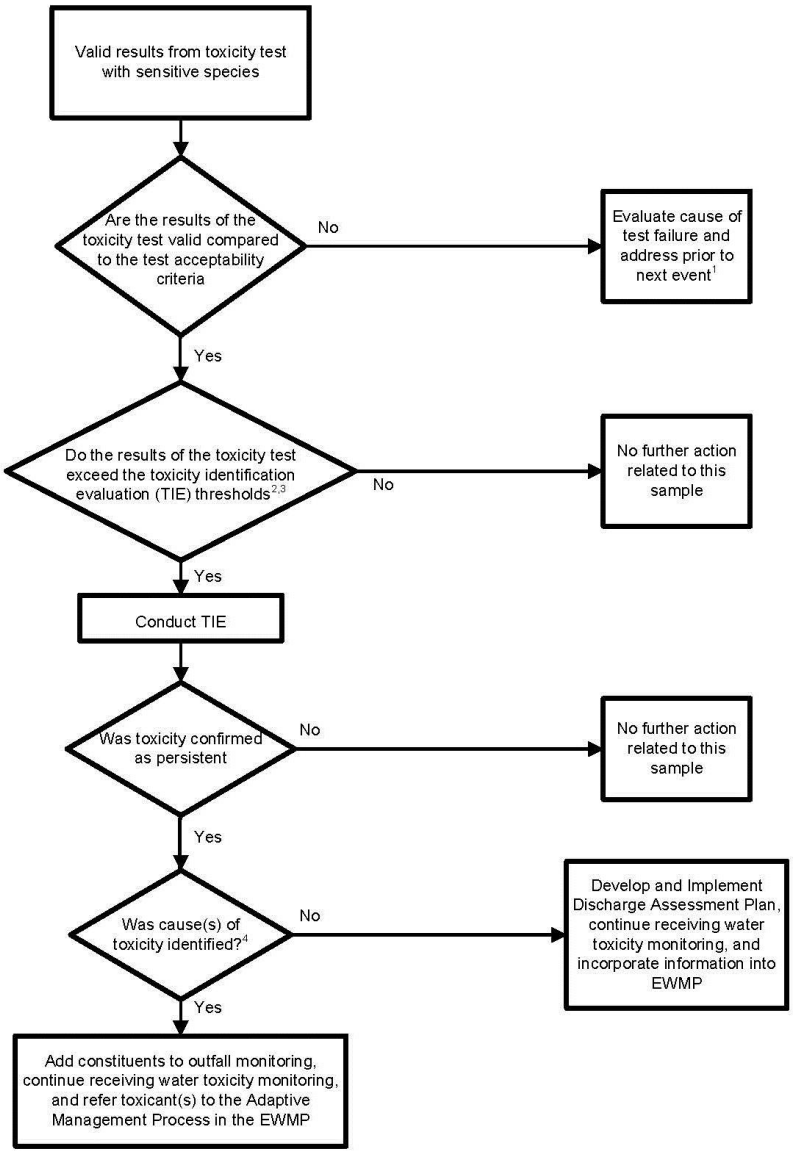
2. If the toxicant is present in the discharge from the outfall at levels above the applicable receiving water limitation, a toxicity reduction evaluation (TRE) will be performed for that toxicant.

The list of constituents monitored at outfalls identified in the CIMP will be modified based on the results of the TIEs. 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 DCWMA 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 storm water 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.

### C.1.4.7 Summary of Aquatic Toxicity Monitoring

The approach to conducting aquatic toxicity monitoring as described in the previous sections is summarized in detail in Figure C-2. The intent of the approach is to identify the cause of toxicity observed in receiving water to the extent possible with the toxicity testing tools available, thereby directing outfall monitoring for the pollutants causing toxicity with the ultimate goal of supporting the development and implementation of management actions.




**Footnotes**

1. Test failure includes pathogen or epibont interference, which should be addressed prior to the next toxicity sampling event. Additionally, lab control organisms may fail to meet test standards. As a result of test failure, toxicity samples will be collected during the next wet weather event, or as soon as possible following notification of test failure for dry event samples.
2. For freshwater, the TIE threshold is equal to or greater than 50% (≥50%) mortality in an acute (wet weather) or chronic (dry weather) test. If a ≥50% effect in a sub-lethal endpoint for chronic test is observed during dry weather, 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 ≥50% effect, a TIE will be initiated.
3. For marine waters and estuarine waters, the TIE threshold is the percent effect value ≥50%. If a ≥50% or greater effect is observed during dry weather a follow up sample will be collected within two weeks of the initial sample collection and if the follow up sample exhibits a ≥50% effect, a TIE will be initiated.
4. The goal of conducting Phase I TIEs 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 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-2. Detailed Aquatic Toxicity Assessment Process**

## C.1.5 Sediment Toxicity Testing and Toxicity Identification Evaluations

The California Sediment Quality Objectives[1] (SQOs) for direct effects describes acceptable toxicity tests. Annual sediment toxicity tests will be conducted using the 10-day Eohaustorius estuaries whole sediment toxicity test. Every five years, in conjunction with the full SQO testing (sediment triad sampling), sediment toxicity tests will be conducted using the 10-day E. estuaries whole sediment toxicity test and the 48-hour Mytilus galloprovincialis sediment-water interface toxicity test. Samples will be prepared and analyzed consistent with the methods presented in Chapter 4 of the Sediment Quality Assessment Draft Technical Support Manual (SCCWRP 2009).

TIE methods recommended by the USEPA (1996 and 2007) will be utilized. The various TIE treatments that may be employed are presented in Table C-9. Sediment pore water will be extracted and tested for toxicity if a greater than 50 percent effect is observed in bulk sediment. If the subsequent sediment pore water toxicity testing results in a greater than 50 percent effect, a Phase 1 TIE will be initiated on the bulk sediment and pore water.

**Table C-9. Sediment Toxicity Identification Evaluation Sample Manipulations**

| Treatment | Matrix | Purpose |
|---|---|---|
| Coconut carbon addition | Sediment | Binds organic contaminants |
| Cation exchange resin addition | Sediment | Binds of trace metals |
| Piperonyl Butoxide (PBO) addition | Sediment/ Pore water | Inhibits pesticide metabolism. Reduces toxicity of organophosphorus pesticides; increases toxicity of pyrethroid pesticides |
| C18 Extraction | Pore water | Removes non-polar organic compounds |
| EDTA | Pore water | Chelates cationic metals |

## C.1.6 Bioassessment/Macrobenthic Community Assessment

The SQOs for direct effects requires the analysis of benthic infauna. Benthic infauna assessment will be conducted as part of the sediment triad sampling once every five years. Samples will be processed and analyzed consistent with the methods presented in Chapter 5 of the Sediment Quality Assessment Draft Technical Support Manual (SCCWRP 2009).

## C.1.7 List of Laboratories Conducing Analysis

Laboratories will be chosen based on their ability to meet the measurement quality objectives set forth in Tables C-2 through C-6. Laboratories are required to meet ELAP and/or NELAP certifications and any data quality requirements specified in this document. Due to contracting procedures and solicitation requirements, qualified laboratories have not yet been selected to carry out the analytical responsibilities described in this CIMP. Following the completion of the first monitoring year, the CIMP will be updated to include the pertinent laboratory specific information. At the end of all future monitoring years the DCWMA Group will assess the laboratories performance and at that time a new laboratory may be chosen.

[1] Water Quality Control Plan for Enclosed Bays and Estuaries – Part 1 Sediment Quality. Effective August 25, 2009.

### C.1.7.1 Alternate Laboratories

In the event that the laboratories selected to perform analyses for the CIMP are unable to fulfill data quality requirements outlined herein (e.g., due to instrument malfunction), alternate laboratories need to meet the same requirements that the primary labs have met. The original laboratory selected may recommend a qualified laboratory to act as a substitute. However, the final decision regarding alternate laboratory selection rests with the DCWMA Group.

## C.2 Sampling Methods and Sample Handling

The following sections describe the steps to be taken to properly prepare for and initiate water quality sampling for the DCWMA CIMP.

### C.2.1 Monitoring Event Preparation

Monitoring event preparation includes preparation of field equipment, placing bottle orders, and contacting the necessary personnel regarding site access and schedule. The following steps will be completed two weeks prior to each sampling event (a condensed timeline may be appropriate in storm events, which may need to be completed on short notice):

1. Contact laboratories to order sample containers and to coordinate sample transportation details.
2. Confirm scheduled monitoring date with field crew(s), and set-up sampling day itinerary including sample drop-off.
3. Prepare equipment.
4. Prepare sample container labels and apply to bottles.
5. Prepare the monitoring event summary and field log sheets to indicate the type of field measurements, field observations and samples to be collected at each of the monitoring sites.
6. Verify that field measurement equipment is operating properly (i.e., check batteries, calibrate, etc.)

Table C-10 provides a checklist of field equipment to prepare prior to each monitoring event.

**Table C-10. Field Equipment Checklist**

| | |
|---|---|
| ☐ | Monitoring Plan |
| ☐ | Sample Containers plus Extras with Extra Lids |
| ☐ | Pre-Printed, Waterproof Labels (extra blank sheets) |
| ☐ | Event Summary Sheets |
| ☐ | Field Log Sheets or Electronic Device (e.g., laptop or tablet computer) |
| ☐ | Chain of Custody Forms |
| ☐ | Bubble Wrap |
| ☐ | Coolers with Ice |
| ☐ | Tape Measure |

| Table C-10. Field Equipment Checklist | |
|---|---|
| ☐ | Paper Towels or “Rags in a Box” |
| ☐ | Safety Equipment |
| ☐ | First Aid Kit |
| ☐ | Cellular Telephone |
| ☐ | Gate Keys |
| ☐ | Hip Waders |
| ☐ | Plastic Trash Bags |
| ☐ | Sealable Plastic Bags |
| ☐ | Grab Pole and/or Fishing Pole |
| ☐ | Clean Secondary Container(s) |
| ☐ | Field Measurement Equipment |
| ☐ | New Powder-Free Nitrile Gloves |
| ☐ | Pens |
| ☐ | Stop Watch |
| ☐ | Camera |
| ☐ | Blank Water |

### C.2.1.1 Bottle Order/Preparation

Sample container orders will be placed with the appropriate analytical laboratory at least two weeks prior to each sampling event. Containers will be ordered for all water samples, including quality control samples, as well as extra containers in case the need arises for intermediate containers or a replacement. The containers must be the proper type and size and contain preservative as appropriate for the specified laboratory analytical methods. Table C-7 presents the proper container type, volume, and immediate processing and storage needs. The field crew must inventory sample containers upon receipt from the laboratory to ensure that adequate containers have been provided to meet analytical requirements for each monitoring event. After each event, any bottles used to collect water samples will be cleaned by the laboratory and either picked up by or shipped to the field crew.

### C.2.1.2 Container Labeling and Sample Identification Scheme

All samples will be identified with a unique identification code to ensure that results are properly reported and interpreted. Samples will be identified such that the site, sampling location, matrix, sampling equipment and sample type (i.e., environmental sample or QC sample) can be distinguished by a data reviewer or user. The following provides a container and sample identification scheme that could be used. However, alternative sample and data management schemes can be used if they provide the essential information listed here. Sample identification codes will consist of a site identification code, a matrix code, and a unique sample ID number. An example format for sample ID codes is DC- ###.# - AAAA - XXX, where:

- DC indicates that the sample was collected as part of the DCWMA CIMP.
- ###- identifies the sequentially numbered monitoring event, and .# is an optional indicator for re-samples collected for the same event. Sample events are numbered from 001 to 999 and will not be repeated.

- AAAA indicates the unique site identification code assigned to each site.
- XXX identifies the sample number unique to a sample bottle collected for a single event. Sample bottles are numbered sequentially from 001 to 999 and will not be repeated within a single event.

Custom bottle labels should be produced using blank waterproof labels and labeling software. Labels will be placed on the appropriate bottles in a dry environment; applying labels to wet sample bottles should be avoided. Labels should be placed on sides of bottles rather than on bottle caps. All sample containers will be pre-labeled before each sampling event to the extent practicable. Pre-labeling sample containers simplifies field activities, leaving only sample collection time and date and field crew initials to be filled out in the field. Custom labels will be produced using blank water-proof labels. This approach will allow the site and analytical constituent information to be entered in advance and printed as needed prior to each monitoring event. Labels should include the following information:

- Program Name
- Date
- Analytical Requirements
- Station ID
- Collection Time
- Preservative Requirements
- Sample ID
- Sampling Personnel and Agency/Firm
- Analytical Laboratory

### C.2.1.3 Field Meter Calibration

Calibration of field measurement equipment is performed as described in the owner's manuals for each individual instrument. Each individual field crew will be responsible for calibrating their field measurement equipment. Field monitoring equipment must meet the requirements outlined in Table C-11 and be calibrated before field events based on manufacturer guidance, but at a minimum prior to each event. Table C-11 outlines the typical field instrument calibration procedures for each piece of equipment requiring calibration. Each calibration will be document on each event's calibration log sheet.

If calibration results do not meet manufacturer specifications, the field crew should first try to recalibrate using fresh aliquots of calibration solution. If recalibration is unsuccessful, new calibration solution should be used and/or maintenance should be performed. Each attempt should be recorded on the equipment calibration log. If the calibration results cannot meet manufacturer's specifications, the field crew should use a spare field measuring device that can be successfully calibrated. Additionally, the Project Manager should be notified.

Calibration should be verified using at least one calibration fluid within the expected range of field measurements, both immediately following calibration and at the end of each monitoring day. Individual parameters should be recalibrated if the field meters do not measure a calibration fluid within the range of accuracy presented in Table C-11. Calibration verification documentation will be retained in the event's calibration verification log.

**Table C-11. Calibration of Field Measurement Equipment**

| Equipment/ Instrument | Calibration and Verification Description | Frequency of Calibration | Frequency of Calibration Verification | Responsible Party |
|---|---|---|---|---|
| pH Probe | Calibration for pH measurement is accomplished using standard buffer solutions. Analysis of a mid-range buffer will be performed to verify successful calibration. | Day prior to 1st day or 1st day of sampling event | After each day's calibration and at the end of the sampling day | Individual Sampling Crews |
| Temperature | Temperature calibration is factory-set and requires no subsequent calibration. | | | |
| Dissolved Oxygen Probe | Calibration for dissolved oxygen measurements is accomplished using a water saturated air environment. Dissolved oxygen (DO) measurement of water-saturated air will be performed and compared to a standard table of DO concentrations in water as a function of temperature and barometric pressure to verify successful calibration. | | | |
| Conductivity | Conductivity calibration will follow manufacturer's specifications. A mid-range conductivity standard will be analyzed to verify successful calibration. | | | |
| Turbidity | Turbidity calibration will follow manufacturer's specifications. A mid-range turbidity standard will be analyzed to verify successful calibration. | | | |

### C.2.1.4 Weather Conditions

Monitoring will occur during conditions that are defined as "dry" and "wet". Dry weather is defined in the MRP as when the flow of the receiving water body is less than 20 percent greater than the base flow or, in the case of an estuary, on days with less than 0.1 inch of rain and those days not less than three days after a rain event of 0.1 inch or greater within the watershed, as measured from at least 50 percent of LACDPW or NWS controlled rain gauges within the watershed. Wet weather conditions are defined in the MRP as when the receiving water body has flow that is at least 20 percent greater than its base flow or, in the case of an estuary, during a storm event of greater than or equal to 0.1 inch of precipitation. TMDLs within the Dominguez Channel watershed have defined wet weather as when at least 0.1 inches of rainfall accumulates

in a 24-hour period. As such, for the purposes of the DCWMA CIMP, weather conditions will be defined as follows:

- Dry-Weather: When there is less than 0.1 inch of rain in the previous three days.
- Wet-Weather: When there is at least 0.1 inch of rain during the targeted storm event.

