Appendix 8-1: Description of Imported Water Cost Assumptions

(Note that all other documents supporting analysis are available on CD)

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Adopted Water Rates & Charges

Historical Water Rates

Effective January 1st	2012	2013	2014
Tier 1 Supply Rate ($/AF)	$106	$140	$148
Delta Supply Surcharge ($/AF)	$58	*	*
Tier 2 Supply Rate ($/AF)	$290	$290	$290
System Access Rate ($/AF)	$217	$223	$243
Water Stewardship Rate ($/AF)	$43	$41	$41
System Power Rate ($/AF)	$136	$189	$161
Full Service Untreated Volumetric Cost ($/AF)			
Tier 1	$560	$593	$593
Tier 2	$686	$743	$735
Replenishment Water Rate: untreated ($/AF)	$442	**	**
Interim Agricultural Water Program: untreated ($/AF)	$537	***	***
Treatment Surcharge ($/AF)	$234	$254	$297
Full Service Treated Volumetric Cost ($/AF)			
Tier 1	$794	$847	$890
Tier 2	$920	$997	$1,032
Treated Replenishment Water Rate ($/AF)	$651	**	**
Treated Interim Agricultural Water Program ($/AF)	$765	***	***
Readiness-to-Serve Charge (millions of dollars)	$146	$142	$166
Capacity Charge ($/cfs)	$7,400	$6,400	$8,600

* The Delta Supply Surcharge will be suspended after 2012
** Discussions on the replenishment program are continuing with the Member Agencies
*** The Interim Agricultural Water Program will be discontinued after 2012

Definitions

Tier 1 Supply Rate - recovers the of cost of maintaining a reliable amount of supply.

Delta Supply Surcharge - reflects the additional supply costs that Metropolitan faces along with other costs due to the pumping restrictions on the State Water Project.

Tier 2 Supply Rate - set at Metropolitan's cost of developing additional supply to encourage efficient use of local resources.

System Access Rate – recovers a portion of the costs associated with the delivery of supplies.

System Power Rate – recovers Metropolitan's power costs for pumping supplies to Southern California.

Water Stewardship Rate – recovers the cost of Metropolitan's financial commitment to conservation, water recycling, groundwater clean-up and other local resource management programs.

Replenishment Water Rate – a discounted rate for surplus system supplies available for the purpose of replenishing local storage.

Treated Replenishment Water Rate – a discounted rate for surplus system supplies available for the purpose of replenishing

local storage.

Interim Agricultural Water Rate – discounted rate for surplus system supplies available for the purpose of growing agricultural, horticultural, or floricultural products.

Treated Interim Agricultural Water Program Rate – discounted rate for surplus system supplies available for the purpose of growing agricultural, horticultural, or floricultural products.

Treatment Surcharge – recovers the costs of treating imported water.

Readiness-to-Serve Charge - a fixed charge that recovers the cost of the portion of system capacity that is on standby to provide emergency service and operational flexibility.

Capacity Charge – the capacity charge recovers the cost of providing peak capacity within the distribution system.

Page updated: April 19, 2012

Appendix 8-1 - Real Price Escalation for Imported water

Several proposed projects enhance local water supplies and, thus, reduce the region's reliance on waters imported from the Bay-Delta via the State Water Project (SWP) and Metropolitan Water District of Southern California (MWD). The avoided cost of imported SWP water is thus an important monetized benefit for projects that enhance local supplies.

An important aspect in monetizing the value of avoided imports entails predicting the future cost of imported SWP water. The economic analyses in these grant applications are developed in real terms (based on 2012 dollars), meaning that the future stream of benefits and costs typically are not adjusted for general inflation. This is because most outcomes are expected to see price changes that generally align with broader measures of inflation, such as the Consumer Price Index (CPI), which is measured and reported by the federal Bureau of Labor Statistics (ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt).

The price of imported SWP water is an important exception, because various factors have led to rate increases that have considerably outpaced general inflation over the past two decades (as detailed below). This trend of real price increases for imported water (i.e., above the projected CPI) is likely to continue in the future as well, because the same factors that have driven these prices upward will remain relevant for several years to come. These factors principally include limitations on overall supply, due to a variety of factors primarily linked to the declining health of the Bay-Delta system from which these waters are extracted.

The supply-constraining factors for the Bay-Delta include Court rulings and environmental regulations related to the severe adverse impacts that declining water levels and the associated alterations in water quality (e.g., salinity) have imposed on this important ecosystem. Fish populations have declined dramatically in recent decades (including threatened and endangered species such as salmon and the delta smelt, for which the Bay Delta provides critical habitat). The levee system is aging, and vulnerability of the Delta to flooding, sea level rise, or a major earthquake has contributed to concerns about possible levee collapse which could have devastating and far-reaching consequences. In addition, water quality problems continue, with impacts not only on fisheries and natural systems, but also on water treatment needs to meet drinking water standards for protecting human health and aesthetics.

These factors -- and the associated investments the MWD and other water agencies have needed to make in infrastructure and potable water treatment – have resulted in dramatic increases in the cost of water that MWD wholesales throughout southern California. Large investments in new infrastructure made over the past ten to twenty years include the Eastside Reservoir and Inland Feeder. In the coming years, additional large-scale costs are likely to be incurred for the Delta Conveyance, which may cost around $20 billion in its current formulation, with MWD likely to bear a large portion (e.g., one-third to one-half) of the cost.

Tables A and B reveal the extent to which MWD water rates have increased over the past 10 to 20 years, relative to general inflation as reflected by the federal CPI. Table A shows the change in MWD "Tier 1 treated" supply rates, and Table 2 provides the same information for MWD's

"Tier 2 treated" water rates (MWD rates derived from http://www.mwdh2o.com/mwdh2o/pages/finance/finance_03.html). In both instances, it is evident that over both the recent short-term (5-year period) and longer-term periods (10-year and 20-year), imported water costs have increased at rates well above inflation.

For example, Tier 1 rates in the 2008 through 2012 period increased by over 56%, which is 8.5 times greater than the CPI over the same period. A very similar result is evident for Tier 2 rates. This indicates that the real rate of price increase (above general inflation) for MWD water has been between 9.4% and 10.2% over the past five years (as shown in the right-most column in Tables 1 and 2).

Over a longer timeframe, similar escalations are evident as well. Over the last decade, the 10-year average annual cost increase for MWD water has been from 4.8% to 5.2% per year above inflation, for Tier 2 and Tier 1, respectively. The 20-year price trend indicates a real annual increase in imported water costs of nearly 2% above inflation.

Table A: MWD Tier 1 Treated Rates compared to CPI

		cumulative change			average annual change		
time interval	# years	Tier 1	CPI	ratio	Tier 1	CPI	Real Tier 1
2008 - 2012	5 years	56.3%	6.6%	8.5	11.8%	1.6%	10.2%
2003 - 2012	10 years	94.6%	24.8%	3.8	7.7%	2.5%	5.2%

Table B: MWD Tier 2 Treated Rates compared to CPI

		cumulative change			average annual change		
time interval	# years	Tier 2	CPI	ratio	Tier 2	CPI	Real Tier 2
2008 - 2012	5 years	51.8%	6.6%	7.8	11.0%	1.6%	9.4%
2003 - 2012	10 years	88.1%	24.8%	3.6	7.3%	2.5%	4.8%
1993 - 2012	20 years	123.3%	58.9%	2.1	4.3%	2.5%	1.9%

Based on these data, it is appropriate for the economic analyses to reflect how imported water costs in southern California are likely to continue to increase at rates considerable above general inflation. To reflect real prices of imported water in the future, we have adopted the following conservative assumptions:

1. For water imported from 2013 and 2014, we use rates published by MWD as of March 2013 (http://www.mwdh2o.com/mwdh2o/pages/finance/finance_03.html), but adjusted to reflect real 2012 price levels (e.g., the 2013 nominal rates posted by MWD are reduced by the 2.07% CPI for 2012).

2. For water imported between 2015 and 2020 (inclusive), we derive a 2012 real cost by escalating by 3.5%. This escalation of 3.5% above CPI is fairly conservative (i.e., low end), given the documented trends over the past 5 to 10 years (for which real increases have ranged from 4.8% to 10.2% per year).

3. For water imported in 2021 and years thereafter, we escalate at a rate of 1.5% per year to obtain real prices. This is also a conservative, given that observed 10 to 20 year escalation rates have been in the 1.9% to 5.2% range).

Another benchmark for considering these real price adjustments is provided by the long-term forecast for CPI for the upcoming 10-year period, 2013 through 2022. The Federal Reserve Bank of Philadelphia indicates an anticipated annual average CPI of 2.3% over the next ten years (Survey of Professional Forecasters, http://www.phil.frb.org/research-and-data/real-time-center/survey-of-professional-forecasters/2013/survq113.cfm, accessed February 28, 2013).

Combining the CPI forecast with the real escalation rates we propose above for MWD imports, this suggests an average nominal increase in imported water costs of only 5.8% per year through 2020 (2.3% + 3.5%), and 3.8% from 2021 onwards (2.3% + 1.5%). Both of these nominal price increases are well below the average nominal price increases observed for MWD over the relevant comparable time periods:

- The MWD 5- and 10-year average nominal rate increase has ranged from 7.3% to 11.8% (as shown in Tables 1 and 2), compared to our use of 5.8% over the 6-year period 2015 – 2020; and
- The 10- and 20-year MWD history shows nominal increases of 4.3% to 7.7%, contrasted to our use of a 3.8% nominal increase starting in 2012, eight years in the future.

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Appendix y-A: Citywide Storm Drain Catch Basin Curb Screens Supporting Documents

(Please see Appendix CD for documents)

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Technical Report: Assessment of Catch Basin Opening Screen Covers

JUNE 2006

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Technical Report:
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JUNE 2006

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Executive Summary

Introduction

The intent of this report is to present the results gathered by the City of Los Angeles through a pilot study on the effectiveness of catch basin opening screen covers in complying with the Trash TMDL.