Note that if rainfall begins after dry weather monitoring has been initiated, then dry weather monitoring will be suspended and continued on a subsequent day when weather conditions meet the dry weather conditions. Generally, grab samples will be collected during dry weather and composite samples will be collected during wet weather depending on the sample collection requirements of the constituent of interest. Grab samples will be used for dry weather sampling events because the composition of the receiving water will change less over time; and thus, the grab sample can sufficiently characterize the receiving water. Grab samples during dry weather are consistent with similar programs within the region. However, to sufficiently characterize the receiving water during wet weather, composite samples will generally be used for wet weather sampling events. Grab samples may be utilized to collect wet weather sampling in certain situations, which may include, but are not limited to, when the constituent of interest requires the use of grab samples (e.g., *E. coli* and oil and grease), situations where it is unsafe to collect composite samples, or to perform investigative monitoring where composite sampling or installation of an automatic sample compositor (autosampler) may not be warranted. For safety purposes, when wet weather grab sampling is conducted, samples may be taken from slightly upstream or downstream of the designated monitoring location.

The MRP includes specific criteria for the time of monitoring events. With the exception of bacteria and metals monitoring, most constituents will be monitored during two dry weather monitoring events. For dry weather toxicity monitoring, sampling must take place during the historically driest month. As a result, the dry weather monitoring event that includes toxicity monitoring will be conducted in July. The second dry weather monitoring event will take place during January unless sampling during another month is deemed to be necessary or preferable.

All reasonable efforts will be made to monitor the first significant rain event of the storm year (first flush). The targeted storm events for wet weather sampling will be selected based on a reasonable probability that the events will result in substantially increased flows in Dominguez Channel over at least 12 hours; however, it may be necessary to target smaller storms in some instances. Sufficient precipitation is needed to produce runoff and increase flow. The decision to sample a storm event will be made in consultation with weather forecasting information services after a quantitative precipitation forecast (QPF) has been determined. All efforts will be made to collect wet weather samples from all sites during a single targeted storm event. However, safety or other factors may make it infeasible to collect samples from a given storm event. For example, storm events that will require field crews to collect wet weather samples during holidays and/or weekends may not be sampled due to sample collection or laboratory staffing constraints.

During a typical water year, for a storm water outfall monitoring, the first flush event will have a predicted rainfall of at least 0.25 inches at a 70 percent probability of rainfall at least 24 hours prior to the event start time. Since a significant storm event is based on predicted rainfall, it is recognized that this monitoring may be triggered without 0.25 inches of rainfall actually occurring. In this case, the monitoring event will still qualify as meeting this requirement provided that sufficient sample volume is collected to do all required laboratory analysis. Documentation will be provided showing the predicted rainfall amount.

Subsequent storm events must meet the tracking requirements, flow objectives, as well as be separated by a minimum of three days of dry weather (less than 0.1 inch of rain). Antecedent

conditions will be based on the National Weather Service (NWS) rain gage listed in Table C-12. The rain gage has been used to define wet and dry weather during TMDL monitoring in the watershed since 2009. Data can be obtained at http://weather.gov by searching for HHR and clicking the 'See History' link on the forecast page.

**Table C-12. Real-Time Rain Gage Used to Define Weather Conditions for CIMP Monitoring1**

| Rainfall Gage | Operator | Gage Type | Latitude | Longitude |
|---|---|---|---|---|
| Hawthorne Airport (HHR) | National Weather Service | Manually Observed Non-Mechanical Rain Gage | 33.92361 | -118.33194 |

1. Information for the gage can be found at http://weather.gov or http://forecast.weather.gov/MapClick.php?lat=33.92185597000048&lon=-118.3265396489997&site=all&smap=1

For the purpose of triggering wet weather sampling preparation, field staff can estimate that rainfall prediction within the Watershed of 0.1-0.5 inches in a 6- to 12-hour period would be sufficient to mobilize for wet weather sampling. The sampling crew should prepare to depart at the forecasted time of initial rainfall. The initiation of composite samples should be targeted for collection within 2 hours of local rainfall. The National Weather Service's weather forecast for the Watershed can be accessed on-line at http://www.wrh.noaa.gov/lox/ then click on the location of the Watershed on the area map. From the forecast page, the link to "Quantitative Precipitation Forecast" provides forecasted precipitation in inches for the next 24 hours, in 3-hour increments for the first 12 hours and in 6-hour increments for the last 12 hours.

## C.2.2 Sample Handling

Proper sample handling ensures the samples will comply with the monitoring methods and analytical holding time and provides traceable documentation throughout the history of the sample.

### C.2.2.1 Documentation Procedures

The Project Manager is responsible for ensuring that each field sampling team adheres to proper custody and documentation procedures. Field log sheets documenting sample collection and other monitoring activities for each site will be bound in a separate master logbook for each event or saved in an event specific electronic file. Field personnel have the following responsibilities:

- Keep an accurate written record of sample collection activities on the field log sheets.
- Ensure that all field log sheet entries are legible and contain accurate and inclusive documentation of all field activities.
- Note errors or changes using a single line to cross out the entry and date and initial the change.
- Ensure that a label is affixed to each sample collected and that the labels uniquely identify samples with a sample ID, site ID, date and time of sample collection and the sampling crew initials.
- Complete the chain of custody forms accurately and legibly.

### C.2.2.2 Field Documentation/Field Log

Field crews will keep a field log book or electronic file for each sampling event that contains calibration documentation, field documentation for each site, and appropriate contact information. The following items should be recorded for each sampling event:

- Monitoring station location (Site ID);
- Date and time(s) of sample collection;
- Name(s) of sampling personnel;
- Sample collection depth;
- Sample ID numbers and unique IDs for any replicate or blank samples;
- QC sample type (if appropriate);
- Requested analyses (specific parameters or method references);
- Sample type (e.g., grab or composite);
- The results of field measurements (e.g., flow, temperature, dissolved oxygen, pH, conductivity, turbidity) and the time that measurements were made;
- Qualitative descriptions of relevant water conditions (e.g., water color, flow level, clarity) or weather (e.g., wind, rain) at the time of sample collection;
- Trash observations (presence/absence);
- A description of any unusual occurrences associated with the sampling event, particularly those that may affect sample or data quality.

The field log will be scanned into a PDF and transmitted along with the Post-Event Summary Report to the Project Manager within one week of the conclusion of each sampling event.

### C.2.2.3 Sample Handling/Shipment

The field crews will have custody of samples during each monitoring event. Chain-of-custody (COC) forms will accompany all samples during shipment to contract laboratories to identify the shipment contents. All water quality samples will be transported to the analytical laboratory by the field crew or by overnight courier. The original COC form will accompany the shipment, and a signed copy of the COC form will be sent, typically via fax, by the laboratory to the field crew to be retained in the project file.

While in the field, samples will be stored on ice in an insulated container. Samples that must be shipped to the laboratory must be examined to ensure that container lids are tight and placed on ice to maintain the appropriate temperature. The ice packed with samples must be approximately 2 inches deep at the top and bottom of the cooler, and must contact each sample to maintain temperature. The original COC form(s) will be double-bagged in re-sealable plastic bags and either taped to the outside of the cooler or to the inside lid. Samples must be shipped to the contract laboratory according to Department of Transportation standards. The method(s) of shipment, courier name, and other pertinent information should be entered in the "Received By" or "Remarks" section of the COC form.

Coolers must be sealed with packing tape before shipping, unless transported by field or lab personnel, and must not leak. It is assumed that samples in tape-sealed ice chests are secure whether being transported by common carrier or by commercial package delivery. The laboratory's sample receiving department will examine the shipment of samples for correct documentation, proper preservation and compliance with holding times.

The following procedures are used to prevent bottle breakage and cross-contamination:

- Bubble wrap or foam pouches are used to keep glass bottles from contacting one another to prevent breakage, re-sealable bags will be used if available.
- All samples are transported inside hard plastic coolers or other contamination-free shipping containers.
- If arrangements are not made in advance, the laboratory's sample receiving personnel must be notified prior to sample shipment.

All samples remaining after successful completion of analyses will be disposed of properly. It is the responsibility of the personnel of each analytical laboratory to ensure that all applicable regulations are followed in the disposal of samples or related chemicals. Samples will be stored and transported as noted in Table C-7. Samples not analyzed locally will be sent priority overnight on the same day that the sample collection process is completed, if possible. Samples will be delivered to the appropriate laboratory as indicated in Table C-13. Note that due to procurement procedures, the analytical laboratories have not been identified at this time. Information for all laboratories will be added to this table following their selection and upon CIMP update. Appropriate contacts will be listed along with lab certification information in Table C-13.

**Table C-13. Information on Laboratories Conducting Analysis for the DCWMA CIMP**

| Laboratory[1] | General Category of Analysis | Shipping Method | Contact | Phone | Address | Lab Certification No. & Expiration Date [2] |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |

1. Information for all laboratories will be added to this table following their selection and upon CIMP update.
2. Lab certifications are renewed on an annual basis.

### C.2.2.4 Chain-of-Custody Forms

Sample custody procedures provide a mechanism for documenting information related to sample collection and handling. Sample custody must be traceable from the time of sample collection until results are reported. A sample is considered under custody if:

- It is in actual possession.
- It is in view after in physical possession.
- It is placed in a secure area (accessible by or under the scrutiny of authorized personnel only after in possession).

A COC form must be completed after sample collection and prior to sample shipment or release. The COC form, sample labels, and field documentation will be cross-checked to verify sample identification, type of analyses, number of containers, sample volume, preservatives, and type of containers. A complete chain-of-custody form is to accompany the transfer of samples to the analyzing laboratory.

### C.2.2.5 Laboratory Custody Procedures

Laboratories will follow sample custody procedures as outlined in the laboratory's Quality Assurance (QA) Manual. A copy of each contract laboratory's QA Manual should be available at the laboratory upon request. Laboratories shall maintain custody logs sufficient to track each sample received and to analyze or preserve each sample within specified holding times. The following sample control activities must be conducted at the laboratory:

- Initial sample login and verification of samples received with the COC form;
- Document any discrepancies noted during login on the COC;
- Initiate internal laboratory custody procedures;
- Verify sample preservation (e.g., temperature);
- Notify the Project Manager if any problems or discrepancies are identified; and,
- Perform proper sample storage protocols, including daily refrigerator temperature monitoring and sample security.

Laboratories shall maintain records to document that the above procedures are followed. With the exception of microbiological samples, once samples have been analyzed, samples will be stored at the laboratory for at least 30 days. After this period, samples may be disposed of properly.

## C.2.3 Field Protocols

Briefly, the key aspects of quality control associated with field protocols for sample collection for eventual chemical, microbiological, and toxicological analyses are as follows:

- Field personnel will be thoroughly trained in the proper use of sample collection gear and will be able to distinguish acceptable versus unacceptable water samples in accordance with pre-established criteria.
- Field personnel will be thoroughly trained to recognize and avoid potential sources of sample contamination (e.g., engine exhaust, ice used for cooling, touching the inner surfaces the sample bottle or cap).
- Sampling gear and utensils which come in direct contact with the sample will be made of non-contaminating materials (e.g., borosilicate glass, high-quality stainless steel and/or Teflon™, according to protocol) and will be thoroughly cleaned between sampling stations according to appropriate cleaning protocol (rinsing thoroughly with laboratory reagent water at minimum).
- Sample containers will be of the recommended type and will be free of contaminants (i.e., pre-cleaned and/or sterile).

- Conditions for sample collection, preservation and holding times will be followed.

Field crews will be comprised of two persons per crew, minimum. For safety reasons, sampling will occur during daylight hours, when possible. Sampling on weekends and holidays will also be avoided. Other constraints on sampling events include, but are not limited to lab closures and toxicity testing organism availability. Sampling events should proceed in the following manner:

1. Before leaving the sampling crew base of operations, confirm number and type of sample containers as well as the complete equipment list.
2. Proceed to the first sampling site.
3. Fill-out the general information on the field log sheet.
4. Collect the environmental and QA/QC samples indicated on the event summary sheet in the manner described in the CIMP and store samples as described in the CIMP. Using the field log sheet, confirm that all appropriate containers were filled.
5. Collect field measurements and observations, and record these on the field log sheet.
6. Repeat the procedures in steps 3, 4, and 5 for each of the remaining sampling sites.
7. Complete the COC forms using the information on the field log sheets.
8. After sample collection is completed, deliver and/or ship samples to appropriate laboratory.

## C.2.4 Sample Collection

All samples will be collected in a manner appropriate for the specific analytical methods to be used. The proper sampling techniques, outlined in this section, will ensure that the collected samples are representative of the water bodies sampled. Should field crews feel that it is unsafe to collect samples for any reason, the field crews **SHOULD NOT COLLECT** sample and note on the field log the same was not collected, why the sample was not collected, and provide photo documentation, if feasible.

As specified in Attachment E of the MRP Part VIII.C, samples shall be collected during the first 24 hours of the storm water discharge or for the entire storm water discharge if it is less than 24 hours. NSW collection will be consistent with the MRP, Part IX.H, as outlined in Section 5.

### C.2.4.1 Overview of Sampling Techniques

As described below, the method used to collect water samples is dependent on the depth, flow and type of outfall. Nonetheless, in all cases:

- Throughout each sample collection event, the sampler should exercise aseptic techniques to avoid any contamination (i.e., do not touch the inner surfaces or lip edges of the sample bottle or cap).
- The sampler should collect a single representative grab sample.
- The sampler should use clean, powder-free, nitrile gloves for each site to prevent contamination.
- When collecting the sample, he or she should not breathe in the direction of the container.

- Gloves should be changed if they are soiled or if the potential for cross-contamination exists from handling sampling materials or samples.
- While the sample is collected, the bottle lid shall not be placed on the ground.
- No eating or drinking during sample collection.
- No smoking.
- Do not breathe, sneeze or cough in the direction of an open sample bottle.
- Each person on the field crew will wear clean clothing that is free of dirt, grease, or other substances that could contaminate the sampling apparatus or sample bottles.
- To the extent practical, never sample near a running vehicle. Do not park vehicles in immediate sample collection area, even non-running vehicles.
- When the sample is collected leave ample air space (about 1 inch) in the bottle to facilitate mixing by shaking for lab analysis, unless otherwise required by the method.
- After the sample is collected and the cap is tightly screwed back on the bottle, the time of sampling should be recorded on the field tablet or log sheet.
- Any QA/QC samples that are collected should be also be noted on the field log sheet and labeled according the convention.
- Store as described previously.
- Fill out COC forms and deliver to the appropriate lab as soon as possible to ensure hold times are met.

To prevent contamination of samples, clean metal sampling techniques using USEPA protocols outlined in USEPA Method 1669[2] will be used throughout all phases of the water sample collection. The protocol for clean metal sampling, based on USEPA Method 1669, is summarized below:

- Samples are collected in rigorously pre-cleaned sample bottles with any tubing specially processed to clean sampling standards.
- At least two persons, wearing clean, powder-free nitrile or latex gloves at all times, are required on a sampling crew.
- One person, referred to as "dirty hands", opens only the outer bag of all double-bagged sample bottles.
- The other person, referred to as "clean hands", reaches into the outer bag, opens the inner bag and removes the clean sample bottle.
- Clean hands rinses the bottle at least two times by submerging the bottle, removing the bottle lid, filling the bottle approximately one-third full, replacing the bottle lid, gently shaking and then emptying the bottle. Clean hands then collects the sample by submerging the bottle, removing the lid, filling the bottle and replacing the bottle cap while the bottle is still submerged.

[2] USEPA. April 1995. Method 1669: Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels. EPA 821-R-95-034.

- After the sample is collected, the sample bottle is double-bagged in the opposite order from which it was removed from the same double-bagging.

- Clean, powder-free gloves are changed between all samples and whenever something not known to be clean has been touched. If anything except sterile uncontaminated sampling equipment is touched before sample is collected, gloves are to be changed.

### C.2.4.2 Field Measurements and Observations

Except as identified in the CIMP, field measurements will be recorded and observations made at each sampling site after a sample is collected. Given that some samples will be collected via automated composite samplers it may not be feasible to collect measurements and observations at the same time as sample collection. In these instances, in-situ measurement equipment may be utilized or, if necessary, field measurements will be collected from composited samples and noted as such on the field log forms. Field measurements will include dissolved oxygen, temperature, conductivity, pH, and flow. Field monitoring equipment must meet the requirements outlined in Table C-6. Field measurements for sediment samples shall be collected from within one meter of the sediment. All field measurement results and field observations will be recorded on a field log sheet (or electronic device).

Measurements (except for flow) will be attained at approximately mid-stream, mid-depth at the location of greatest flow (if feasible) with a Hydrolab DS4 multi-probe meter, or comparable instrument(s). If at any time the collection of field measurements by wading appears to be unsafe, field crews will not attempt to collect mid-stream, mid-depth measurements. Rather, field measurements will be made either directly from a stable, unobstructed area at the channel edge, or by using a telescoping pole and intermediate container to obtain a sample for field measurements and for filling sample containers. For situations where flows are not sufficiently deep to submerge the probes, an intermediate container will be utilized. The location of field measurements will be documented on the field log sheet.

Flow measurements will be collected as outlined in the following subsections or from automated flow equipment, if available, at freshwater receiving water and non-storm water outfall monitoring sites. Regardless of measurement technique used, if a staff gage is present the gage height will be noted. Field crews may not be able to measure flow at several sites during wet weather because of inaccessibility of the site. If this is the case, site inaccessibility will be documented on the field log sheet.

The field sampling crew has primary responsibility for responding to failures in the sampling or measurement systems. Deviations from established monitoring protocols will be documented in the comment section of the field log sheet and noted in the post event summaries. If monitoring equipment fails, monitoring personnel will report the problem in the notes section of the field log sheet and will not record data values for the variables in question. Broken equipment will be replaced or repaired prior to the next field use. Data collected using faulty equipment will not be used.

**Velocity Meter Flow Measurements**

For sampling sites where water is deep enough (>0.1-foot) a velocity meter will be utilized. For these cases, velocity will be measured at approximately equal increments across the width of the flowing water using a Marsh-McBirney Flo-Mate® velocity meter[3] or equivalent, which uses an electromagnetic velocity sensor. A "flow pole" will be used to measure the water depth at each

[3] For more information, see http://marsh-mcbirney.com/Products/2000.htm

measurement point and to properly align the sensor so that the depth of each velocity measurement is 0.6 * total depth, which is representative of the average velocity. The distance between velocity measurements taken across the stream is dependent on the total width. No more than 10% of the flow will pass through any one cross section.

**Shallow Sheet Flow Measurements**

If the depth of flow does not allow for the measurement of flow with a velocity meter (<0.1-foot) a "float" will be used to measure the velocity of the flowing water. The width, depth, velocity, cross section, and corresponding flow rate will be estimated as follows:

**Sheet flow width:** The width (W) of the flowing water (not the entire part of the channel that is damp) is measured using a tape measure at the "top", "middle", and "bottom" of a marked-off distance – generally 10 feet (e.g., for a 10-foot marked-off section, is measured at 0-feet, is measured at 5 feet, and is measured at 10 feet).

**Sheet flow depth:** The depth of the sheet flow is measured at the top, middle, and bottom of the marked-off distance. Specifically, the depth (D) of the sheet flow is measured at 0, 25, 50, 75, and 100 percent of the flowing width (e.g., is the depth of the water at middle of the section in the middle of the sheet flow) at each of the width measurement locations.

**Representative cross-section:** Based on the collected depth and width measurements, the representative cross-sectional area across the marked-off sheet flow is approximated as follows:

$$\text{Re}presentative\ Cross\ Section =$$
$$Average\ \{[\frac{W_{Top}}{4}\times(\frac{D_{25\%}^{Top}}{2}+\frac{\left(D_{50\%}^{Top}+D_{25\%}^{Top}\right)}{2}+\frac{\left(D_{75\%}^{Top}+D_{50\%}^{Top}\right)}{2}+\frac{D_{75\%}^{Top}}{2})],$$
$$[\frac{W_{Mid}}{4}\times(\frac{D_{25\%}^{Mid}}{2}+\frac{\left(D_{50\%}^{Mid}+D_{25\%}^{Mid}\right)}{2}+\frac{\left(D_{75\%}^{Mid}+D_{50\%}^{Mid}\right)}{2}+\frac{D_{75\%}^{Mid}}{2})],$$
$$[\frac{W_{Bottom}}{4}\times(\frac{D_{25\%}^{Bottom}}{2}+\frac{\left(D_{50\%}^{Bottom}+D_{25\%}^{Bottom}\right)}{2}+\frac{\left(D_{75\%}^{Bottom}+D_{50\%}^{Bottom}\right)}{2}+\frac{D_{75\%}^{Bottom}}{2})]\}$$

**Sheet flow velocity:** Velocity is calculated based on the amount of time it took a float to travel the marked-off distance (typically 10-feet or more). Floats are normally pieces of leaves, litter, or floatables (suds, etc.). The time it takes the float to travel the marked-off distance is measured at least three times. Then average velocity is calculated as follows:

$$Average\ Surface\ Velocity = \frac{Distance\ Marked\ off\ for\ Float\ Measurement}{Average\ Time\ for\ Float\ to\ Travel\ Marked\ off\ Distance}$$

**Flow Rate calculation:** For sheet flows, based on the above measurements/estimates, the estimated flow rate, Q, is calculated by:

$$Q = f\ x\ (Representative\ Cross\ Section)\ x\ (Average\ Surface\ Velocity)$$

The coefficient f is used to account for friction effects of the channel bottom. That is, the float travels on the water surface, which is the most rapidly-traveling portion of the water column. The average velocity, not the surface velocity, determines the flow rate, and thus f is used to "convert" surface velocity to average velocity. In general, the value of f typically ranges from

0.60 – 0.90 (USGS 1982). Based on flow rate measurements taken during the LA River Bacteria Source Identification Study (CREST 2008) a value of 0.75 will be used for f.

**Free-Flowing Outfalls**

Some storm drain outfalls are free-flowing, meaning the runoff falls from an elevated outfall into the channel, which allows for collection of the entire flowing stream of water into a container of known volume (e.g., graduated bucket or graduated Ziploc bag). The time it takes to fill the known volume is measured using a stopwatch, and recorded on the field log. The time it takes to fill the container will be measured three times and averaged to ensure that the calculated discharge is representative. In some cases, a small portion of the runoff may flow around or under the container. For each measurement, "percent capture", or the proportion of flow estimated to enter the bucket, will be recorded. For free-flowing outfalls, the estimated flow rate, Q, is calculated by:

$$Q = Average\left[\frac{Filled\ \ container\ Volume}{(Time\ to\ Fill\ \ Container)\times(Estimated\ \ Capture)}\right]$$

## C.2.4.3 Sampling Techniques for the Collection of Water

The following subsections provide details on the various techniques that can be utilized to collect water quality samples. Should field crews feel that it is unsafe to collect samples for any reason, the field crews SHOULD NOT COLLECT sample and note on the field log the same was not collected, why the sample was not collected, and provide photo documentation, if feasible.

**Direct Submersion**

Where practical, all grab samples will be collected by direct submersion at mid-stream, mid-depth using the following procedures:

1. Follow the standard sampling procedures described above.
2. Remove the lid, submerge the container to mid-stream/mid-depth, let the container fill and secure the lid. In the case of mercury samples, remove the lid underwater to reduce the potential for contamination from the air.
3. Place the sample on ice.
4. Collect the remaining samples including quality control samples, if required, using the same protocols described above.
5. Follow the sample handling procedures described above.

**Intermediate Container Technique**

Samples may be collected with the use of a clean intermediate container, if necessary, following the steps listed below. An intermediate container may include a container that is similar in composition to the sample container, a pre-cleaned pitcher made of the same material as the sample container, or a Ziploc bag. An intermediate container should not be reused at a different site without appropriate cleaning.

1. Follow the standard sampling procedures described above.

2. Submerge the intermediate container to mid-stream/mid-depth (if possible), let the container fill, and quickly transfer the sample into the individual sample container(s) and secure the lid(s).

3. Place the sample(s) on ice.

4. Collect remaining samples including quality control samples, if required, using the same protocols described above.

5. Follow the sample handling procedures described above.

**Shallow Sheet Flows**

Some flows may be too shallow to fill a container without using an intermediate container. When collecting samples from shallow sheet flows it is very important to not scoop up algae, sediment, or other particulate matter on the bottom because such debris is not representative of flowing water. To prevent scooping up such debris, either (1) find a spot where the bottom is relatively clean and allow the sterile intermediate container to fill without scooping, or (2) lay a clean sterile Ziploc bag on the bottom and collect the water sample from on top of the bag. A fresh Ziploc bag must be used at each site.

**Pumping**

Samples may be collected with the use of a peristaltic pump and specially cleaned tubing following the steps listed below. Sample tubing should not be reused at a different site without appropriate cleaning.

1. Follow the standard sampling procedures described above.

2. Attach pre-cleaned tubing into the pump, exercising caution to avoid allowing tubing ends to touch any surface known not to be clean. A separate length of clean tubing must be used at each sample location for which the pump is used.

3. Place one end of the tubing below the surface of the water. To the extent possible, avoid placing the tubing near the bottom so that settled solids are not pumped into the sample container.

4. Hold the other end of the tubing over the opening of the sample container, exercising care not to touch the tubing to the sample container.

5. Pump the necessary sample volume into the sample container and secure the lid.

6. Place the sample on ice.

7. Collect remaining samples including quality control samples, if required, using the same protocols described above.

8. Follow the sample handling procedures described above.

**Autosamplers**

Automatic sample compositors are used to characterize the entire flow of a storm in one analysis. They can be programmed to take aliquots at either time or flow based specified intervals. To setup and install an automatic compositor it is recommended to read the manufacturer's

instructions, before beginning setup in the field. The general steps to setup the sampler are described below:

1. Connect power source to automatic sampling computer. This can be in the form of a battery or a power cable.

2. Install pre-cleaned tubing into the pump. To the extent practicable, clean tubing will be used at each site and for each event, in order to minimize contamination. For some stations, it may be more practicable to replace tubing on an annual or every other year basis. In those instances, it would be appropriate to collect equipment blanks prior to sampling events. Tubing that is not newly installed should be flushed with clean water prior to each sampling event.

3. Attach strainer to intake end of the tubing and install in sampling channel.

4. If running flow based composite samples; install flow sensor in sampling channel and connect it to the automatic compositor.

5. Label and install and composite bottle(s). If sampler is not refrigerated, then add enough ice to the composite bottle chamber to keep sample cold for the duration of sampling or until such time as ice can be refreshed. Make sure not to contaminate the inside of the composite bottle with any of the ice.

6. Program the sampler as to the manufacturer's instructions and make sure sampler is powered and running before leaving the site.

After the sample collection is completed the following steps must be taken to ensure proper sample handling.

1. Upon returning to the site, check the status of the sampler and record any errors or missed samples. Note on the field log the time of the last sample, as this will be used for filling out the COCs.

2. Remove composite bottle and store on ice. If dissolved metals are required then begin the sample filtration process outlined above, within 15 minutes of the last composite sample, unless compositing must occur at another location, in which case the filtration process should occur as soon as possible upon sample compositing.

3. Power down automatic compositor, unless continuous flow measurements are being collected, and leave sampling site.

4. The composite sample will need to be split into the separate analysis bottles before being shipped to the laboratory. This is best done in a clean and weatherproof environment, using clean sampling technique.

**Dissolved Metals Field Filtration**

When feasible, samples for metals will be filtered in the field[4]. The following describes an appropriate field filtration method. An alternative or equivalent method may be utilized if necessary[5]. A 50mL plastic syringe with a 0.45µm filter attached will be used to collect and filter the dissolved metals sample in the field. The apparatus will either come certified pre-cleaned from the manufacturer and confirmed by the analytical laboratory or be pre-cleaned by and confirmed by the analytical laboratory at least once per year. The apparatus will be double bagged in zip-lock plastic bags.

To collect the sample for dissolved metals, first collect the total metals sample using clean sampling techniques. The dissolved sample will be taken from this container. Immediately prior to collecting the dissolved sample, shake the total metals sample. To collect the dissolved metals sample using clean sampling techniques, remove the syringe from the bag and place the tip of the syringe into the bottle containing the total metals sample and draw up 50 mL of sample into the syringe. Next, remove the filter from the zip-lock bag and screw it tightly into the tip of the syringe. Then put the tip of the syringe with the filter into the clean dissolved metals container and push the sample through the filter taking care not to touch the inside surface of the sample container with the apparatus. The sample volume needs to be a minimum of 20 mL. If the filter becomes clogged prior to generating 20 mL of sample, remove and dispose of the used filter and replace it with a new clean filter. Continue to filter the sample. When 20 mL has been collected, cap the sample bottle tightly and store on ice for delivery to the laboratory.