In compliance with the Federal Clean Water Act (CWA) and existing consent decree between the U.S. EPA and the environmental groups, the Los Angeles Regional Water Quality Control Board (RWQCB) approved the Trash Total Maximum Daily Loads (TMDLs) for the Los Angeles River and Ballona Creek and Wetlands on September 19, 2001. The Trash TMDL requires a reduction of 10% of trash per year for a ten-year period ending in year 2013. The RWQCB has based compliance on a three-year rolling average, with the milestone in September 2006 when the City must achieve a 20% trash reduction.

Pilot Study

The sole purpose of the pilot study was to determine the CB opening screen cover deflection effectiveness during the wet season for trash greater than 0.75 inches. A typical year experiences approximately twenty-five (25) wet days and three hundred forty (340) dry days. The pilot study location is located in the Westlake area of the City, just west of downtown Los Angeles and has a drainage area approximately 55 acres. Stormwater runoff from this area is captured by a total of 24 catch basins and a CDS unit located at the base of this drainage area. All 24 catch basins were retrofitted with

opening screen covers having diamond shape openings measuring 1 inch in the longitudinal direction by ¾ inch in the vertical direction. This means all trash greater than 1 inch would remain out in the street. These covers remain in the closed position by means of two magnetic anchors at each end that release when runoff from a storm builds up to approximately 60% of the curb height. Once the flow diminishes, the screen swings into the closed position and locks itself by means of the magnet anchors. Field measurements from the catch basins and the CDS unit were obtained for this past wet season, FY 2005/06, by crews from the Wastewater Collection Systems Division following storms greater than 0.25 inches.

Conclusion

At the conclusion of the study, the effectiveness of the covers in deflecting trash during a storm greater than 0.25 inches was determined to be 58% to 79% percent. It should be noted that dry days account for approximately ninety-three percent (93%) of the total calendar days in the City. For dry days the trash deflection effectiveness of the opening screen cover will be considered 85 percent, given that the screen will remain closed position and only trash smaller than one (1) inch will enter the catch basin. Therefore, using a 1:9.3 weighted average over an entire year, the opening screen cover will have an **86 percent effectiveness rate.**

CHAPTER 1

PILOT STUDY

Background

The intent of this report is to present the results gathered by the City of Los Angeles through a pilot study on trash capture effectiveness of catch basin opening screen covers.

In compliance with the CWA and existing consent decree between the U.S. EPA and the environmental groups, RWQCB approved the TMDLs for the Los Angeles River and Ballona Creek and Wetlands on September 19, 2001. This Trash TMDL requires a reduction of 10% of trash per year for a ten-year period. The RWQCB has based compliance on a three-year rolling average, with the first milestone in September 2006 when the City must achieve a 20% trash reduction.

The RWQCB further identified trash in urban runoff that is conveyed through the storm drain as a primary source of pollution reaching the Los Angeles River and Ballona Creek. Trash that gets into the water bodies can cause water quality problems. Settables, such as glass, cigarette butts, rubber, and construction debris, can be a problem for bottom feeders and can contribute to sediment contamination. Some debris, such as diapers, medical and household waste, is a source of bacteria and toxic substances. The Trash TMDL identified the following beneficial uses as being impaired due to trash in these water bodies: 1) contact recreation like bathing and swimming; 2) non-contact recreation such as fishing, hiking, jogging, and bicycling; and 3) habitat for aquatic life and bird life.

Throughout this pilot study the word "trash" is used to represent sediment, debris, vegetation and litter and should not be misconstrued to represent only anthropogenic trash.

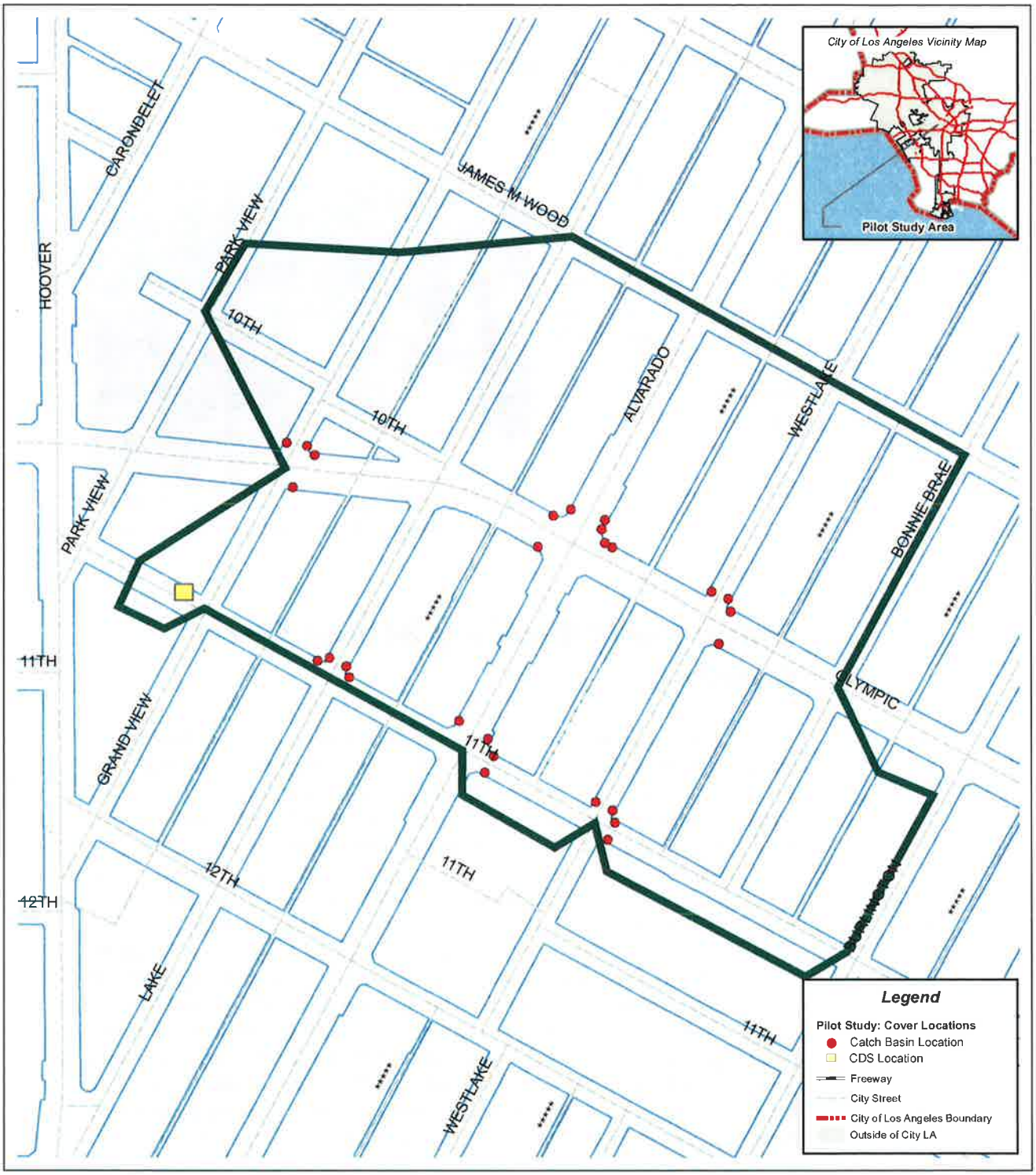
Description of Study Area

The catch basins retrofitted with opening screen covers were located west of the downtown Los Angeles Civic Center in the Westlake area of the City in close proximity to Koreatown (See Figure 1.1). The drainage area is approximately 55 acres, with three-quarters commercial and the remaining multi-family residential landuses (see Figure 1.2). This area is regarded as a high trash generation area within the City.

Figure 1. Westlake Area (Grand View / Olypmic Blvd)

Catch Basin Opening Screen Cover Details

All the opening screen covers being evaluated have been purchased and installed by Practical Technology, Inc. They have been manufactured from ASTM A36 steel, hot dipped galvanized expanded metal with diamond shape openings (1 inch longitudinal by ¾ inch vertical). The screen covers have a smooth edge around the perimeter with no prongs or jagged edges. The opening screen covers encompass the entire curb opening. The opening screen covers were designed to block trash while allowing surface runoff to enter the catch basin. In the event that material obstructs the screen and results in localized ponding, the screen will open due to hydraulic force. The cover is maintained in the closed position by magnets of predetermined force that will release at approximately 60% curb face flow height generated by a moderate to severe storm. At this point the cover will swing open inwards to relieve this condition. Up to this point all trash greater than 1 inch mobilized by this flow will remain outside of the catch basin. See Figures 1.3 through 1.5 for actual pictures of the opening screen cover and Figure 1.6 for the opening screen cover operational sequence.