### C.2.4.4 Receiving Water Sample Collection

A grab sample is a discrete individual sample. A composite sample is mixture of samples collected over a period of time either as time or flow weighted. A time weighted composite is created by mixing multiple aliquots collected at specified time intervals. A flow weighted composite is created by mixing multiple aliquots collected at equal intervals but then mixed based on flow rate. Generally, grab samples will be collected during dry weather and composite samples will be collected during wet weather. Should field crews feel that it is unsafe to collect samples for any reason, the field crews **SHOULD NOT COLLECT** sample and note on the field log the same was not collected, the reason the sample was not collected, and provide photo documentation, if feasible.

Grab samples will be used for dry weather sampling events, because the composition of the receiving water will change less over time and thus the grab sample can sufficiently characterize it. Monitoring site configuration and consideration of safety will dictate grab sample collection technique. The potential exists for monitoring sites to lack discernable flow. The lack of discernable flow may generate unrepresentative data. To address the potential confounding interference that can occur under such conditions, sites sampled should be assessed for the following conditions and sampled or not sampled accordingly:

- Pools of water with no flow or visible connection to another surface water body should not be sampled. The field log should be completed for non-water quality data (including date and time of visit) and the site condition should be photo-documented.

[4] If the field filtration for dissolved metals is not practical or feasible the filtration and preservation of the sample in accordance with the applicable method should be done as soon as practical upon delivery to the laboratory.

[5] An example of such methods include but are not limited to Alternative methods should be considered (especially when more volume is required for lab analysis); for example, such as filtering 1 or 2 Liters by passing sample through 0.45 um filter using peristaltic pump equipped with clean tubing.

- Flowing water (i.e., based on visual observations, flow measurements, and a photo-documented assessment of conditions immediately upstream and downstream of the sampling site) site should be sampled.

Wet weather samples will generally be collected as either time or flow weighted composites. Grab samples may be utilized to collect wet weather sampling in certain situations, which may include, but are not limited to, situations where it is unsafe to collect composite samples or to perform investigative monitoring where composite sampling or installation of an autosampler may not be warranted. For safety purposes, when wet weather grab sampling is conducted, samples may be taken from slightly upstream or downstream of the designated monitoring location.

It is the combined responsibility of all members of the sampling crew to determine if the performance requirements of the specific sampling method have been met, and to collect additional samples if required. If the performance requirements outlined above or documented in sampling protocols are not met, the sample will be re-collected. If contamination of the sample container is suspected, a fresh sample container will be used. The Project Manager will be contacted if at any time the sampling crew has questions about procedures or issues based on site-specific conditions.

### C.2.4.5 Storm Water Outfall Sample Collection

Storm water outfalls will be monitored with similar methods as discussed in the receiving water sampling section. Sampling will not be undertaken if the outfalls are not flowing or if conditions exist where the receiving water is back-flowing into the outfall. It is the combined responsibility of all members of the sampling crew to determine if the performance requirements of the specific sampling method have been met, and to collect additional samples if required. If the performance requirements outlined above or documented in sampling protocols are not met, the sample will be re-collected. If contamination of the sample container is suspected, a fresh sample container will be used. The Project Manager will be contacted if at any time the sampling crew has questions about procedures or issues based on site-specific conditions.

### C.2.4.6 Non-Storm Water Outfall Screening, Field Surveys, and Sample Collection

The Non-Storm Water Outfall Monitoring Program will consist of Outfall Screening, Field Surveys, and Sample Collection. The initial identification of sites will be screened based on visual observations (at least three visual surveys) and field observational data. The location of these outfalls will be compared against the known permitted discharges in order to eliminate those outfalls from further screening.

The outfall screening process is designed to identify outfalls that have significant non-storm water discharges. The collection of water quality data will support the determination of significant non-storm water discharges as well as to characterize dry weather loading. The following subsections outline the preparation step.

**Preparation for Outfall Field Surveys**

Preparation for outfall field surveys includes preparation of field equipment, placing bottle orders, and contacting the necessary personnel regarding site access and schedule. The following steps should be completed two weeks prior to each outfall survey:

1. Check weather reports and LACDPW rain gage to ensure that antecedent dry weather conditions are suitable.
2. Contact appropriate Flood Maintenance Division personnel from LACDPW to notify them of dates and times of any activities in flood control channels.
3. Contact laboratories to order bottles and to coordinate sample pick-ups.
4. Confirm scheduled sampling date with field crews.
5. Set-up sampling day itinerary including sample drop-offs and pick-ups.
6. Compile field equipment.
7. Prepare sample labels.
8. Prepare event summaries to indicate the type of field measurements, field observations and samples to be taken at each of the stations.
9. Prepare COCs.
10. Charge the batteries of field tablets (if used).

**NSW Outfall Field Surveys**

At least three visual field surveys of the outfalls will be conducted during the first year of implementation of the program. Field surveys will be conducted during dry-weather.

1. Conduct visual reconnaissance survey of all outfalls connected to more than one catch basin (36" diameter and larger and 12" diameter and larger in vicinity of industrial areas) that drain more than one catch basin.
2. Document any NSW discharges and collect data on observed flow that includes the following information:
    a. Outfall Characteristics
        1) Date and time of last visual observation or inspection
        2) Outfall alpha-numeric identifier
        3) Description of outfall structure including size (e.g., diameter and shape)
        4) Description of receiving water at the point of discharge (e.g., natural, soft-bottom with armored sides, trapezoidal, concrete channel)
        5) Latitude/longitude coordinates
        6) Nearest street address

7) Parking, access, and safety considerations

b. Discharge Characteristics

1) Photographs of outfall condition

2) Estimation of discharge rate

3) Observations regarding discharge characteristics such as turbidity, odor, color, presence of debris, floatables, or characteristics that could aid in pollutant source identification

3. For signs of illicit discharge (foam, oil, color) refer location to appropriate jurisdictional IC/ID investigation group to identify source.

**Non-Storm Water Discharge Sample Collection**

Water quality samples will be collected from those outfalls that have been classified as persistent and significant non-storm water discharges. Water quality samples will be collected consistent with the dry weather requirements outlined in the receiving water monitoring section using the direct submersion, intermediate container, shallow sheet flow, or pumping methods described in the sampling section.

## C.2.4.7 Storm-Borne Sediment Sampling and Analysis

The Harbor Toxics TMDL include requirements for the analysis of water quality samples to assess the contribution of copper, lead, zinc, chlordanes, PCBs, DDTs, and PAHs. Note that the TMDL also indicates that total organic carbon (TOC) associated with stormborne/suspended sediments should also be measured. However, TOC is not a pollutant identified in the TMDL and will not be targeted for management actions. Rather, TOC in bed sediments, which can affect the toxicity of certain pollutants in bed sediment, will be measured. Measuring TOC only in bed sediments is consistent with other TMDLs in the region (e.g., Machado Lake Pesticides and PCBs TMDL, and the Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters Toxic Pollutants TMDL).

Most of the organochlorine (OC) pesticides and PCBs and many of the PAHs tend to strongly associate with sediment and organic material. These constituents commonly have octanol/water partition coefficients (log Kow) that are greater than six, elevated soil/water partition coefficients (log Kd) and elevated soil adsorption coefficients (log Koc). The lighter weight PAHs such as naphthalene, acenaphthene and acenaphthylene tend to be more soluble in water and volatile. Concentrations of OC pesticides, PCBs, and PAHs are often below or are very close to the limits of detection for conventional analytical methods used for analyzing water samples. Although collection and filtration of high volumes of stormwater will allow improved quantification of these constituents, it also introduces substantial potential for introduction of errors.

A number of studies have been performed to directly measure the concentration of contaminants associated with suspended solids but there are no standardized procedures established for this type of testing. Use of filtration methods in combination with conventional analytical methods requires collection of extremely large volumes of stormwater and challenging filtration processes. Use of conventional analytical methods for analysis of the filtered sediment is then expected to require at least 5 grams (dry weight) of sediment (typically 10 grams dry weight is preferred by laboratories) for each of the groups of analytes (metals, OC pesticides, PCBs and PAHs) in order to achieve detection limits necessary to quantify loads. In addition, the direct impacts of filtering samples with high sediment content are not well understood. Efforts by the City of Los Angeles

and Los Angeles County in the Ballona Creek and Marina del Rey watersheds, respectively, have demonstrated the challenges associated with collecting and analyzing suspended sediments. Assuming samples contain sediment at an average TSS concentration of 100 mg/L and that all sediment could be recovered, analyses might require as much as 50 liters for each test method (total of 200 liters). An ongoing special study is underway in the Marina del Rey to evaluate various methods for capturing sufficient sediment to conduct analysis. In Ballona Creek, the City of Los Angeles has been successful in collecting sufficient volumes of sediment over the course of a year to conduct the analysis. This allows for the quantification of annual loading; however, it does not allow for an evaluation of concentrations and loads under various storm conditions. Although use of lower sediment volumes may be possible, both detection limits and quality control measures might be impacted. In Ballona Creek, duplicate and quality control analysis have been limited to the available sediment, resulting in situations where either certain target constituents or quality control analysis are not completed during the pilot study.

An alternative approach for assessing the loads of the constituents of interest will be utilized in this CIMP to substantially reduce the amount of sample needing to be handled and potential for introduction of error. This approach will utilize High Resolution Mass Spectrometry (HRMS) to analyze for OC pesticides (USEPA 1699), PCBs (USEPA 1668) and PAHs (CARB). HRMS analyses are quantified by isotope dilution techniques. Conventional methods utilized to analyze water samples for most metals of interest are sufficiently sensitive to allow for the assessment of concentrations on suspended sediments. During the first three years, analyses will be conducted on whole water samples. These test methods provide detection limits that are roughly 100 times more sensitive than conventional analytical methods. In addition, these extremely low detection limits can be achieved with as little as 3-6 liters of stormwater. Similar approaches have been used by the San Francisco Estuary Institute (SFEI) staff (Gilbreath, Pearce and McKee, 2012) to measure the performance of a rain garden. Autosamplers were used to collect stormwater influent and treated effluent to assess removal efficiency for pesticides, PCBs, mercury, and copper subject to TMDLs. HRMS was used to quantify PCB removal. HRMS methods are also being used in Virginia to assist in identification of sources of PCBs in MS4 and industrial stormwater discharges (Gilinsky, 2009).

Use of this approach is expected to greatly enhance the ability to consistently obtain appropriate samples for measuring and comparing loads of constituents of interest associated with each sampling event. This will assure that all key toxics can be quantified at levels suitable for estimation of mass loads. Due to relatively low levels of sediment in stormwater, efforts in Los Angeles County related to TMDL monitoring of suspended sediments have often led to the need to composite sediments collected over multiple storm events. The approach contained herein provides the opportunity to quantify concentrations, and therefore loads, for each stormwater sampling event.

For purposes of load calculations, it would be assumed that 100% of OC pesticides, PCBs and PAHs were associated with suspended solids. Separate analyses of TSS/SSC would be used to normalize the data. After three years (approximately four to six storm events) the data will be reevaluated to assess whether direct analysis of the filtered suspended sediments are necessary to improve load assessments. If deemed necessary, a modified approach will be evaluated for analysis of suspended sediments. It is currently not clear whether direct measurement of the target toxics in suspended sediments will result in any significant improvements in our ability to assess loads. In fact, collecting, transporting and processing the high volumes of stormwater necessary for this approach may result in a decrease in our ability to obtain useful data and will likely result in a decrease in our ability to assess pollutant loads.

Analysis of trace metals will be conducted based upon measured concentrations of dissolved and trace metals in routine monitoring at the downstream receiving water site. Existing detection

limits for trace metals are considered suitable for calculation of concentrations in suspended solids. The concentration of trace metals associated with the particulate fraction will be calculated as:

$$C_P = C_T - C_D$$

where $C_T$ =Concentration of total recoverable metals
$C_D$ =Concentration of dissolved fraction
$C_P$ =Concentration of the particulate fraction

USEPA's guidance document for development of metals translators (EPA, 1996) uses the same approach for calculation of the trace metals in the particulate fraction.

#### *C.2.4.7.1 Sampling and Analytical Procedures*

Stormwater samples will be collected using autosamplers as described in Section C.2.4.3. Based on TSS measurements at three mass emission sites in LA County (Table C-14), use of a TSS concentration of 100 mg/L is expected to provide a conservative basis for estimating reporting limits for OC pesticides, PCBs, and PAHs in suspended sediments based upon 2-liter samples. However, three liters of storm water will be provided for each organic analytical suite for a total of nine liters. An accurate measure of suspended sediments is critical to this sampling approach. TSS will be analyzed; however, SSC will be used as the standard for calculating the concentrations of target constituents in suspended sediments and total loads.

**Table C-14. Summary of Median TSS Measurements (mg/L) at Four Mass Emission Monitoring Sites in Los Angeles County**

| Waterbody | LA County Monitoring Site ID | Median |
|---|---|---|
| Dominguez Channel | S28 | 104 |
| Los Angeles River | S10 | 143 |
| San Gabriel River | S14 | 113 |
| Ballona Creek | S01 | 158 |

Since detection limits will depend upon the concentration of suspended sediment in the sample, the laboratory analyzing the suspended sediment concentrations will be asked to provide a rush analysis to provide information that can be used to direct processing of the samples for the organic compounds. Processing of sample waters provided to the laboratory will depend upon the results of the SSC analysis.

- If TSS/SSC are less than 150 mg/L, an additional liter of water will be extracted for each subsequent HRMS analysis. If TSS concentrations are between 150 and 200 mg/L, one of the additional liter samples may be used to increase the volume of sample water for just PAHs or the two additional liters may be used as a field duplicate for one of the analyses.

- If TSS concentrations are greater than 200 mg/L, two of the three additional liters may be used as a field duplicate for one analysis. If available, the additional water provided in 2.5 L containers will also be considered for use as field replicates.

- If the initial TSS sample indicates that sediment content is less than 50 mg/L, additional measures will be taken to improve PAH reporting limits with respect to suspended sediment loads. This would include use of extra sample water to bring up the total sample volume (up to a maximum of 4 liters) or reduction the final extract volume.

- Given adequate sample volumes and normal levels of suspended sediment, a field duplicate will be analyzed for each analysis.