0 0.010.02 0.04 0.06 Miles

Figure 1.1 Study Area: Catch Basin Locations

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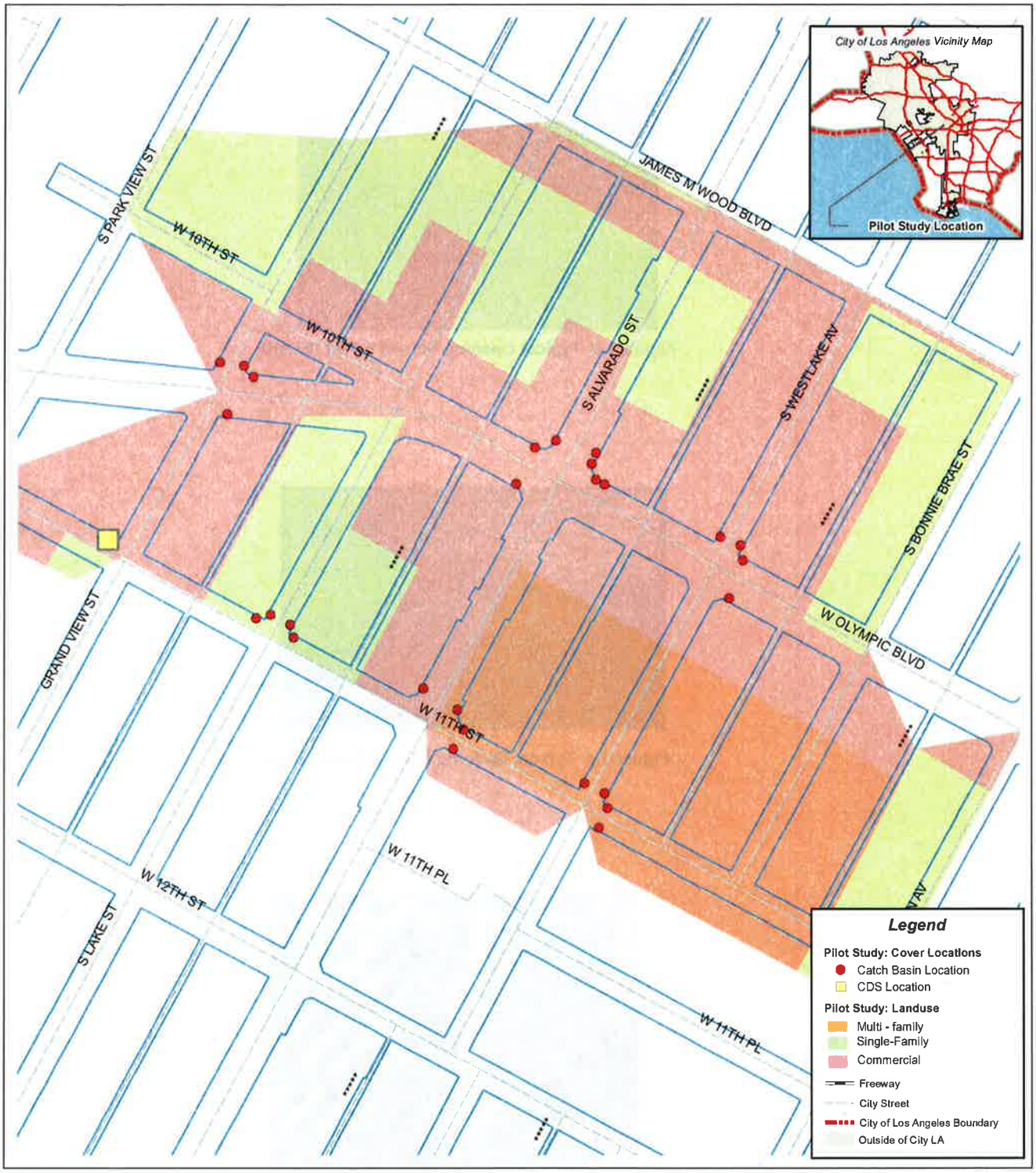

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Figure 1.2 Study Area: Landuse

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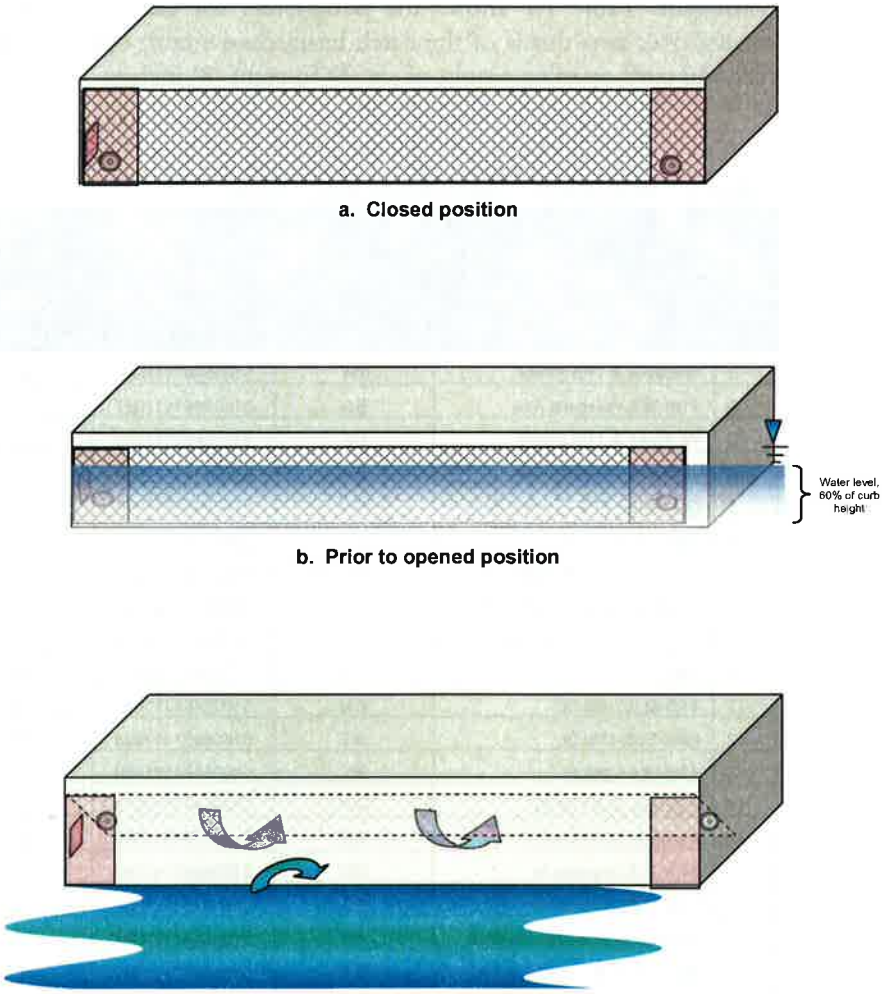
Figure 1.3 Typical Opening Screen Cover (Front)

Figure 1.4 Typical Opening Screen Cover (Back)

Figure 1.5 Typical Opening Screen Cover Magnet Locking Mechanism



a. Closed position

b. Prior to opened position

c. Open position (flow recedes, cover returns to closed position)

Figure 1.6 Catch Basin Opening Cover operation sequence

Catch Basin and Hydrodynamic Device Details

Catch Basins

The physical parameters of the catch basins included in the study were consistent. Table 1.1 shows the parameters for each CB. As the Table shows, over two-thirds of the catch basins had a curb opening length of 3.5 feet and curb opening height of six (6) to eight (8) inches.

Table 1.1 Pilot Study Catch Basin Parameters

No.	Address	Location	Clamms	Catch Basin Curb Opening	
				Length	Height
				Feet	Inches
1	Westlake & 11th Street	NW	51605461111089	2	8
2	11th St & Westlake Ave	ES	51605461111097	2	8
3	Westlake & 11th Street	NE	51605461111093	3	6
4	11th St & Westlake Ave	EN	51605461111095	3	8
5	Grandview St & Olympic Blvd	NW	51605461111027	3.5	7
6	2222 Olympic Blvd	ES	51605461111037	3.5	8
7	Olympic Blvd & Avarado St	WS	51605461111048	3.5	8
8	Olympic Blvd & Westlake Ave	EN	51605461111054	3.5	8
9	Olympic Blvd & Westlake Ave	ES	51605461111055	3.5	8
10	Lake St & 11th St	NW	51605461111063	3.5	8
11	11th St & Lake St	WN	51605461111064	3.5	8
12	Lake St & 11th St	NE	51605461111068	3.5	8
13	11th St & Lake St	EN	51605461111069	3.5	8
14	Alvarado St &11th St	NW	51605461111078	3.5	8
15	Alvarado St &11th St	NE	51605461111082	3.5	7
16	11th St & Avarado St	EN	51605461111084	3.5	8
17	11th St & Avarado St	ES	51605461111086	3.5	7
18	Grandview St & Olympic Blvd	NE	51605461111032	3.5	6
19	Alvarado St & Olympic Blvd	NW	51605461111040	7	8
20	Olympic Blvd & Avarado St	WN	51605461111041	7	8
21	Westlake & Olympic Blvd	NW	51605461111056	7	8
22	Westlake & Olympic Blvd	NE	51605461111066	7	8
23	Alvarado St & Olympic Blvd	NE	51605461111044	7	7
24	Alvarado St & Olympic Blvd	EN	51605461111050	7	8

Hydrodynamic Device – CDS

The drainage area in which these catch basins are located is serviced by a hydrodynamic unit installed on the downstream end of the mainline storm drain. The unit being used is a CDS Technologies Continuous Deflective Separation (CDS) unit Model PSW 70-70 with treatment design flow rate of 26.5 cubic feet per second (CFS). The CDS unit is located on Parkview St. and Grandview St. Figure 1.7 shows a typical CDS installation.

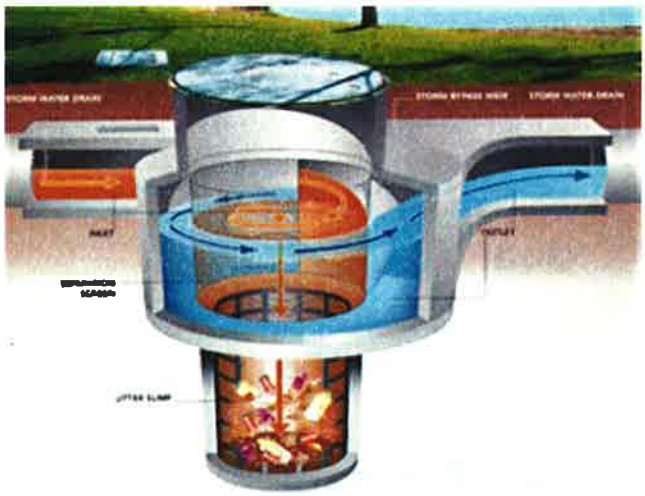


Figure 1.7. Typical CDS installation and operation

CHAPTER 2

PILOT STUDY – TEST PROTOCOL

Goal

The goal of this test protocol is: to determine the CB opening screen covers' effectiveness during rainy days with 0.25 inch or greater of rainfall.

Test Protocol

A. General

1. The covers evaluated for the pilot study were purchased from Practical Technology, Inc. They are constructed from hot dipped galvanized expanded metal with a diamond shape opening. The longer dimension of the opening is approximately 1 inch. Covers span the entire length of the curb opening and height.