Target reporting limits (Tables C-15 and C-16) were established based upon bed sediment reporting limits listed in the *Coordinated Compliance and Reporting Plan for the Greater Los Angeles and Long Beach Harbor Waters* (Anchor QEA, 2013). Tables C-15 and C-16 provide a summary of the detection limits attainable in water samples using HRMS analytical methods. Estimated detection limits are provided for concentrations of the target constituents in suspended sediments given the assumption that 2-liter sample volumes will be used for each test, suspended sediment content of the water sample is 100 mg/L, and that 100 percent of the target constituents are associated with the suspended sediment. This provides a conservative assumption with respect to evaluating the potential impacts of concentrations of OC pesticides, PCBs, and PAHs in suspended sediment on concentrations in bed sediment. Additionally, Tables C-15 and C-16 present relevant TMDL targets and reporting limits suggested in the SWAMP QAPP (SWRCB, 2008) and the SQO Technical Support Manual (SCCWRP, 2009). Table C-17 examines the possible limitations of this approach if trace metal concentrations are extremely low, approaching detection limits. The following summarizes a comparison between the estimated detection limits for OC pesticides, PCBs, and PAHs in the suspended sediments to target reporting limits:

- For OC pesticides (Table C-15), estimated detection limits in the suspended sediment are at or below TMDL targets limits for bed sediments. Additionally, estimated detection limits in the suspended sediment are below target bed sediment reporting limits for this CIMP and target reporting limits presented in the SWAMP QAPP (SWRCB, 2008) and the SQO Technical Support Manual (SCCWRP, 2009).

- For PCBs (Table C-15), estimated detection limits in the suspended sediment are below TMDL targets limits for bed sediments. Additionally, estimated detection limits in the suspended sediment are at or below target bed sediment reporting limits for this CIMP and below target reporting limits presented in the SWAMP QAPP (SWRCB, 2008) and the SQO Technical Support Manual (SCCWRP, 2009).

- For PAHs (Table C-16), estimated detection limits in the suspended sediment are below TMDL targets limits for bed sediments. Most individual PAH compounds would be expected to be detectable in the suspended sediment at concentrations about 2.5 times greater that the target bed sediment reporting limits for this CIMP and the target reporting limits presented in the SWAMP QAPP (SWRCB, 2008). Approximately half of the individual PAH compounds are above the target reporting limits presented in the SQO Technical Support Manual (SCCWRP, 2009), while the other half are below. Two compounds, naphthalene and phenanthrene, would have detection limits roughly 6 times the target bed sediment reporting limits for this CIMP. Naphthalene is an extremely light weight PAH that is not considered a major analyte of concern in storm water.

- Table C-17 summarizes the reporting limits applicable to total recoverable metals. Estimated equivalent concentrations in suspended solids are very conservatively estimated based upon 100 percent of the metals being associated with suspended particulates as measured values approach project detection limits. In reality, this is not a likely condition. When concentrations of total recoverable metals approach the very low detection limits used in this program, sediment loads will also be extremely low and the concentrations of metals in the dissolved phase will become a more significant fraction of the total metals concentrations. If concentrations of total cadmium are extremely low, comparison with TMDL targets in bed sediments could be limited.

#### *C.2.4.7.2 Quality Control Measures*

In addition to the quality control measures described in **Section C.3**, quality control measures for all HRMS analyses will include field equipment blanks to assess background contamination due to the field equipment and sample handling. One field equipment blank will be analyzed from one set of field equipment during each sampling site during the first year. Data will be evaluated at the end of the year to determine if field equipment blanks should be reduced to one per season. For the field blank, two liters of HPLC grade water provided by the laboratory will be pumped through the entire autosampler and intake hose for each analytical test (OC pesticides, PCBs and PAHs). The blank water will be pumped into precleaned sample containers and refrigerated until the stormwater sampling is completed. If the storm does not occur immediately after blanking, the equipment blank will be transmitted under COC to the laboratory in order the meet the requirement for extraction of aqueous samples within 7 days of collection. Extracts will be held until stormwater samples are received unless storm does not develop within a period of 30 days after extraction (samples are required to be analyzed within 40 days of extraction). If a successful storm event is monitored immediately after the equipment blank is taken, the equipment blank and stormwater samples will be submitted to the laboratory together. Given adequate sample volumes, field duplicates will also be analyzed to assess variability associated with the sampling and subsampling processes.

Laboratory quality control measures will include analysis of method blanks, initial calibrations, analysis of Ongoing Precision and Recovery (OPR) samples and use of labeled compounds to assess recoveries and matrix interferences. Method blanks will be based upon processing of laboratory water volumes identical to those used for the field samples. Initial calibrations are run periodically but daily calibration checks are conducted to verify stability of the calibration. OPR tests will be conducted with each batch of samples. OPR samples are blanks spiked with labeled isotopes that are used to monitoring continued performance of the test. Labelled isotopes are added to each field sample and analyzed to measure recovery in the sample matrix. Estimated Detection Limits (EDLs) will be calculated for each analyte associated with each field sample. For each analyte 'x', the EDL is calculated by the following formula:

$$EDL_x = 2.5 * \frac{(Na)*(Qis)*(Rah)}{(Ais)*(RRF)*(wv)}$$

Where: Na = Analyte peak to peak noise height.
Qis = Concentration of internal standard.
Rah = Area of Height Ratio
Ais = Area of internal standard
RRF = initial calibration average relative response factor for the congener of interest.
wv = sample weight/volume.
2.5 = Minimum signal to noise ratio.

#### *C.2.4.7.3 Summary*

In summary, all target reporting limits for the targeted organic compounds are below relevant TMDL targets and the overwhelming majority are below bed sediment reporting limits identified in this CIMP and the SWAMP QAPP (SWRCB, 2008) and SQO Technical Support Manual (SCCWRP, 2009). In the case of metals, some limitations may exist for cadmium, in extreme conditions. Overall, the proposed approach based upon analyzing whole water samples to estimate concentrations of target pollutants meets the overall objectives of the program while also enhancing the chances of successfully monitoring multiple storm events and provide data necessary to evaluate relative loads from multiple storms each year. The proposed methods are also expected to allow incorporation of quality control measures necessary to evaluate potential source of contamination and variability that might be attributable to both the sampling and analytical processes.

**Table C-15. Recommended Methods, Estimated Detection Limits, Target Reporting Limits, and Relevant TMDL Targets for Organochlorine Pesticides and Total PCBs**

| Constituent and Analytical Method | Detection Limits Associated with Suspended Sediments | | Reporting Limits Associated with Bed Sediment Monitoring | | | Relevant TMDL Targets |
|---|---|---|---|---|---|---|
| | Water Detection Limit (1) | Equivalent Suspended Sediment Detection Limit (2) | DCWMA CIMP Target Bed Sediment Reporting Limits | SWAMP QAPP (2008) Reporting Limit | SQO Technical Support Manual (2009) Reporting Limit | Ballona Creek Estuary Toxics TMDL Sediment Target (Indirect Effects) |
| | pg/L | ng/g – dry wt | ng/g – dry wt | | | ng/g – dry wt |
| ***Chlordane Compounds (EPA 1699)*** | | | | | | |
| alpha-Chlordane | 40 | 0.4 | 1 | 1 | 0.5 | 1.3 (Total Chlordane) |
| gamma-Chlordane | 40 | 0.4 | 1 | 1 | 0.54 | |
| Oxychlordane | 40 | 0.4 | 1 | 1 | NA | |
| trans-Nonachlor | 40 | 0.4 | 1 | 1 | 4.6 | |
| cis-Nonachlor | 40 | 0.4 | 1 | 2 | NA | |
| ***Other OC Pesticides (EPA 1699)*** | | | | | | |
| 2,4'-DDD | 40 | 0.4 | 1 | 2 | 0.5 | 1.9 (Total DDT) |
| 2,4'-DDE | 80 | 0.8 | 1 | 2 | 0.5 | |
| 2,4'-DDT | 80 | 0.8 | 1 | 3 | 0.5 | |
| 4,4'-DDD | 40 | 0.4 | 1 | 2 | 0.5 | |
| 4,4'-DDE | 80 | 0.8 | 1 | 2 | 0.5 | |
| 4,4'-DDT | 80 | 0.8 | 1 | 5 | 0.5 | |
| Total DDT | 80 | 0.8 | --- | --- | 0.5 | |
| ***Total PCBs (EPA 1668)*** | 5-20 | 0.05-0.2 | 1 | 0.2 | 3.0 | 3.2 |

1. Water EDLs based upon 2 liters of water.
2. Suspended Sediment detection limits based upon estimate of 100 mg/L suspended solids.

| Table C-16. Recommended Method, Estimated Detection Limits, Target Reporting Limits, and Relevant TMDL Targets for PAHs | | | | | | |
|---|---|---|---|---|---|---|
| **Constituent** | **Detection Limits Associated with Suspended Sediments** | | **Reporting Limits Associated with Bed Sediment Monitoring** | | | **Relevant TMDL Targets** |
| | **Water Detection Limit [1]** | **Equivalent Suspended Sediment Detection Limit [2]** | **DCWMA CIMP Target Bed Sediment Reporting Limits** | **SWAMP QAPP (2008) Reporting Limit** | **SQO Technical Support Manual (2009) Reporting Limit** | **Ballona Creek Estuary Toxics TMDL Sediment Targets** |
| | **pg/L** | **ng/g – dry wt** | **ng/g – dry wt** | | | **ng/g – dry wt** |
| 1-Methylnaphthalene | 5 | 50 | 20 | 20 | 20 | NA |
| 1-Methylphenanthrene | 5 | 50 | 20 | 20 | 20 | |
| 2-Methylnaphthalene | 5 | 50 | 20 | 20 | 20 | |
| 2,6-Dimethylnaphthalene | 5 | 50 | 20 | 20 | 20 | |
| Acenaphthene | 5 | 50 | 20 | 20 | 20 | |
| Anthracene | 5 | 50 | 20 | 20 | 20 | |
| Benzo(a)anthracene | 5 | 50 | 20 | 20 | 80 | |
| Benzo(a)pyrene | 5 | 50 | 20 | 20 | 80 | |
| Benzo(e)pyrene | 5 | 50 | 20 | 20 | 80 | |
| Biphenyl | 5 | 50 | 20 | 20 | 20 | |
| Chrysene | 5 | 50 | 20 | 20 | 80 | |
| Dibenz(a,h)anthracene | 5 | 50 | 20 | 20 | 80 | |
| Fluoranthene | 5 | 50 | 20 | 20 | 80 | |
| Fluorene | 5 | 50 | 20 | 20 | 20 | |
| Naphthalene | 12.5 | 125 | 20 | 20 | 20 | |
| Perylene | 5 | 50 | 20 | 20 | 80 | |
| Phenanthrene | 12.5 | 125 | 20 | 20 | 20 | |
| Pyrene | 5 | 50 | 20 | 20 | 80 | |

1. Water EDLs based upon 2 liters of water and CARB 429m. Detection limits are based upon a final extract of 500 µL. If the SSC is low, either an additional liter of water can be extracted to decrease the detection limit by 1/3 or the final extract volume can be reduced. Depending on sample characteristics, the extract volume can be reduced to as little as 50-100 µL which would drop EDLs by a factor of 0.1 to 0.2 times the listed EDLs.
2. Suspended Sediment detection limits based upon estimate of 100 mg/L suspended solids.
3. *Low Molecular Weight PAHs* Low weight PAHs include Acenaphthene, Anthracene, Phenanthrene, Biphenyl, Naphthalene, 2,6-dimethylnaphthalene, Fluorene, 1-methylnaphthalene, 2-methylnaphthalene, 1-methylphenanthrene, *High Molecular Weight PAHs:* Benzo(a)anthracene, Benzo(a)pyrene, Benzo(e)pyrene, Chrysene, Dibenz(a,h)anthracene, Fluoranthene, Perylene, Pyrene.

| Table C-17. Estimated Detection Limits, Target Reporting Limits, and Relevant TMDL Targets for Metals | | | | | | |
|---|---|---|---|---|---|---|
| **Constituent** | **Detection Limits Associated with Suspended Sediments** | | **Reporting Limits Associated with Bed Sediment Monitoring** | | | **Relevant TMDL Targets** |
| | **Water Detection Limit** | **Equivalent Suspended Sediment Detection Limit (1)** | **DCWMA CIMP Target Bed Sediment Reporting Limits** | **SWAMP QAPP (2008) Reporting Limit** | **SQO Technical Support Manual (2009) Reporting Limit** | **Ballona Creek Estuary Toxics TMDL Sediment Targets** |
| | **ug/L** | **ng/g – dry wt** | **ng/g – dry wt** | | | **ng/g – dry wt** |
| Cadmium | 0.25 | 2.5 | 0.03 | 0.01 | 0.09 | 1.2 |
| Copper | 0.50 | 5.0 | 0.03 | 0.01 | 52.8 | 34 |
| Lead | 0.50 | 5.0 | 0.03 | 0.01 | 25 | 46.7 |
| Silver | 0.25 | 2.5 | 0.03 | 0.02 | (2) | 1.0 |
| Zinc | 1 | 10 | 0.03 | 0.01 | 60 | 150 |

1. Suspended Sediment EDLs based upon estimate of 100 mg/L suspended solids.
2. Silver is not included as part of the Sediment Quality Objectives.

### C.2.4.8 Estuary Bed Sediment Sample Collection

Sediment samples from the Los Angeles Harbor and Dominguez Channel Estuary will be collected in subtidal areas to allow the data to be compared to the California Sediment Quality Objectives[6] (SQOs) and TMDL targets. Sediment samples will be collected by use of a Van Veen grab, diver, or by wading and use of a trowel or intermediate container. Samples collected consistent with the methods presented in Chapter 2 of the Sediment Quality Assessment Draft Technical Support Manual (SCCWRP 2009). The following generally outline the field procedures:

1. All samples shall be collected using a grab sampler.
2. Benthic samples shall be screened through a 1.0 mm-mesh screen.
3. Surface sediment from within the upper 5 cm shall be collected for chemistry and toxicity analyses.
4. The entire contents of the grab sample, with a minimum penetration depth of 5 cm, shall be collected for benthic community analysis.

Subsamples of sediment shall be collected directly into a clean polyethylene bag, mixed, and then placed into the appropriate jars. Sediments for toxicity and chemistry analysis should be composited in a separate bag than sediments for benthic community analysis as the depth of sample collection may be different for the different analysis.

### C.2.4.9 Sediment Sample Collection in Lakes

The top layer of sediment will be sampled from the bottom of the lake using an Eckman dredge or a similar device. While on a boat, the field crew will drop the Eckman dredge to the bottom of the lake and obtain a sample. Using a pre-cleaned stainless steel trowel, the field crew will scoop the top two to three centimeters of the sample and place it in a clean polyethylene bag. This procedure will be repeated at multiple locations throughout the waterbody and the final composited sample will be mixed and placed into the appropriate sample jar.

### C.2.4.10 Bioaccumulation Sample Collection

Bioaccumulation sampling will be used to monitor trends in the concentration of contaminants in the tissues of aquatic organisms. This will be conducted in order to assess both ecological and human health concerns and to see if the trends or patterns of contaminant concentrations mirror those observed from the sediment analyses. Human health concerns will be assessed by sampling the tissues from fish species that are commonly taken for consumption by sport fisherman. Fish swim throughout the Los Angeles Harbor and Dominguez Channel Estuary and it is difficult to collect fish at any single monitoring station on a consistent basis. Therefore, for the purposes of monitoring, bioaccumulation sampling that takes place at any monitoring site in the Estuary is considered to be representative of the entire Estuary. The following subsections describe fish and mussel sample collection.

[6] Water Quality Control Plan for Enclosed Bays and Estuaries – Part 1 Sediment Quality. Effective August 25, 2009.

**Fish Sampling**

Fish sampling protocols shall be conducted in accordance with OEHHA's *General Protocol for Sport Fish Sampling and Analysis*[7]. Fish may be analyzed, as individuals (preferred) or as composites (secondary). During each survey, the goal will be to collect at least nine fish per targeted species that are of legal size[8]. 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.

Fish sampling techniques may vary due to season, weather, flow rate, target species, etc. Sport fish may be taken by any means permissible (e.g., hook and line, seine, trawling). If trawling is utilized, fish may be collected using different gear types, if necessary, due to the variation in gear capture efficiency and strata of the various target species. Examples include otter trawl, lampara net, and gill net. Trawling will be conducted at a speed-over-ground of approximately 2 knots, ranging between 1.5 and 2.5 knots. 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 a five minute period. Using a standard otter trawl, this will result in linear trawl coverage of 450 m to 600 m. 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.

Reasonable attempts will be made to collect two to three species of sport fish; but, if sport fish cannot be obtained, whatever species of fish, if any, that can be obtained will be collected and analyzed. However, data collected from species that are not typically consumed will be for informational purposes only and not considered representative of human health exposures. The more likely a species is to be consumed by anglers, the greater the importance of information. Based the available information regarding species present, the species targeted are placed in three groups as presented in Table C-18:

- Group 1 consists of highly sought after sport fish which makes them most appropriate in terms of how the information is intended to be used. With the exception of barred sand bass, all of the species in Group 1 have been observed in Los Angeles Harbor in recent surveys so there is a high opportunity of collection.

- Group 2 consists of a second tier of sought after game fish which makes them appropriate in terms of how the information is intended to be used (but not as appropriate as the Group 1 species). Some of these species have been observed in the Los Angeles Harbor and Dominguez Channel Estuary[9] in recent surveys. Others have not been observed in the Los Angeles Harbor and Dominguez Channel Estuary. However, based on their ecology, the occurrence of these species is a distinct possibility.

[7] 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 the Dominguez Channel Estuary.

[8] 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.

[9] The first scheduled occurrence of the bioaccumulation sampling in the Dominguez Estuary will validate the assumption that the fish species at the Lower Dominguez Estuary Site are consistent with the Consolidated Slip and to determine if the collection of sufficient and representative fish specimens is practical at the Upper Dominguez Estuary Site.

- Group 3 consists of species that could possibly be occurring in the Los Angeles Harbor and could possibly be eaten by an angler. However, they are not typically considered sport fish making them less appropriate in terms of how the information is intended to be used.

**Table C-18. Targeted Fish Species for the Los Angeles Harbor and Dominguez Channel Estuary**

| Group 1 | Group 2 | Group 3 |
|---|---|---|
| California Halibut (*Paralichthys californicus*) | White Croaker (*Genyonemus lineatus*) | Shiner Perch (*Cymatogaster aggregate*) |

1. Note that species may be found in the Los Angeles Harbor and Dominguez Channel Estuary; however, these species are known to be transient and are not considered "resident" for the purposes of assessing how pollutants in bed sediments in the Estuary are solely contributing to tissue concentrations. As these species may travel to other waterbodies nearby with elevated levels of pollutants of concern, concentrations within the tissue may be representative of the effects of non- Los Angeles Harbor and Dominguez Channel Estuary sediments.

**Mussel Sampling**

Mussels are filter feeders that rely on collecting organic particles from a large volume of water as food. Mussel sampling will be conducted within the intertidal zone at the sampling site. Mussel sampling may be of resident mussels or transplanted mussels. It is expected that initially, tissue from mussels resident to the Estuary will be collected and composited into two replicate samples of five individuals (55 to 65 mm in length, if available). As studies have found that the use of resident and transplant mussels yield nearly identical results[10], transplanted mussels sampling maybe used in place of resident mussel sampling in order to better control for mussel age and, therefore, assessment of mussel tissue bioaccumulation. Cages, containing approximately 50 California mussels per cage, would be installed at monitoring sites in the Estuary. Cages would remain on-site for one month before mussels were retrieved for tissue analysis.

### C.2.4.11 Trash Monitoring

The Machado Lake Trash TMDL requires the development of a Trash Monitoring and Reporting Plan (TMRP). A TMRP is intended to establish the baseline conditions for trash in the Machado Lake and scheduling for the installation of full capture devices. The TMRP is being addressed through the City's Lake Water Quality Management Plan and the County's Multi-pollutant Monitoring and Reporting Plan.

### C.2.4.12 Quality Control Sample Collection

Quality control samples will be collected in conjunction with environmental samples to verify data quality. Quality control samples collected in the field will generally be collected in the same manner as environmental samples.

## C.3 Quality Assurance/Quality Control

This section describes the quality assurance and quality control requirements and processes. There are no requirements for quality control for field analysis of general parameters (e.g., temperature, pH, conductivity, dissolved oxygen, and pH) outlined in the California State Water Resources Control Board's Surface Water Ambient Monitoring Program (SWAMP). However, field crews will be required to calibrate equipment as outlined in the sampling section. Table C-19 presents the quality assurance parameter

[10] California State Water Resources Control Board. State Water Mussel Watch Monitoring in California: Long-term Trends in Coastal Contaminants and Recommendations for Future Monitoring. January 10, 2013.

addressed by each quality assurance requirement as well as the appropriate corrective action if the acceptance limit is exceeded.

**Table C-19. Quality Control Requirement**

| Quality Control Sample Type | QA Parameter | Frequency[1] | Acceptance Limits | Corrective Action |
|---|---|---|---|---|
| **Quality Control Requirements – Field** | | | | |
| Equipment Blanks | Contamination | 5% of all samples [2] | < MDL | Identify equipment contamination source.<br>Qualify data as needed. |
| Field Blank | Contamination | 5% of all samples | < MDL | Examine field log. Identify contamination source. Qualify data as needed. |
| Field Duplicate | Precision | 5% of all samples | RPD ≤ 25% if \|Difference\| ≥ RL | Reanalyze both samples if possible.<br>Identify variability source.<br>Qualify data as needed. |
| **Quality Control Requirements – Laboratory** | | | | |
| Method Blank | Contamination | 1 per analytical batch | < MDL | Identify contamination source. Reanalyze method blank and all samples in batch.<br>Qualify data as needed. |
| Lab Duplicate | Precision | 1 per analytical batch | RPD ≤ 25% if \|Difference\| ≥ RL | Recalibrate and reanalyze. |
| Matrix Spike | Accuracy | 1 per analytical batch | 80-120% Recovery for GWQC<br>75-125% for Metals<br>50-150% Recovery for Pesticides [3] | Check LCS/SRM recovery. Attempt to correct matrix problem and reanalyze samples. Qualify data as needed. |
| Matrix Spike Duplicate | Precision | 1 per analytical batch | RPD ≤ 30% if \|Difference\| ≥ RL | Check lab duplicate RPD. Attempt to correct matrix problem and reanalyze samples. Qualify data as needed. |

| Table C-19. Quality Control Requirement | | | | |
|---|---|---|---|---|
| **Quality Control Sample Type** | **QA Parameter** | **Frequency[1]** | **Acceptance Limits** | **Corrective Action** |
| Laboratory Control Sample (or CRM or Blank Spike) | Accuracy | 1 per analytical batch | 80-120% Recovery for GWQC | Recalibrate and reanalyze LCS/ SRM and samples. |
| | | | 75-125% for Metals | |
| | | | 50-150% Recovery for Pesticides [3] | |
| Blank Spike Duplicate | Precision | 1 per analytical batch | RPD $\leq$ 25% if \|Difference\| $\geq$ RL | Check lab duplicate RPD. Attempt to correct matrix problem and reanalyze samples. Qualify data as needed. |
| Surrogate Spike (Organics Only) | Accuracy | Each environmental and lab QC sample | 30-150% Recovery[3] | Check surrogate recovery in LCS. Attempt to correct matrix problem and reanalyze sample. Qualify data as needed. |

MDL = Method Detection Limit RL = Reporting Limit RPD = Relative Percent Difference

LCS = Laboratory Control Sample/Standard CRM = Certified/ Standard Reference Material

GWQC = General Water Quality Constituents

1. "Analytical batch" refers to a number of samples (not to exceed 20 environmental samples plus the associated quality control samples) that are similar in matrix type and processed/prepared together under the same conditions and same reagents (equivalent to preparation batch).
2. Equipment blanks will be collected by the field crew before using the equipment to collect sample.
3. Or control limits set at + 3 standard deviations based on actual laboratory data.

## C.3.1 QA/QC Requirements and Objectives

### C.3.1.1 Comparability

Comparability of the data can be defined as the similarity of data generated by different monitoring programs. For this monitoring program, this objective will be ensured mainly through use of standardized procedures for field measurements, sample collection, sample preparation, laboratory analysis, and site selection; adherence to quality assurance protocols and holding times; and reporting in standard units. Additionally, comparability of analytical data will be addressed through the use of standard operating procedures and extensive analyst training at the analyzing laboratory.

### C.3.1.2 Representativeness

Representativeness can be defined as the degree to which the environmental data generated by the monitoring program accurately and precisely represent actual environmental conditions. For the CIMP, this objective will be addressed by the overall design of the program. Representativeness is attained through the selection of sampling locations, methods, and frequencies for each parameter of interest, and by maintaining the integrity of each sample after collection. Sampling locations were chosen that are representative of various areas within the

watershed and discharges from urban and agricultural lands, which will allow for the characterization of the watershed and impacts discharges may have on water quality.

### C.3.1.3 Completeness

Data completeness is a measure of the amount of successfully collected and validated data relative to the amount of data planned to be collected for the project. It is usually expressed as a percentage value. A project objective for percent completeness is typically based on the percentage of the data needed for the program or study to reach valid conclusions.

Because the CIMP is intended to be a long term monitoring program, data that are not successfully collected during a specific sample event may not be recollected at a later date if the goals for data completeness shown in Table C-6 are met. Rather subsequent events conducted over the course of the monitoring will provide robust data sets to appropriately characterize conditions at individual sampling sites and the watershed in general.

However, some reasonable objectives for data are desirable, if only to measure the effectiveness of the program when conditions allow for the collection of samples (i.e., flow is present). The program goals for data completeness shown in Table C-6 are based on the planned sampling frequency and SWAMP's Measurement Quality Objective for completeness of 90% (SWRCB 2008). If, however, sampling sites do not allow for the collection of enough samples to provide representative data due to conditions (i.e., no flow) alternate sites will be considered. Data completeness will be evaluated on a yearly basis.

## C.3.2 QAQC/Field Procedures

Quality control samples to be prepared in the field will consist of equipment blanks, field blanks and field duplicates as described below.

### C.3.2.1 Equipment Blanks

The purpose of analyzing equipment blanks is to demonstrate that sampling equipment is free from contamination. Equipment blanks will be prepared by the analytical laboratory responsible for cleaning equipment and analyzed for pesticides, PCBs, and metals before sending the equipment to the field crew. Equipment blanks will consist of laboratory-prepared blank water (certified to be contaminant-free by the laboratory) processed through the sampling equipment that will be used to collect environmental samples.

The blanks will be analyzed using the same analytical methods specified for environmental samples. If any analytes of interest are detected at levels greater than the MDL, the source(s) of contamination will be identified and eliminated (if possible), the affected batch of equipment will be re-cleaned, and new equipment blanks will be prepared and analyzed before the equipment is returned to the field crew for use.

### C.3.2.2 Field Blanks

The purpose of analyzing field blanks is to demonstrate that sampling procedures do not result in contamination of the environmental samples. Per the Quality Assurance Management Plan for SWAMP (SWRCB, 2008) field blanks are to be collected as follows:

- At a frequency of 5% of samples collected for the following constituents: trace metals in water (including mercury), VOA samples in water and sediment, DOC samples in water, and bacteria samples.

- Field blanks for other media and analytes should be conducted upon initiation of sampling, and if field blank performance is acceptable, further collection and analysis of field blanks for these other media and analytes need only be performed on an as-needed basis, or during field performance audits. An as-needed basis for the ESGR CIMP will be annually.

Blanks will consist of laboratory-prepared blank water (certified to be contaminant-free by the laboratory) processed through the sampling equipment using the same procedures used for environmental samples.

If any analytes of interest are detected at levels greater than the MDL, the source(s) of contamination should be identified and eliminated, if possible. The sampling crew should be notified so that the source of contamination can be identified (if possible) and corrective measures taken prior to the next sampling event.

#### C.3.2.3 Field Duplicates

The purpose of analyzing field duplicates is to demonstrate the precision of sampling and analytical processes. Field duplicates will be prepared at the rate of 5% of all samples, and analyzed along with the associated environmental samples. Field duplicates will consist of two grab samples collected simultaneously, to the extent practicable. If the Relative Percent Difference (RPD) of field duplicate results is greater than the percentage and the absolute difference is greater than the RL, both samples should be reanalyzed, if possible. The sampling crew should be notified so that the source of sampling variability can be identified (if possible) and corrective measures taken prior to the next sampling event.

### C.3.3 QA/QC Laboratory Analyses

Quality control samples prepared in the laboratory will consist of method blanks, laboratory duplicates, matrix spikes/duplicates, laboratory control samples (standard reference materials), and toxicity quality controls.

#### C.3.3.1 Method Blanks

The purpose of analyzing method blanks is to demonstrate that sample preparation and analytical procedures do not result in sample contamination. Method blanks will be prepared and analyzed by the contract laboratory at a rate of at least one for each analytical batch. Method blanks will consist of laboratory-prepared blank water processed along with the batch of environmental samples. If the result for a single method blank is greater than the MDL, or if the average blank concentration plus two standard deviations of three or more blanks is greater than the RL, the source(s) of contamination should be corrected, and the associated samples should be reanalyzed.

#### C.3.3.2 Laboratory Duplicates

The purpose of analyzing laboratory duplicates is to demonstrate the precision of the sample preparation and analytical methods. Laboratory duplicates will be analyzed at the rate of one pair per sample batch. Laboratory duplicates will consist of duplicate laboratory fortified method

blanks. If the Relative Percent Difference (RPD) for any analyte is greater than the percentage and the absolute difference between duplicates is greater than the RL, the analytical process is not being performed adequately for that analyte. In this case, the sample batch should be prepared again, and laboratory duplicates should be reanalyzed.