2. Wastewater Collection Systems Division (WCSD) crews performed data collection and measurements following a storm event having an accumulation greater than 0.25 inches as measured at the civic center of the City of Los Angeles.

3. Existing data collection procedures were employed and amended, as necessary. Data from individual events were recorded in tabular form, using existing WCSD data collection forms or amended forms provided by Watershed Protection Division (WPD).

4. Existing historical CB and CDS cleaning data gathered for comparison with that of the data collection from this study.

5. Data collection and measurements were only performed if the storm events occurred ten or more days apart.

6. Precipitation data of every storm event were obtained from the County of Los Angeles, Department of Public Works real time rain gauge identified as the Los Angeles-Ducommun (#377, Lat. 34-03-09; Long. 118-14-13; Elev. 306). Data was be analyzed for total rainfall, one-hour maximum rainfall, and 30-minute maximum rainfall (rainfall intensity).

7. The following field conditions were recorded by WPD staff at the start of the study at each retrofitted CB:
   a. Location;
   b. Visual observations of street surroundings;
   c. Visual observations of inside of catch basin; and
   d. Street cleaning frequency at CB location.

8. The following field conditions were recorded by WCSD crews during data collection at each retrofitted catch basin :
   a. Existing weather condition;
   b. Visual observations for fullness of CB (i.e., none, minimal, ¼ full, ½ full, ¾ full, full);
   c. Visual observations for signs of ponding immediately adjacent to CB opening; and
   d. Other parameters, as the study proceeds.

9. Following each cleaning WCSD sent results to WPD for data assessment.

B. Evaluation of CB opening covers Effectiveness

Determination of an overall CB opening cover effectiveness relied on field measurements and visual observations.

1. WCSD crews visually monitored the CDS unit for floating trash after every storm event described. If no floating trash was visible, such results were recorded, otherwise crews removed the floating trash.

2. WCSD crews removed all accumulated trash after every storm from all retrofitted CBs. Removal of trash was performed using the described procedure.

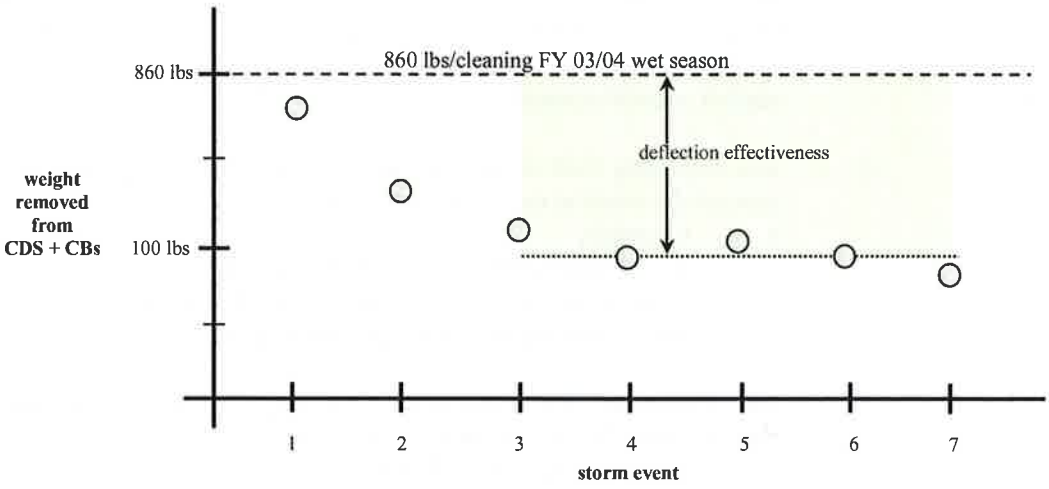
3. Effectiveness of screen covers (SC) was determined as follows:

$$SC_{effectiveness}\,\% = (TH_{tCDS+CBs} - TC_{tCDS+CBst} \,/\, TH_{tCDS+CBs}) \times 100$$

$TH_{CDS+CBs}$ = *Trash Historical*$_{tCDS+CBs}$
= *860 lbs (based on average 2003/2004 wet season cleaning)*

$TC_{CDS+CBs}$ = *Trash Current*$_{CDS+CBs}$

Below is an example of the methodology used:



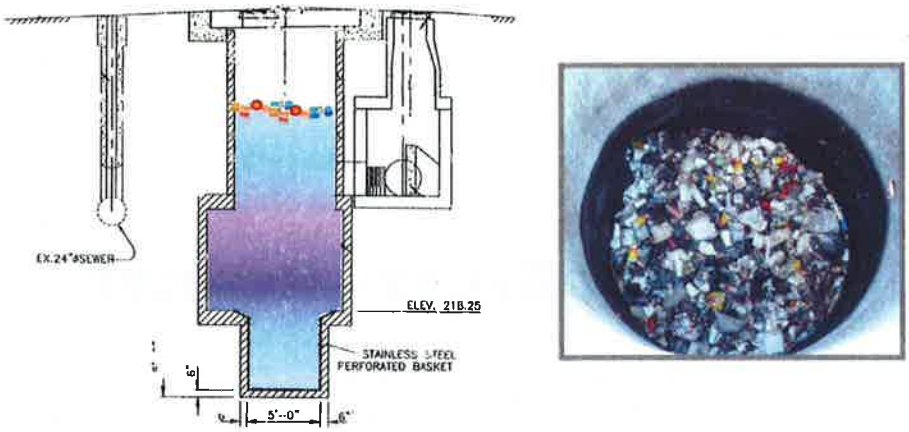
The data from the initial storm events may be discarded in that it is anticipated that the CDS unit will have trash that has already enter the storm drain system and catch basins prior to placement of the covers.

CHAPTER 3

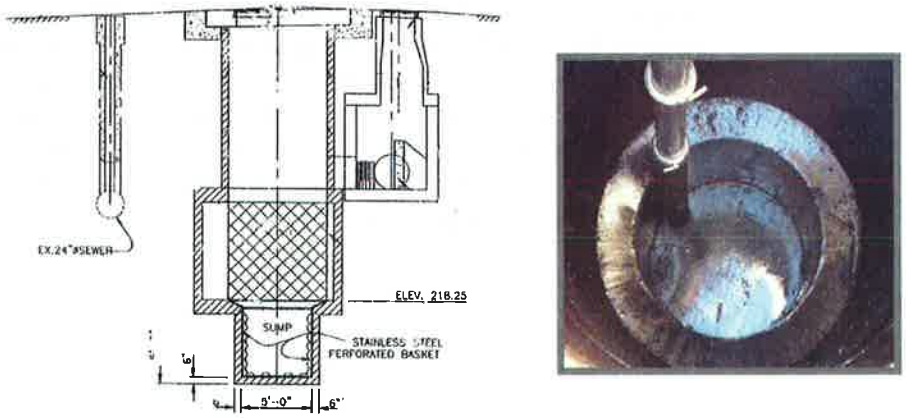
PILOT STUDY – RESULTS

The intent of this section is to present the results obtained by the Wastewater Collection System Division (WCSD) crews during the cleaning of the catch basins and CDS unit after every storm greater than 0.25 inch. There were a total of 4 rain events of a magnitude that triggered a cleaning event during the 2005/2006 wet season.

Data collection consistency was maintained by employing the same practice/protocol throughout the study. To ensure less variability in data gathered, at the start of the pilot study the CDS unit was thoroughly cleaned (emptied). Figure 3.1a shows the condition of the CDS unit prior to cleaning whereas Figure 3.1b shows condition after cleaning. During the study, only floatable material within the CDS were gathered as shown in Figure 3.2. Vactor trucks were used to remove all floatables from the surface and then proceeded to the Hyperion Treatment Plant to obtain the weight of the floatables. Every effort was made to decant the truck thoroughly prior to obtaining the wet weight of the floatables collected.

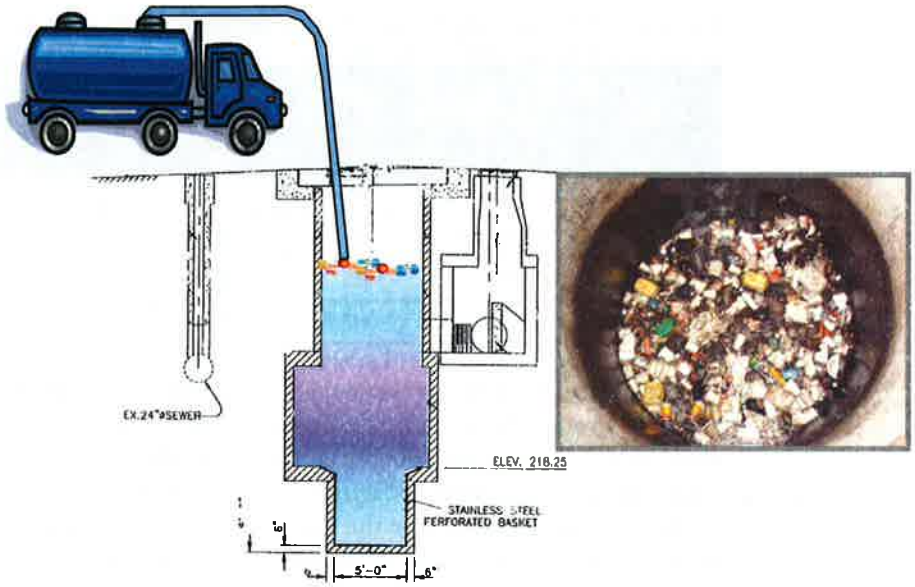


a. CDS unit prior to cleaning.

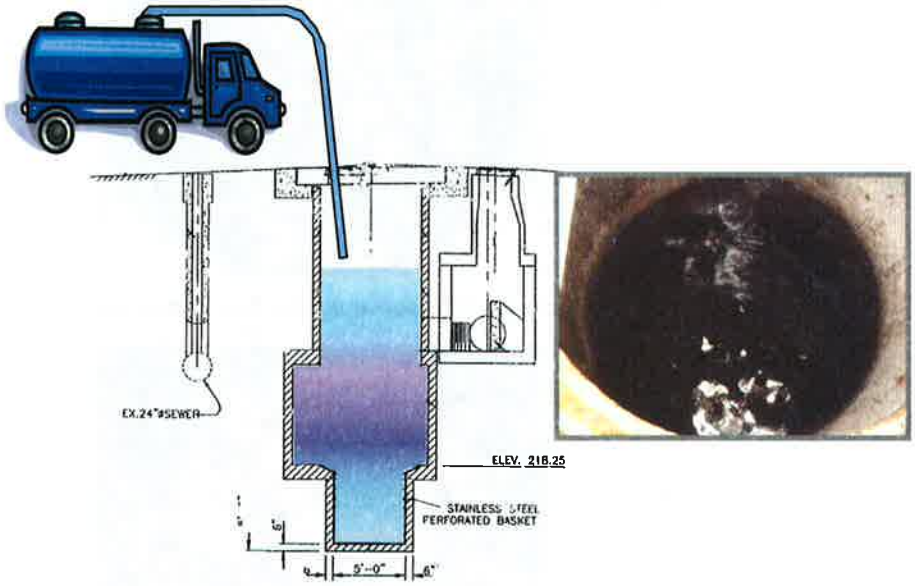


b. CDS unit after cleaning.

Figure 3.1 Preparation of CDS unit for pilot study



a. Contents of CDS unit after storm event



b. CDS unit after cleaning

Figure 3.2 Method of cleaning of CDS unit during pilot study duration.

Table 3.1 illustrates the rain event and the corresponding deflection effectiveness based on the Test Protocol procedure.

Table 3.1 CB Opening Screen Cover Deflection Effectiveness
(During storm event only)

Event	Date	Collected Trash (lbs)		Screen Cover % Deflection Effectiveness (c)
		CBs (a)	CDS (b)	
1	10/17-18/05	91	170	70
2	12/31/05- 1/2/06	69	110	79
3	2/17-18/06	155	200	59
4	3/20-21/06	112	250	58

Figures 3.3 and 3.4 below show typical contents found in the CDS unit after a storm event. Note that the predominate material is floatable materials such as styrofoam cups and containers, light film plastics used in packaging, and some paper products. Figures 3.5 through 3.10 show typical conditions of the opening covers after the rain events. Note that Figure 3.9 and 3.10 depict condition of the opening covers for rain events (late March and early April) less than 0.25 inches and staff only documented these through photos.

Figure 3.3 CDS contents after first storm event

Figure 3.4 CDS contents after last storm event

Figure 3.5 Typical opening cover after Rain Event No. 1 (10/17-18/05)

Figure 3.6 Typical opening cover after Rain Event No. 2 (12/31/05 – 01/02/06)

Figure 3.7 Typical opening cover after Rain Event No. 3 (2/17-18/06)

Figure 3.8 Typical opening cover after Rain Event No. 4 (3/19-20/06)

Figure 3.9 Typical opening cover after rain event less than 0.25in (3/29/06)

Figure 3.10 Typical opening cover after rain event less than 0.25in (4/4-5/06)

CHAPTER 4

PILOT STUDY ANALYSIS AND RECOMMENDATIONS

Data Analysis

The study objective was to determine the CB opening screen cover effectiveness during the wet season. Chapter 3 shows that this type of opening cover demonstrated preliminary percentage effectiveness in the range of 58% to 79% during the rain events greater than 0.25 inches. As stated beforehand, the only time trash would enter a retrofitted catch basin with an opening screen cover would be when sufficient flow is generated by a medium to large storm to mobilize floatable trash in the area and push the cover open. It should be noted however that the City of Los Angeles during a typical year experiences twenty five (25) wet days and three hundred forty (340) dry days (93% of the calendar year). For dry days the trash deflection effectiveness of the opening screen cover will be considered 85 percent, given that the screen will remain in the closed position and only trash smaller than one (1) inch will enter the catch basin. The 85 percent was arrived at by data collected from a waste characterization conducted from 30 catch basins in June 2004. The waste characterization resulted in 85 percent of the collected waste being plastic material (i.e., plastic bags, plastic film, moldable plastic), and paper greater than 1 inch. Therefore, using a 1:9.3 weighted average over an entire year, the opening screen cover will have an **86 percent effectiveness rate.**

Observations

Throughout the study many observations, other than deflection effectiveness trash rate, were recorded and below are some aspects that need to be considered with the use of this type of opening screen cover:

- This type of opening screen cover tended to snare bottles, beverage cups, and other large material as the cover receded to the closed position. Thus, resulting in the CB opening screen cover remaining in the unlocked position.
- This type of opening screen cover relies on static pressure from the accumulation of flow outside the catch basin resulting in some occasions in localized ponding.
- This type of opening screen cover was installed flush with the curb face and was prone to damage by vehicles that have large wheel lug nuts, such as buses and heavy duty trucks.
- The placement of this type of opening screen cover flush with the curb face allowed for it to sometimes open when street sweepers swept the streets, resulting in trash being pushed into the catch basin.

Recommendations

The City should continue the use of catch basin opening screen covers in high trash generation areas based on its preliminary high trash deflection capability. However, the city should continue to evaluate different configurations of covers based on the following criteria:

- Maximize the amount of trash kept on the streets;
- Minimize flooding potential;
- Prevent large trash from entering the catch basin; and
- Ease of maintenance

Tracking Bacterial Pollution Sources in Stormwater Pipes

A final report to the
New Hampshire Estuaries Project/Office of State Planning

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Introduction

The New Hampshire Department of Environmental Services (DES) conducted two rounds of wet weather sampling in the Hampton Harbor watershed during 2002. Samples were collected from stormdrains, tributaries, and harbor stations for bacteria and flow in order to calculate bacteria loads. This information was needed to prioritize pollution sources as part of a Total Maximum Daily Load (TMDL) study of bacteria in Hampton Harbor (Trowbridge, 2003).

Two of the 16 monitored stormdrain pipes were selected for microbial source determination using ribotype profiling. Stormdrain pipe selection was based on the bacteria loading data from the first wet weather sampling that occurred on 7/23/02. The two sampling sites identified as HHPS069 and HHPS182 contributed 12% and 60%, respectively, of the bacteria load from the 16 monitored stormdrains during the first storm event. It was determined that these two pipes would be targeted for more intensive investigations based on the high relative loading of bacteria. Thus, samples were collected during a second storm on October 16, 2002 from these two pipes and analyzed for source species identification using ribotype profiling.

Project Goals and Objectives

The goal of this project was to determine the bacteria source species from two of the highest priority stormdrain pipes that discharge to Hampton Harbor. Specific objectives were to:

1. Collect water samples at the two selected sites during a storm of >0.25 inch total precipitation.
2. Analyze the water samples for bacteria concentrations and determine source species using ribotype profiling.
3. Issue a report for incorporation into the Hampton Harbor Wet Weather Study for the Bacteria TMDL.

Methods

Storm Selection

For this study, one storm was needed with the following characteristics: (1) onset at or around low tide; (2) >0.25 inches total precipitation; (3) occurrence during daylight hours on Monday-Thursday; and (4) very little rainfall for the prior three days. These criteria were met for the storm that DES used for this study.

The storm occurred on October 16, 2002 and was a classic "Nor'easter" with soaking rain and high winds lasting over 12 hours. A total of 1.39 inches of rain fell during the storm (Trowbridge, 2003).

Field Methods

The sampling sites were identified as HHPS182 which is located in Seabrook, west of Rt. 1A and south of Cross Beach Road and HHPS069 which is located in Hampton, west of the municipal parking lot on Ashworth Avenue. Samples were collected from the stormdrain pipe outfalls throughout the duration of the storm in accordance with the Quality Assurance Project Plan (QAPP). The samples were collected at periodic intervals to represent the entire storm. The samples were placed on ice packs in a cooler and delivered to the UNH Jackson Estuarine Laboratory.

The sampling site descriptions, photos and field collection methods for this study are described in detail in the approved QAPP, which is on file at DES.

Lab and Analytical Methods

Detection of Fecal Coliforms and E. coli

Appropriate volumes of water samples were filtered to give at least 20 colonies on agar plates, where possible. The membrane filters were rolled onto **mTEC** agar in petri dishes. Plates were inverted and incubated at 44.5±0.2 °C for 24 hours (USEPA, 1986). Fecal coliforms were enumerated by counting the yellow colonies after the incubation period, and *E. coli* was enumerated by counting the yellow colonies on the plate following incubation of the filter on urea substrate (Jones and Bryant, 2002).

For each sample/site, yellow colonies from the best dilution (10-30 readable colonies) were counted and recorded as fecal coliforms (Rippey et al., 1987). The yellow/yellow brown colonies remaining on the membrane filter after incubation on urea substrate were recorded as confirmed *E. coli* colonies.

Sample Processing

The procedures used for ribotyping *E. coli* isolates for this study have been used previously (Jones and Landry, 2003 and Jones, 2002) and are based to a large extent on those of Parveen et al. (1999). *E. coli* isolates were stored in cryovials at -80°C and re-cultured onto trypticase soya agar (TSA). Some of the stored isolates could not be re-cultured. Cultures on TSA were incubated overnight at room temperature (~20°C). Some of the resulting culture was transferred to duplicate cryovials containing fresh glycerol/DMSO cryo-protectant media for long-term storage at -80°C.

A RiboPrinter was used to process *E. coli* culture for ribotype determinations. After preparation of the samples, the automated process involved lysing cells and cutting

the released DNA into fragments via the restriction enzyme EcoR1. These fragments were separated by size through gel electrophoresis and then transferred to a membrane, where they were hybridized with a DNA probe and mixed with a chemiluminescent agent. The DNA probe targeted 5S, 16S and 23S ribosomal RNA genes. A digitizing camera captured the light emission as image data, from which the system extracted a RiboPrint® pattern. This pattern could be compared to others in the RiboPrinter database for characterization and identification based on densiometry data, although our approach has conformed to other ribotyping studies in using banding patterns instead as the basis for comparing patterns.

Band Identification

The images were transferred from the RiboPrinter into GelComparII (Applied-Maths) analytical software. The bands in lanes containing the standard were labeled and entered into the memory for optimization of gel pattern images. The densiometry data were processed for band identification. The ribopattern data for each separate water sample isolate were then selected for identification of source species.