### C.3.3.3 Matrix Spikes and Matrix Spike Duplicates

The purpose of analyzing matrix spikes and matrix spike duplicates is to demonstrate the performance of the sample preparation and analytical methods in a particular sample matrix. Matrix spikes and matrix spike duplicates will be analyzed at the rate of one pair per sample batch. Each matrix spike and matrix spike duplicate will consist of an aliquot of laboratory-fortified environmental sample. Spike concentrations should be added at five to ten times the reporting limit for the analyte of interest.

If the matrix spike recovery of any analyte is outside the acceptable range, the results for that analyte have failed to meet acceptance criteria. If recovery of laboratory control samples is acceptable, the analytical process is being performed adequately for that analyte, and the problem is attributable to the sample matrix. An attempt will be made to correct the problem (e.g., by dilution, concentration, etc.), and the samples and matrix spikes will be re-analyzed.

If the matrix spike duplicate RPD for any analyte is outside the acceptable range, the results for that analyte have failed to meet acceptance criteria. If the RPD for laboratory duplicates is acceptable, the analytical process is being performed adequately for that analyte, and the problem is attributable to the sample matrix. An attempt will be made to correct the problem (e.g., by dilution, concentration, etc.), and the samples and matrix spikes will be re-analyzed.

### C.3.3.4 Laboratory Control Samples

The purpose of analyzing laboratory control samples (or a standard reference material) is to demonstrate the accuracy of the sample preparation and analytical methods. Laboratory control samples will be analyzed at the rate of one per sample batch. Laboratory control samples will consist of laboratory fortified method blanks or a standard reference material. If recovery of any analyte is outside the acceptable range, the analytical process is not being performed adequately for that analyte. In this case, the sample batch should be prepared again, and the laboratory control sample should be reanalyzed.

### C.3.3.5 Surrogate Spikes

Surrogate recovery results are used to evaluate the accuracy of analytical measurements for organics analyses on a sample-specific basis. A surrogate is a compound (or compounds) added by the laboratory to method blanks, samples, matrix spikes, and matrix spike duplicates prior to sample preparation, as specified in the analytical methodology. Surrogates are generally brominated, fluorinated or isotopically labeled compounds that are not usually present in environmental media. Results are expressed as percent recovery of the surrogate spike. Surrogate spikes are applicable for analysis of PCBs and pesticides.

### C.3.3.6 Toxicity Quality Control

For aquatic toxicity tests, the acceptability of test results is determined primarily by performance-based criteria for test organisms, culture and test conditions, and the results of control bioassays. Control bioassays include monthly reference toxicant testing. Test acceptability requirements are documented in the method documents for each bioassay method.

## C.4 Instrument/Equipment Calibration and Frequency

Frequencies and procedures for calibration of analytical equipment used by each contract laboratory are documented in the QA Manual for each laboratory. Any deficiencies in analytical equipment calibration should be managed in accordance with the QA Manual for each contract laboratory. Any deficiencies that affect analysis of samples submitted through this program must be reported to the Project Manager, or designee. Laboratory QA Manuals are available for review at the analyzing laboratory.

## C.5 Data Management, Validation, and Usability

The Monitoring Manager will maintain an inventory of data and its forms. After each sampling event, data collected in the BC CIMP will be verified and validated before it is deemed ready for reporting. This section describes the process that the Monitoring Manager will take to verify and validate the collected data.

### C.5.1 Data Review, Verification, and Validation Requirements

The acceptability of data is determined through data verification and data validation. Both processes are discussed in detail below. In addition to the data quality objectives presented in Table C-5, the standard data validation procedures documented in the contract laboratory's QA Manual will be used to accept, reject, or qualify the data generated by the laboratory. Each laboratory's QA Officer will be responsible for validating data generated by the laboratory.

Once analytical results are received from the analyzing laboratory, the Project QA Officer will perform an independent review and validation of analytical results. Decisions to reject or qualify data will be made by the Project QA Manager, or designee, based on the evaluation of field and laboratory quality control data, according to procedures outlined in Section 13 of Caltrans document No. CTSW-RT-00-005, Guidance Manual: Stormwater Monitoring Protocols, 2nd Edition (LWA, July 2000).

### C.5.2 Data Verification

Data verification involves verifying that required methods and procedures have been followed at all stages of the data collection process, including sample collection, sample receipt, sample preparation, sample analysis, and documentation review for completeness. Verified data have been checked for a variety of factors, including transcription errors, correct application of dilution factors, appropriate reporting of dry weight versus wet weight results, and correct application of conversion factors. Verification of data may also include laboratory qualifiers, if assigned.

Data verification should occur in the field and the laboratory at each level (i.e., all personnel should verify their own work) and as information is passed from one level to the next (i.e., supervisors should verify the information produced by their staff). Records commonly examined during the verification process include field and sample collection logs, COC forms, sample preparation logs, instrument logs, raw data, and calculation worksheets.

In addition, laboratory personnel will verify that the measurement process was "in control" (i.e., all specified data quality objectives were met or acceptable deviations explained) for each batch of samples before proceeding with the analysis of a subsequent batch. Each laboratory will also establish a system for detecting and reducing transcription and/or calculation errors prior to reporting data.

### C.5.3 Data Validation

In general, data validation involves identifying project requirements, obtaining the documents and records produced during data verification, evaluating the quality of the data generated, and determining whether project requirements were met. The main focus of data validation is determining data quality in terms of accomplishment of measurement quality objectives (i.e., meeting QC acceptance criteria). Data quality indicators, such as precision, accuracy, sensitivity, representativeness, and completeness, are typically used as expressions of data quality. The Project QA Manager, or designee, will review verified sample results for the data set as a whole, including laboratory qualifiers, summarize data and QC deficiencies and evaluate the impact on overall data quality, assign data validation qualifiers as necessary, and prepare an analytical data validation report. The validation process applies to both field and laboratory data.

In addition to the data quality objectives presented in Table C-6, the standard data validation procedures documented in the analyzing laboratory's QA Manual will be used to accept, reject or qualify the data generated. The laboratory will submit only data that have met data quality objectives, or data that have acceptable deviations explained. When QC requirements have not been met, the samples will be reanalyzed when possible, and only the results of the reanalysis will be submitted, provided that they are acceptable. Each laboratory's QA Officer is responsible for validating the data it generates.

### C.5.4 Data Management

Event Summary Reports and Analytical Data Reports will be sent to and kept by the Project Manager. Each type of report will be stored separately and ordered chronologically. The field crew shall retain the original field logs. The contract laboratory shall retain original COC forms. The contract laboratory will retain copies of the preliminary and final data reports. Concentrations of all parameters will be calculated as described in the laboratory SOPs or referenced method document for each analyte or parameter.

The field log and analytical data generated will be converted to a standard database format maintained on personal computers. After the final quality assurance checks for errors are completed, the data will be added to the final database.

## C.6 Monitoring Procedures References

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# Attachment D:
# Reporting

# Attachment D
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# Attachment D: Reporting

Annual monitoring reports are required to be submitted by December 15 of every year. The annual reports will cover the monitoring period of July 1 through June 30. The following sections detail monitoring and reporting requirements outlined in the MRP and how the reported data are to be used.

## D.1 Required Reporting

The following sections detail monitoring and reporting requirements outlined in the MRP.

### D.1.1 Semi-Annual Analytical Data Reports

As required by Part XIV.L of the MRP, results from each of the receiving water or outfall based monitoring stations conducted in accordance with the SOP shall be sent electronically to the Regional Board's Stormwater site at MS4stormwaterRB4@waterboards.ca.gov. The monitoring results will be submitted on a semi-annual basis and will highlight exceedances applicable to WQBELs, RWLs, action levels, or aquatic toxicity thresholds. Corresponding sample dates and monitoring locations will be included. Data will be transmitted in the most recent Southern California SMC's Standardized Data Transfer Formats. Reports of monitoring activities will include, at a minimum, the following information (records of which are required by Part XIV.A.1.c of the MRP):

- The date, time of sampling or measurements, exact place, weather conditions, and rain fall amount.
- The individual(s) who performed the sampling or measurements.
- The date(s) analyses were performed.
- The individual(s) who performed the analyses.
- The analytical techniques or methods used.
- The results of such analyses.
- The data sheets showing toxicity test results.

### D.1.2 Annual Monitoring Reports

As outlined in Part XVI.A of the MRP, the annual reporting process is intended to provide the Regional Board with summary information to allow for the assessment of the Permittee's:

- Participation in one or more Watershed Management Programs.
- Impact of each Permittee(s) stormwater and NSW discharges on the receiving water.
- Each Permittee's compliance with RWLs, numeric WQBELs, and action levels.
- The effectiveness of each Permittee(s) control measures in reducing discharges of pollutants from the MS4 to receiving waters.
- Whether the quality of MS4 discharges and the health of receiving waters is improving, staying the same, or declining as a result of watershed management program efforts, and/or TMDL implementation measures, or other minimum control measures (MCMs).

- Whether changes in water quality can be attributed to pollutant controls imposed on new development, re-development, or retrofit projects.

The annual report process also seeks to provide a forum for Permittee(s) to discuss the effectiveness of its past and ongoing control measure efforts and to convey its plans for future control measures. Detailed data and information will also be provided in a clear and transparent fashion to allow the Regional Board and the general public to review and verify conclusions presented by the Permittee. Annual reports shall be organized to include the information as described in the following subsections.

## D.1.2.1 Watershed Summary Information

According to Section XVII.B of the MRP, to allow for Permittees participation in an EWMP, the Permittee must provide the following Watershed Summary Information through the development of a EWMP.

### *D.1.2.1.1 Watershed Management Area*

When a Permittee has collaboratively developed an EWMP, reference to the EWMP and any revisions to the EWMP may suffice for baseline information regarding the watershed management area. If not, the annual report must contain information detailing the following:

1. The effective TMDLs, applicable WQBELs and RWLs, and implementation and reporting requirements, and compliance dates.
2. CWA section 303(d) listings of impaired waters not addressed by TMDLs.
3. Results of regional bioassessment monitoring.
4. A description of known hydromodifications to receiving waters and a description, including locations, of natural drainage systems.
5. Description of groundwater recharge areas including number and acres.
6. Maps and/or aerial photographs identifying the location of ESAs, ASBS, natural drainage systems, and groundwater recharge areas.

### *D.1.2.1.2 Subwatershed (HUC-12) Descriptions*

Information shall be included for each Subwatershed (HUC-12) within the Permittee(s) jurisdiction. Where relevant information is already present in a EWMP, baseline information regarding the subwatershed descriptions may be satisfied by reference to the EWMP. The following descriptions of subwatersheds must be present:

1. Description including HUC-12 number, name and a list of all tributaries named in the Basin Plan.
2. Land Use map of the HUC-12 watershed.
3. 85th percentile, 24-hour rainfall isohyetal map for the subwatershed.
4. One-year, one-hour storm intensity isohyetal map for the subwatershed.
5. MS4 map for the subwatershed, including major MS4 outfalls and all low-flow diversions.

#### *D.1.2.1.3 Description of Permittee(s) Drainage Area within the Subwatershed*

Information shall be included for each drainage area within the Permittee(s) jurisdiction. Where relevant information is already present in a EWMP, baseline information regarding the subwatershed descriptions may be satisfied by reference to the EWMP. The following descriptions of drainage area must be present:

1. A subwatershed map depicting the Permittee(s) jurisdictional area and the MS4, including major outfalls (with identification numbers), and low flow diversions located within the Permittee(s) jurisdictional area.

2. Provide the estimated baseline percent of effective impervious area (EIA) within the Permittee(s) jurisdictional area.

## D.1.2.2 Annual Assessment and Reporting

The following sections will be included in the DCWMA annual report[1]. The DCWMA annual report will clearly identify all data collected and strategies, control measures, and assessments implemented by each Permittee within the DCWMA, as well as those implemented by multiple Permittees on a watershed scale.

#### *D.1.2.2.1 Stormwater Control Measures*

The following information will be compiled for inclusion in the Annual Report by each Permittee:

1. Estimated cumulative change in percent EIA since the effective date of the Order, and if possible, the estimated change in the stormwater runoff volume during the 85th percentile storm event.

2. Summary of New Development/Re-Development Projects constructed within the Permittee(s) jurisdictional area during the reporting year.

3. Summary of Retrofit Projects that reduced or disconnected impervious area from MS4 during the reporting year.

4. Summary of other projects designed to intercept stormwater runoff prior to discharge to the MS4 during the reporting year.

5. Estimate the total runoff volume retained on site by the implementation of such projects during the reporting year.

6. Summary of actions taken in compliance with TMDL implementation plans or approved EWMP to implement TMDL provisions.

7. Summary of riparian buffer/wetland restoration projects completed during the reporting year. For riparian buffers include width, length and vegetation type; for wetland include acres restored, enhanced, or created.

8. Summary of other MCMs implemented during the reporting year, as the Permittee deems relevant.

[1] At the discretion of the DCWMA Group, separate Annual Reports may be submitted by the participating agencies.

9. Status of all multi-year efforts that were not completed in the current year and will therefore continue into the subsequent year(s). Additionally, if any of the requested information cannot be obtained, the Permittee(s) will provide a discussion of the factor(s) limiting its acquisition and steps that will be taken to improve future data collection efforts.

#### *D.1.2.2.2 Effectiveness Assessment of Stormwater Control Measures*

The following information will be included to detail Stormwater Control Measures during the reporting year:

1. Rainfall summary for the reporting year, including the number of storm events, highest volume event (inches/24 hours), highest number of consecutive days with measurable rainfall, total rainfall during the reporting year compared to average annual rainfall for the DCWMA EWMP area.

2. A summary table describing rainfall during stormwater outfall and wet-weather receiving water monitoring events. The summary description will include the date, time that the storm commenced and the storm duration in hours, the highest 15-minute recorded storm intensity (converted to inches/hour), the total storm volume (inches), and the time between the storm event sampled and the end of the previous storm event.

3. Where control measures were designed to reduce impervious cover or storm water peak flow and flow duration, hydrographs or flow data of pre- and post-control activity for the 85th percentile, 24-hour rain event, if available.

4. An assessment as to whether the quality of stormwater discharges as measured at designed outfalls is improving, staying the same, or declining. Water quality data may be compared from the reporting year to previous years with similar rainfall patterns, a trends analysis may be conducted, or other means may be used to develop and support the assessment's conclusions.

5. An assessment as to whether wet-weather receiving water quality is improving, staying the same or declining, when normalized for variations in rainfall patterns. Water quality data may be compared from the reporting year to previous years with similar rainfall patterns, a trends analysis may be conducted, regional bioassessment studies may be drawn from, or other means may be used to develop and support the assessment's conclusions.