Source Species Databases

The analysis of water sample isolates for identification of source species was based on two distinct databases. The first source species database used was composed of the *E. coli* strains isolated from source species sampled in the Hampton Harbor watershed. This database contained ribotypes for 11 non-human source species and wastewater, and included 120 total ribotypes (Table 1). All water ribotypes that matched the Hampton Harbor database at <90% similarity were reanalyzed using a full New Hampshire source species database. This state database was composed of 676 ribotypes from 26 different non-human source species, humans, septage and wastewater (Table 1). The state database contained ribotypes for more species and more for each shared species except for otters, cormorants and chickens, which were all from the Hampton Harbor watershed.

Table 1 Source species databases for New Hampshire and Hampton Harbor watershed.

Source species category	Source species	Number of Isolates	
		New Hampshire	Hampton Harbor
HUMANS/SEPTAGE			
	septage	16	0
	wastewater	107	25
	humans	68	0
PETS			
	cat	11	4
	dog	54	19

Source species category	Source species	Number of Isolates	
		New Hampshire	Hampton Harbor
LIVESTOCK			
	alpaca	3	0
	buffalo	10	0
	chicken	3	3
	cow	54	0
	goat	4	0
	horse	27	0
	sheep	2	0
WILDLIFE			
	coyote	19	4
	deer	59	7
	mouse	3	0
	muskrat	12	0
	otter	4	4
	raccoon	32	0
	rabbit	30	0
	red fox	25	4
	skunk	6	0
AVIAN SPECIES			
	cormorant	14	14
	duck	10	1
	geese	44	31
	gull	36	4
	pigeon	6	0
	robin	3	0
	sparrow	4	0
	starling	3	0
	wild turkey	7	0
	Total	676	120

Data Analysis

All data were analyzed with GelComparII software on a Dell computer, where the source species database was also stored. Hard copies of ribotype patterns and similarity coefficients for the unknown and its most closely related source species were printed for interpretation. Interpretation and accompanying graphical representations of the data were done using MS Excel on Macintosh computers.

Optimization was set at 1.56% and band position tolerance was set at 1.00%. Both of these parameters were used to adjust the ability to differentiate between bands for the degree of accuracy desired, and also to compensate for possible misalignment of homologous bands caused by technical problems.

Similarity indices were determined using Dice's coincidence index (Dice, 1945) and the distance among clusters calculated using cluster analysis. The source species profile with the best similarity coefficient at a given set of optimization and tolerance settings was accepted as an indication of the possible source species for the water sample isolate. For this study, the predetermined threshold similarity index that was considered to be a minimum value for identifying source species was 90% for comparisons to the source species databases. The identification of the source species was considered successful if the value calculated for a given water isolate was equal to or greater than the threshold value; if the calculated value was below the threshold similarity index, the water sample isolate was considered to be of unknown origin. Thus, the results of the identifications reported are less than completely accurate (0% tolerance and 100% similarity). Nonetheless, useful information has hopefully been gained to help guide management decisions and resource allocation for pollution source identification and elimination in the Hampton Harbor area.

Results and Discussion

Bacteria Concentrations throughout the Storm Event

Fecal coliform and *E. coli* concentrations were measured as part of this study. The concentrations in the pipes at the time of ribotype sample collection are summarized in Table 2. The *E. coli*:fecal coliform ratio was high (94%) for all samples. *E. coli* concentrations decreased steadily with time in HHPS069, from 304,000/100 ml to 72,000/100 ml (Figure 1). In HHPS182, concentrations increased through the first four sample times, from 14,400/100 ml to 1,1120,000/100 ml, before decreasing sharply thereafter to 172,000/100 ml. The gradual rise and sharp decline in *E. coli* concentrations at HHPS182 could be a result of the stormdrain pump stations (River Street and Ocean Boulevard stations) associated with the effluent from the northern pipe of this drainage system.

Table 2 Fecal coliform and *E. coli* concentrations in stormdrain pipes and number of isolates yielding useable ribotypes.

	HHPS069		Ribotype	**HHPS182**		Ribotype
Sample time	FC/100 ml	*Ec*/100 ml	isolates	FC/100 ml	*Ec*/100 ml	isolates
10:30				15,600	14,400	8
11:30	304,000	304,000	1			
11:47				20,400	18,800	9
12:30	236,000	212,000	6			

Sample time	HHPS069 FC/100 ml	HHPS069 *Ec*/100 ml	Ribotype isolates	HHPS182 FC/100 ml	HHPS182 *Ec*/100 ml	Ribotype isolates
13:16				136,000	120,000	5
14:00	180,000	172,000	6			
14:43				1,120,000	1,120,000	8
15:45	140,000	120,000	3			
16:09				180,000	172,000	5
16:50	72,000	72,000	8			

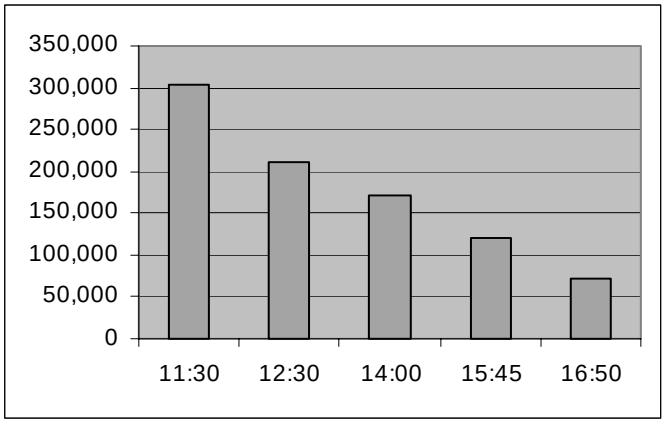

Figure 1 Site HHPS069 *E. coli* concentrations throughout the storm event.

Source Species Identification

The Hampton Harbor and New Hampshire source species databases were used to identify sources for 24 and 35 isolates from water samples taken from HHPS069 and HHPS182, respectively. Banding patterns for water sample and source species isolates were considered to be the same if there was 90% or greater similarity with reference isolates. Overall, sources for 78% of the 59 isolates were identified (Table 3).

Table 3 Identified source species (90% similarity) for 59 *E. coli* strains isolated in effluent from two stormdrain pipes.

Source	HHPS069	HHPS182	Both sites	%
human/wastewater	3	9	12	0.20
cormorant	3	8	11	0.19
goose	6	1	7	0.12
fox	3	2	5	0.08
raccoon	0	2	2	0.03
coyote	0	2	2	0.03
cat	0	2	2	0.03
seagull	1	1	2	0.03

Source	HHPS069	HHPS182	Both sites	%
dog	1	1	2	0.03
pigeon	1	0	1	0.02
Total	18	28	46	
%	0.75	0.80	0.78	
Unknowns	6	7	13	
%	0.25	0.20	0.22	

Source Species for Pollution Source HHPS069

Source species identification was successful for 18 of the 24 *E. coli* isolates (75%) from HHPS069 (Table 3). The most common source species was goose (6 isolates), followed by cormorant, fox and wastewater (3 isolates each). One isolate was identified for each of the following species: dog, pigeon and seagull. The timing of the appearance of the source species showed no clear trends, except that the goose isolates did not appear until the third sample (Table 4). Table 5 summarizes the identified source species by type. Birds were the most commonly identified source type (46%), followed by humans and wildlife (each at 13%) and pets (4%).

Table 4 Temporal identification of source species for *E. coli* in effluent from two stormdrain pipes.

Site HHPS	Time	cat	cormorant	coyote	dog	fox	goose	pigeon	raccoon	seagull	wastewater
069A	11:30										
069B	12:30		2			1		1			1
069C	14:00				1	1	2				
069D	15:45						3				
069E	16:50		1			1	1			1	2
	Total	**0**	**3**	**0**	**1**	**3**	**6**	**1**	**0**	**1**	**3**
182A	10:30	1	2			1	1			1	2
182B	11:47		1	2							3
182C	13:16	1									2
182D	14:43		4			1			2		1
182E	16:09		1		1						1
	Total	**2**	**8**	**2**	**1**	**2**	**1**	**0**	**2**	**1**	**9**
	Overall	***2***	***11***	***2***	***2***	***5***	***7***	***1***	***2***	***2***	***12***

Table 5 Identified source species types at two storm pipes in Hampton Harbor during a storm event on October 16, 2002.

Source species type	HHPS069		HHPS182		Both pipes	
	# of isolates	%	# of isolates	%	# of isolates	%
Human (wastewater)	3	13%	9	26%	12	20%
Pets	1	4%	3	9%	4	7%
Birds	11	46%	10	29%	21	36%
Livestock	0	0%	0	0%	0	0%
Wildlife	3	13%	6	17%	9	15%
Unidentified	6	25%	7	20%	13	22%
Total isolates	**24**		**35**		**59**	

Source Species for Pollution Source HHPS182

Source species identification was successful for 28 of the 35 *E. coli* isolates (80%) from HHPS182 (Table 3). The most common source was wastewater with 9 isolates, followed by cormorant with 8 isolates, and cat, coyote, fox and raccoon with 2 isolates each. One isolate was identified for each of three other species: dog, goose and seagull. The timing of the appearance of the source species showed wastewater and cormorant sources appeared consistently through the sampling period (Table 4). The *E. coli* concentration was much higher for the fourth sample (Table 2), and cormorants were the most commonly identified source. Fox, raccoon and wastewater were also identified in the fourth sample.

Table 5 summarizes the identified source species by type. Birds (29%) and humans (26%) were the most commonly identified source types, followed by wildlife (14%) and pets (9%).

Source Species for Both Pipes

The source species identified for both pipes showed wastewater to be the most common source (12 isolates), followed by cormorant (11), goose (7) and fox (5) (Table 5). Two isolates were identified for each of the following: cat, coyote, dog, raccoon and seagull. One pigeon isolate was identified. Table 5 shows the overall most common type of source was birds (36%), followed by humans (20%), wildlife (15%) and pets (7%).

Conclusions

The present study represents the third published report on use of ribotyping to identify source species on New Hampshire estuarine waters. As such, the procedures and interpretations used have benefited from lessons learned in past studies (Jones and

Landry, 2003; Jones, 2002), and changes were made. Previous ribotyping studies in New Hampshire involved use of non-automated ribotyping procedures. The recent purchase of a fully automated RiboPrinter at UNH/JEL has provided the capacity to conduct ribotyping more rapidly, with more consistency and at a lower cost. The most striking difference resulting from use of a RiboPrinter in this study is the higher level of similarity (90%) used to provide for a reasonable percentage of identified isolates (78%). This means that the identified isolates were more accurately matched to source species than in previous reports where 80% similarity was used.

Another difference in approach used for this study compared to previous studies in New Hampshire was use of two source species databases. A local database was used first to identify sources, and then the larger state database was used to identify sources of isolates that did not meet the threshold similarity index in matching to known source ribotypes in the local database. This approach was used to see how well a small, local database works compared to a larger database. Both databases were still quite closely related from a geographic standpoint, as all ribotypes in the state database were collected from species in communities adjacent to the Great Bay Estuary, the Atlantic coast or Hampton Harbor.

There were distinct differences in identified source species for the two pipes. These differences probably reflect differences in species that are present and depositing fecal material to the drainage area. There are numerous factors that could affect the appearance of the different source species in the effluent from the two pipes. Some species may inhabit or have some presence in the pipe/drainage system prior to the storm. In the case of wastewater/human sources, these could include leaky sewer pipes underground that may cross the storm drainage pipes. The timing of the appearance of source species probably reflects time required for transport of the fecal material with runoff to the end of the pipe. The feces from birds on rooftops may take longer to reach the end of the pipes than pet waste deposited on sidewalks.

The types of source species identified were of interest. Many storm water/runoff studies have attributed fecal contamination to pet wastes. Of the four types of sources identified, pets were the least common, behind birds, humans and wildlife. It may be that pets are not common in the drainage area during October, while birds may be much more prevalent.

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Executive Overview

NRDC's annual analysis of water quality and public notification data at coastal U.S. beaches found that the number of beach closing and advisory days in 2011 reached the third-highest level in the 22-year history of our report, totaling 23,481 days (a 3 percent decrease from 2010). More than two-thirds of closings and advisories were issued because bacteria levels in beachwater exceeded public health standards, potentially indicating the presence of human or animal waste in the water. The portion of all monitoring samples that exceeded national recommended health standards for designated beach areas remained stable at 8 percent in 2011, compared with 8 percent in 2010 and 7 percent for the four previous years. In addition, the number of beaches monitored in 2011 increased slightly (2 percent) from a five-year low in 2010. The largest known source of pollution was stormwater runoff (47 percent, compared with 36 percent last year). The 2011 results confirm that our nation's beaches continue to experience significant water pollution that puts swimmers and local economies at risk.

NRDC continues to push for improvements in beachwater quality standards and test methods. Most recently, the Environmental Protection Agency proposed an action that could leave the public inadequately protected if it is not strengthened—one establishing recommended standards for beach officials to use to keep people from being exposed to unsafe levels of disease-causing bacteria and viruses. While beachwater quality standards are critical, ultimately the most important long-term action is to adopt 21st-century solutions that address the sources of beachwater pollution, particularly stormwater runoff. The most important of these solutions remains incentivizing and implementing green infrastructure in our cities, such as green roofs, porous pavement, and street plantings, which stop rain where it falls. Green infrastructure effectively reduces the amount of runoff that makes its way into beachwater or triggers harmful sewage overflows, transforming potential beach pollution into a tremendous local water supply resource.

POLLUTED BEACHWATER MAKES SWIMMERS SICK AND HURTS COASTAL ECONOMIES

The Environmental Protection Agency (EPA) has estimated that up to 3.5 million people become ill from contact with raw sewage from sanitary sewer overflows each year.[1] Many public health experts believe that the number of illnesses caused by untreated sewage could be much higher than is currently recognized because people who get sick from swimming in polluted recreational waters are not always aware of the cause of their illness and do not report it to doctors or local health officials.

Illnesses associated with polluted beachwater include stomach flu, skin rashes, pinkeye, respiratory infections, meningitis, and hepatitis. Children are especially vulnerable, perhaps because they tend to submerge their heads more often than adults and are more likely to swallow water when swimming. The Centers for Disease Control and Prevention concluded that the incidence of infections associated with recreational water use has steadily increased over the past several decades:[2] one study found that swimmers at polluted beaches in the Great Lakes region were more likely to have gastrointestinal illnesses than nonswimmers;[3] another study found that fecal contamination at Los Angeles and Orange County beaches caused between 627,800 and 1,479,200 excess gastrointestinal illnesses each year.[4]

Our coasts provide more than just local recreation—approximately 85 percent of all U.S. tourism revenue is received in coastal states. According to a 2009 report by the National Ocean Economics Program, the nation's shoreline-adjacent counties contributed an estimated $6 trillion to the nation's gross domestic product and 47 million jobs.[5] With respect to beaches specifically, economists estimate that a typical swimming day is worth approximately $35 to each individual,[6] so depending on the number of potential visitors to a beach, the "consumer surplus" loss on a day that the beach is closed or under advisory for water quality problems can be quite significant. For example, one study estimated that economic losses as a result of closing a Lake Michigan beach due to pollution could be as high as $37,030 per day.[7] Similarly, the Los Angeles/Orange County study mentioned above concluded that the public health cost of the excess gastrointestinal illnesses caused by poor water quality was $21 million to $51 million per year.[8]

CLOSINGS AND ADVISORIES FOR 2011

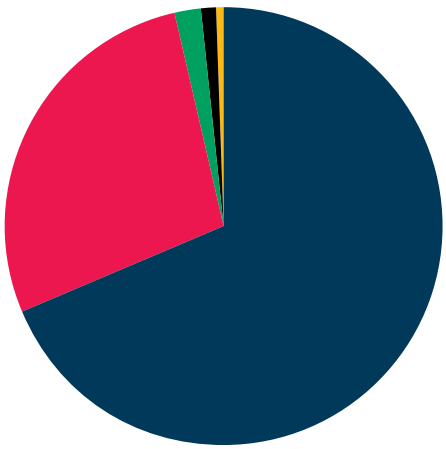
In 2011, the number of closing and advisory days at ocean, bay, and Great Lakes beaches reached its third-highest level since NRDC began tracking these events 22 years ago: 23,481 days nationwide. This is a decrease of 3% (610 days) from the previous year.

In addition, there were 56 closing and advisory events that lasted more than six but not more than 13 consecutive weeks (extended events), and 64 closing and advisory events that lasted more than 13 consecutive weeks (permanent events). Including closing and advisory days that occurred during extended events (3,440 days), the total number of beach closing and advisory days in 2011 comes to 26,921.

The BP oil disaster, which began with the April 20, 2010, explosion on the Deepwater Horizon rig and ended when the well was capped on July 15, 2010, continues to affect beaches along the Gulf of Mexico in Louisiana, Mississippi, Alabama, and Florida. Oil spill inspection and cleanup efforts continued throughout 2011 and into 2012, even at beaches whose oil spill closures, advisories, and notices were lifted. A total of 1,984 closing days at nine Louisiana beach segments and 360 oil spill notice days at two Florida beaches were issued due to the spill in 2011. Four beach segments in Louisiana were closed due to oil for a total of 528 days in the first part of 2012. Over the course of two years, the oil spill resulted in more than 10,000 beach closure, advisory, and notice days at 88 beaches and beach segments in four states. (NRDC includes all oil spill advisory, closure, and notice days at all beaches in its oil spill totals, including days at beaches that were not monitored for bacteria and days that occurred outside of the monitoring season.)

The continued high level of closings and advisories is an indication that serious water pollution persists at our nation's beaches. The most common reason officials cited for closing beaches or issuing advisories in 2011 was testing that revealed bacteria levels that exceeded beachwater quality standards, indicating the potential presence of human or animal waste in the beachwater. Advisories and closings issued as a precaution when poor water quality was suspected were the second-most common type of notification (see Figure EO-1: Reasons Officials Closed Beaches or Issued Advisories in 2011).

Figure EO-1: Reasons Officials Closed Beaches or Issued Advisories in 2011



- 69% (16,240 days) Monitoring detected bacteria levels exceeding beachwater quality standards.
- 28% (6,559 days) Precautionary actions issued because of excessive rainfall, which, at many beaches, leads to stormwater runoff that carries pollution to swimming waters.
- 2% (582 days) Other precautionary actions, predominantly due to algae and storm-related swimmer safety concerns such as riptides and high waves.
- 1% (335 days) Known pollution events, such as sewage treatment plant failures or breaks in sewage pipes; in these cases, localities did not wait for monitoring results before deciding to close beaches or issue advisories.
- Less than 1% (34 days) Preemptive, due to real-time computer modeling using readily measurable physical parameters, such as wind speed and wave height, to predict indicator bacteria levels.

Totals exceed 100 percent and the number of closing and advisory days discussed in this section because 11 events in New York State were both preemptive (because of rain/poor water clarity) and due to monitoring that revealed high bacteria levels.

POLLUTION SOURCES THAT CAUSED CLOSINGS AND ADVISORIES IN 2011

Most beach closings are issued because beachwater monitoring detects unsafe levels of bacteria. These unsafe levels indicate the presence of pathogens—microscopic organisms from human and animal waste that pose a threat to human health. The key reported contributors of these contaminants are (1) stormwater runoff, (2) sewage overflows and inadequately treated sewage, (3) agricultural runoff, and (4) other sources, such as beachgoers themselves, wildlife, septic systems, and boating waste.