6. Status of all multi-year efforts, including TMDL implementation, that were not completed in the current year and will continue into the subsequent year(s). Additionally, if any of the requested information cannot be obtained, a discussion of the factors(s) limiting its acquisition and steps that will be taken to improve future data collection efforts will be provided.

#### *D.1.2.2.3 Non-stormwater Water Control Measures*

The following information will be included to detail NSW control measures:

1. An estimate of the number of major outfalls within the DCWMA EWMP area.

2. The number of outfalls that were screened for significant NSW discharges during the reporting year.

3. The cumulative number of outfalls that have been screened for significant NSW discharges since the date the Order was adopted through the reporting year.

4. The number of outfalls with confirmed significant NSW discharge.

5. The number of outfalls where significant NSW discharge was attributed to other NPDES permitted discharges; other authorized NSW discharges; or conditionally exempt discharges.

6. The number of outfalls where significant NSW discharges were abated as a result of the DCWMA's actions.

7. The number of outfalls where NSW discharges was monitored.

8. The status of all multi-year efforts, including TMDL implementation, that were not completed in the current year and will continue into the subsequent year(s). Additionally, if any of the requested information cannot be obtained, a discussion of the factor(s) limiting its acquisition and steps that will be taken to improve future data collection efforts will be provided.

#### *D.1.2.2.4 Effectiveness Assessment of Non-Stormwater Control Measures*

The following information will be included to assess NSW control measures effectiveness:

1. An assessment as to whether receiving water quality within the DCWMA EMWP area is impaired, improving, staying the same or declining during the dry-weather conditions. Water quality data from the reporting year to previous years with similar dry-weather flows may be compared, a trends analysis may be conducted, regional bioassessment studies may be drawn from, or other means may be used to develop and support the assessment's conclusions.

2. An assessment of the effectiveness of the control measures in effectively prohibiting NSW discharges through the MS4 to the receiving water.

3. The status of all multi-year efforts that were not completed in the current year and will continue into the subsequent year(s).

#### *D.1.2.2.5 Integrated Monitoring Compliance Report*

The following information will be included to assess the Permittee(s) compliance with applicable TMDLs, WQBELs, RWLs, and action levels:

1. An Integrated Monitoring Report that summarizes all identified exceedances of the following against applicable RWLs, WQBELs, NSW action levels, and aquatic toxicity thresholds:

    a. Outfall-based stormwater monitoring data

    b. Wet weather receiving water monitoring data

    c. Dry weather receiving water data

    d. NSW outfall monitoring data

All sample results that exceeded one more applicable thresholds shall be readily identified.

2. If aquatic toxicity was confirmed and a TIE was conducted, the toxic chemicals as determined by the TIE will be identified. All relevant data to allow the Regional Board to review the adequacy and findings of the TIE will be included. This shall include, but not be limited to:

    a. The sample(s) date

    b. Sample(s) start and end time

    c. Sample type(s)

    d. Sample location(s) as depicted on a map

    e. The parameters, analytical results, and applicable limitation.

3. A description of efforts that were taken to mitigate and/or eliminate all NSW discharges that exceeded one or more applicable WQBELs, or caused or contributed to Aquatic Toxicity.

4. A description of efforts that were taken to address stormwater discharges that exceeded one or more applicable WQBELs, or caused or contributed to Aquatic Toxicity.

5. Where RWLs were exceeded, provide a description of efforts that were taken to determine whether discharges from the MS4 caused or contributed to the exceedances and all efforts that were taken to control the discharge of pollutants from the MS4 to those receiving waters in response to the exceedances.

#### *D.1.2.2.6 Adaptive Management Strategies*

The following information will be included to outline Adaptive Management Strategies:

1. The most effective control measures, why the measures were effective, and how other measures will be optimized based on past experiences.

2. The least effective control measures, why the measures were deemed ineffective, and how the controls measures will be modified or terminated.

3. Significant changes to control measures during the prior year and the rationale for the changes.

4. All significant changes to control measures anticipated to be made next year and rationale for the changes. Those changes requiring approval of the Regional Board or its Executive Officer will be clearly identified at the beginning of the Annual Report.

5. A detailed description of control measures to be applied to New Development or Re-development projects disturbing more than 50 acres.

6. The status of all multi-year efforts that were not completed in the current year and will continue into the subsequent year(s).

#### *D.1.2.2.7 Supporting Data and Information*

All monitoring data and associated meta-data used to prepare the Annual Report will be summarized in an MS Excel© spreadsheet and sorted by monitoring station/outfall identifier linked to the DCWMA EWMP area map. The data summary will include the date, sample type

(flow-weighted composite, grab, field measurement), sample start and stop times, parameter, analytical method, value, and units. The date field will be linked to a database summarizing the weather data for the sampling date including 24-hour rainfall, rainfall intensity, and days since the previous rain event.

### D.1.3 Signatory and Certification Requirements

All applications, reports, or information submitted to the Regional Board, State Board, and/or USEPA will be signed and certified as follows:

- All applications submitted to the Regional Board shall be signed by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer includes: (i) the chief executive officer of the agency (e.g., Mayor), or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., City Manager, Director of Public Works, City Engineer, etc.).

- All reports required by this Order and other information requested by the Regional Board, State Board, or USEPA shall be signed by either a principal executive officer or ranking elected official or by a duly authorized representative of a principal executive officer or ranking elected official. A person is a duly authorized representative only if:

    - The authorization is made in writing by a principal executive officer or ranking elected official.
    - The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)
    - The written authorization is submitted to the Regional Board.

- If an authorization of a duly authorized representative is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization will be submitted to the Regional Board prior to or together with any reports, information, or applications, to be signed by an authorized representative.

- The following certification will be made by any person signing an application or report:

    - "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

## D.2 Use of Submitted Data

As stated in Part II.A.2 of the MRP, a Primary Objective of the Monitoring Program is to assess compliance with RWLs and WQBELs established to implement TMDL wet weather and dry weather

wasteload allocations WLAs. As such, a discussion of the compliance evaluation will be conducted is warranted.

### D.2.1 Compliance Evaluation

The compliance evaluation will take into consideration the relationship between the types of monitoring and the pathways for determining compliance outlined in the Permit. As a result, while the receiving water sites will serve to help evaluate the receiving water objectives and support an understanding of potential impacts associated with MS4 discharges, an exceedance of a receiving water limitation at a receiving water site does not on its own represent an exceedance of a receiving water limitation that was caused by or contributed to by MS4 discharges as these sites also receive runoff from non-MS4 sources, including open space and other permitted discharges. Additionally, an exceedance at an outfall location when the corresponding downstream receiving water location is in compliance with the water quality objectives and RWLs does not constitute an exceedance of a WQBEL. Finally, reporting of compliance will be accomplished by evaluating the data per permit condition VI.E.2.b. and compliance will be determined if any of the following conditions are met:

1. There are no violations of the final WQBEL for the specific pollutant at the Permittee's applicable MS4 outfall(s);

2. There are no exceedances of an applicable RWL for the specific pollutant in the receiving water(s) at, or downstream of, the Permittee's outfall(s);

3. There is no direct or indirect discharge from the Permittee's MS4 to the receiving water during the time period subject to the WQBEL and/or RWL for the pollutant(s) associated with a specific TMDL; or

4. In drainage areas where Permittees are implementing an EWMP, (i) all non-storm water and (ii) all stormwater runoff up to and including the volume equivalent to the 85th percentile, 24-hour event is retained for the drainage area tributary to the applicable receiving water.

5. The approved DCWMA EWMP is being implemented pursuant to Part VI.C of the Permit.

6. Conditions of effective Time Schedule Orders (TSOs) are met.

7. Exceedances of RWLs not otherwise addressed by a TMDL are addressed pursuant to Part VI.C.2 of the Permit.

In addition, evaluation of compliance for pollutants subject to TMDLs will consider the requirements specified in the applicable TMDLs.

### D.2.2 Use of Specie-Specific Data for Chlordanes and PCBs

Chlordanes and PCBs are unique in that they are pollutant categories which may be analyzed for all or some of the species that make up the pollutant category and the species of interest varies depending on the purpose of data collection. Analysis included in the CIMP for chlordane includes the following constituents: alpha-chlordane, gamma-chlordane, oxychlordane, cis-Nonachlor and trans-Nonachlor.

- In accordance with the approved California Sediment Quality Objectives, for the purposes of calculating total chlordane when conducting analyses associated with comparing sediment samples to WQBELs, alpha-chlordane, gamma-chlordane, trans-Nonachlor will be included in the calculation.

- Upon approval by the State Board, for the purposes of conducting analyses associated with the Decision Support Tool (DST) for determining impairment due to indirect effects associated with sediment concentrations, alpha-chlordane, gamma-chlordane, oxychlordane, cis-Nonachlor and trans-Nonachlor will be included in the calculation.

- For the purposes of calculating total chlordane when conducting analyses associated with comparing bioaccumulation samples to the indirect effects fish tissue numeric targets in the revised BCE Toxics TMDL, alpha-chlordane, gamma-chlordane, oxychlordane, cis-Nonachlor and trans-Nonachlor will be included in the calculation.

Analysis included in the CIMP for PCBs includes the following constituents: PCB-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.

- For the purposes of calculating total PCBs when conducting analyses associated with comparing sediment samples to WLAs and for the purposes of bioaccumulation monitoring, PCB-18, 28, 37, 44, 49, 52, 66, 70, 74, 77, 81, 87, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 138, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 177, 180, 183, 187, 189, 194, 201, and 206 will be included in the calculation.

- Upon approval by the State Board, for the purposes of conducting analyses associated with the Decision Support Tool (DST) for determining impairment due to indirect effects associated with sediment concentrations, PCB-8, 18, 28, 31, 33, 44, 49, 52, 56, 60, 66, 70, 74, 87, 95, 97, 99, 101, 105, 110, 118, 128, 132, 138, 141, 149, 151, 153, 156, 158, 170, 174, 177, 180, 183, 187, 194, 195, 201, and 203 will be included in the calculation.

# Attachment E:
# LACFCD Background Information

# Attachment E
# LACFCD Background Information

In 1915, the Los Angeles County Flood Control Act established the 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 E-1.**

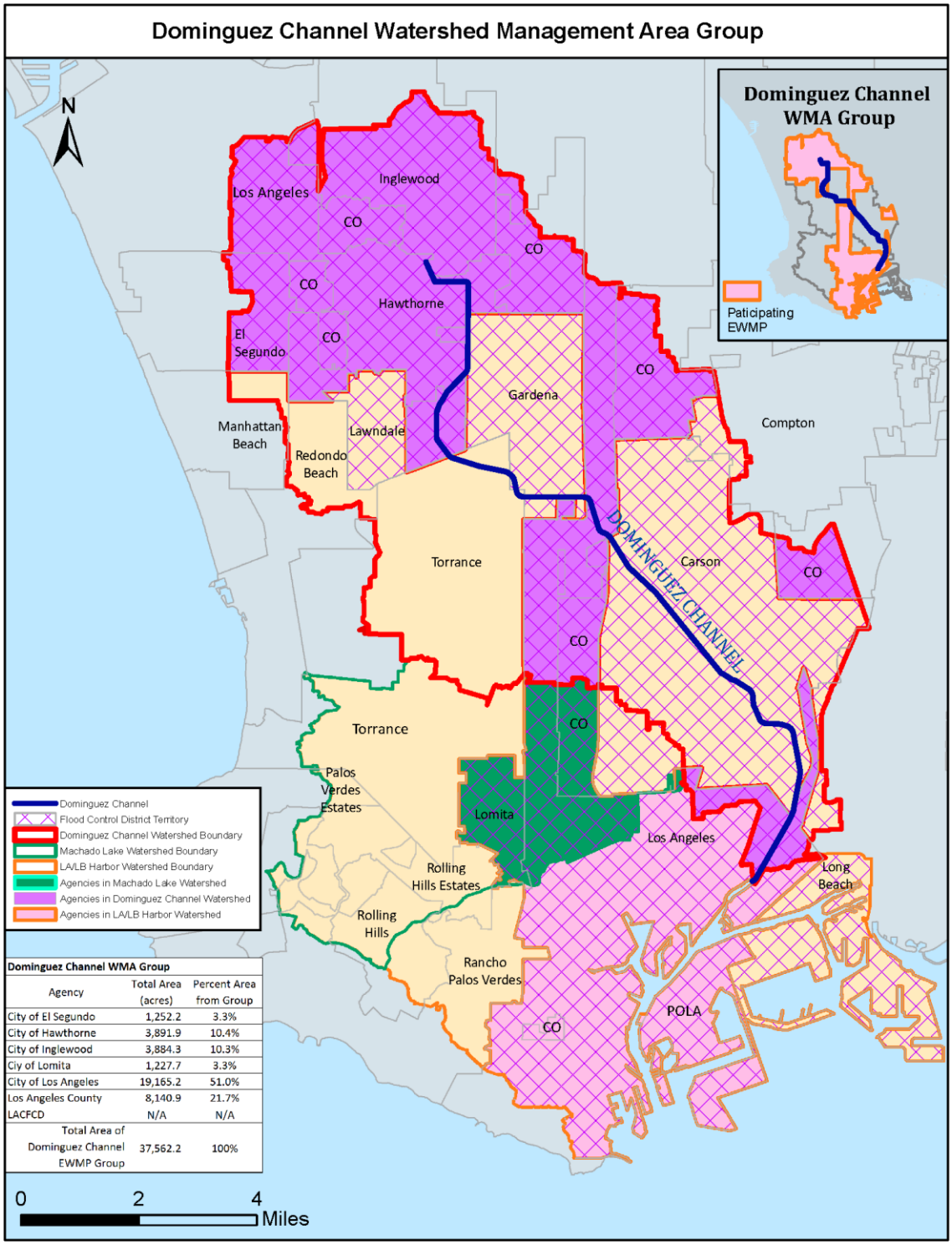
Unlike cities and counties, the LACFCD does not own or operate any municipal sanitary sewer systems, public streets, roads, or highways. The LACFCD operates and maintains storm drains and other appurtenant drainage infrastructure within its service area. The LACFCD has no planning, zoning, development 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 [E]WMPs and 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 E-1. Los Angeles County Flood Control District Service Area**




**Dominguez Channel WMA Group**

| Agency | Total Area (acres) | Percent Area from Group |
|---|---|---|
| City of El Segundo | 1,252.2 | 3.3% |
| City of Hawthorne | 3,891.9 | 10.4% |
| City of Inglewood | 3,884.3 | 10.3% |
| Cty of Lomita | 1,227.7 | 3.3% |
| City of Los Angeles | 19,165.2 | 51.0% |
| Los Angeles County | 8,140.9 | 21.7% |
| LACFCD | N/A | N/A |
| Total Area of Dominguez Channel EWMP Group | 37,562.2 | 100% |

**Figure E-2. Los Angeles County Flood Control District Areas in DCWMA**