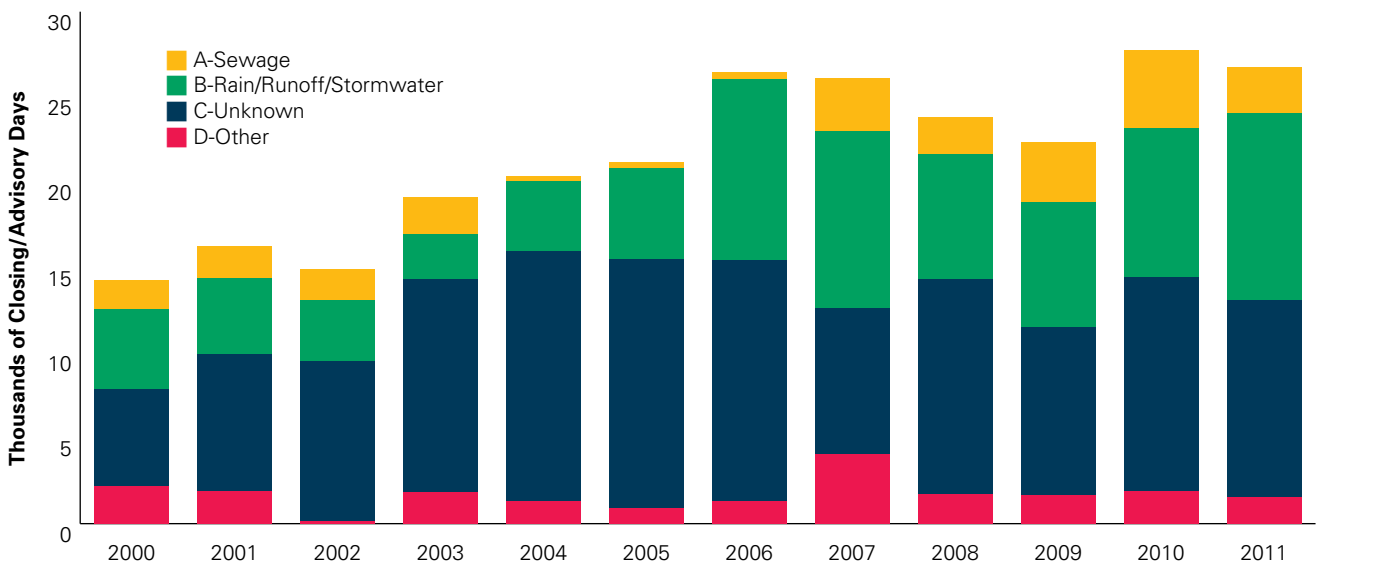
Advisories may also be issued as precautionary measures when a pollution event is expected to occur, for instance during rainstorms. (See also Figure EO-2: Sources of Pollution That Caused Closings/Advisories, 2000–2011.)

For advisory and closing days issued during events that lasted six weeks or less:

- 49 percent (11,588 closing/advisory days) were attributed to unknown sources of pollution.
- 47 percent (10,954 closing/advisory days) were attributed to polluted runoff and stormwater. In 2010, 36 percent of closing advisory/days were attributed to polluted runoff and stormwater.
- 12 percent (2,690 closing/advisory days) were attributed to miscellaneous pollution sources, such as boat discharges. Of those, 1,366 days were attributed to wildlife sources.
- 6 percent (1,541 closing/advisory days) were attributed to sewage spills and overflows. This category includes combined sewer overflows, sanitary sewer overflows, breaks or blockages in sewer lines, and faulty septic systems.

(Totals exceed total closing/advisory days and 100 percent because more than one contamination source was reported for some events.)

Figure EO-2: Sources of Pollution That Caused Closings/Advisories, 2000–2011



Total days shown are greater than annual totals because more than one pollution source may have contributed to each closing/advisory.
Key: (A) Sewage spills and overflows. (B) Polluted runoff, stormwater, or preemptive due to rain. (C) Unknown. (D) Other reasons (including closings/advisories with no source information provided).

BEACHWATER MONITORING FOR 2011

In 2011, the portion of all monitoring samples exceeding national recommended health standards for designated beach areas, indicating the potential presence of human or animal waste, remained steady at 8 percent, the same level as in 2010 (7 percent in 2009, 2008, 2007, and 2006). Louisiana, Ohio, Illinois, Indiana, Connecticut, and Wisconsin had the highest percentage of samples exceeding the EPA's recommended single-sample maximum for designated beach areas (see Table EO-1: Rank of States by Percentage of Beachwater Samples Received Exceeding the National Recommended Standard in 2011).[9]

Table EO-1: Rank of States by Percentage of Beachwater Samples Received Exceeding the National Recommended Standard in 2011

Rank	Percent Exceedance	State	2011 Total Samples	Beaches With Reported Monitoring Results
1	1%	Delaware	523	25
2	1%	New Hampshire	1,144	16
3	3%	North Carolina	6,762	240
4	3%	New Jersey	4,187	226
5	3%	Florida	13,288	306
6	4%	Virginia	901	47
7	4%	Hawaii	4,107	158
8	5%	Texas	7,267	66
9	5%	Georgia	1,023	27
10	6%	Washington	1,156	78
11	6%	Maryland	772	70
12	6%	Massachusetts	8,160	597
13	6%	Alabama	991	25
14	6%	Oregon	956	27
15	7%	Pennsylvania	1,005	10
16	7%	Rhode Island	1,752	70
17	8%	South Carolina	2,389	22
18	8%	Michigan	12,474	232
19	8%	Mississippi	1,136	22
20	9%	Maine	1,310	61
21	9%	California	24,659	497
22	9%	Minnesota	1,014	50
23	10%	Alaska	208	12
24	10%	New York	9,133	352
25	11%	Wisconsin	4,428	114
26	11%	Connecticut	2,322	72
27	11%	Indiana	2,976	31
28	12%	Illinois	4,056	51
29	22%	Ohio	2,937	62
30	29%	Louisiana	850	25

The percent exceedances shown in this table are rounded to the nearest whole number, but state ranks are based on percent exceedances to one or two decimal places.

Ways in Which NRDC's Report Differs From the EPA's Beach Report

Most years, the U.S. Environmental Protection Agency (EPA) also issues a beach report summarizing closing/advisory information (see water.epa.gov/type/oceb/beaches/upload/national_facsheet_2011.pdf). NRDC's report is much different from the EPA report.

1. NRDC includes an analysis of monitoring data and compares states and beaches using the available water quality data.
2. NRDC provides state-by-state reporting and analysis of individual beach programs.
3. With respect to closings and advisories, NRDC reports the total number of days and focuses its analysis on events lasting up to six consecutive weeks. Events lasting longer are grouped as either extended or permanent events. EPA reports the number of beaches with closings or advisories and the percentage of total "beach days" that were affected.
4. NRDC analyzes reported contamination sources associated with closings and advisories.
5. NRDC reports closings and advisories beyond monitored beaches. (In 2011, excluding Hawaii, there were 404 closing/advisory days at 19 non-monitored beaches in four states, plus 2 extended and 3 permanent events. Hawaii adds another 3,116 days at 209 beaches.)

Regionally, the Great Lakes had the highest exceedance rate (11 percent) in 2011, followed by western states (8 percent), New England (7 percent), the New York-New Jersey region (6 percent), the Gulf Coast (6 percent), the Delmarva region (4 percent), and the Southeast (3 percent).

For the sixth consecutive year, NRDC determined the number of beaches exceeding the national recommended daily standard more than 25 percent of the time. In 2011, this list included 159 beaches in 22 states, a decrease from 171 beaches in 22 states in 2010. Nineteen beach areas in 7 states (California, Illinois, Louisiana, New Jersey, New York, Ohio, and Wisconsin) made this list in each of the last five years, 2007 through 2011 (see Table EO-2: Repeat Offenders: Beaches With More Than 25 Percent of Samples Received Exceeding the EPA's Applicable Recommended Single-Sample Maximum Bacteria Standards for Designated Beach Areas, Each Year, 2007–2011). Chronically high bacteria counts indicate that the beachwater is probably contaminated with human or animal waste.

It is important to note that while a high percent exceedance rate is a clear indication of contaminated coastal recreational waters, it is not necessarily an indication that the state's beachwater quality monitoring program is deficient or fails to protect public health when beachwater quality is poor. For example, four of the five states with the highest exceedance rates always or almost always close a beach or issue an advisory when a sample exceeds the recommended standard. That is, they do not wait for the results of a resample or check other conditions first, as some other states do.

Table EO-2: Repeat Offenders: Beaches With More Than 25 Percent of Samples Received Exceeding the EPA's Applicable Single-Sample Maximum Bacteria Standards for Designated Beach Areas, Each Year, 2007–2011

State	County	Beach	Tier	Assigned Monitoring Frequency	Potential Pollution Sources (Reported by EPA)
California	Los Angeles	Avalon Beach 100 feet west of the Green Pleasure Pier	1	1/wk	unknown
California	Los Angeles	Avalon Beach 50 feet east of the Green Pleasure Pier	1	1/wk	unknown
California	Los Angeles	Avalon Beach 50 feet west of the Green Pleasure Pier	1	1/wk	unknown
California	Orange	Doheny State Beach, 1000' South Outfall	1	3/wk	unknown
California	Orange	Doheny State Beach, North of San Juan Creek	1	3/wk	unknown
California	Orange	Doheny State Beach, Surfzone at Outfall	1	3/wk	unknown
Illinois	Cook	Winnetka Elder Park Beach	1	Daily	unknown
Illinois	Lake	North Point Marina Beach	1	4/wk	unknown
Louisiana	Cameron	Constance Beach	2	1/wk	unknown
Louisiana	Cameron	Gulf Breeze	2	1/wk	unknown
Louisiana	Cameron	Little Florida	2	1/wk	unknown
Louisiana	Cameron	Long Beach	2	1/wk	unknown
Louisiana	Cameron	Rutherford Beach	2	1/wk	unknown
New Jersey	Ocean	Beachwood Beach West	1	1/wk	Stormwater, Wildlife
New York	Erie	Woodlawn Beach - Woodlawn Beach State Park	1	1/wk	stormwater, combined sewer overflow, sanitary sewer overflow, wastewater treatment plants, other
New York	Monroe	Ontario Beach	1	Daily	stormwater, agriculture, concentrated animal feeding operations, combined sewer overflow, sanitary sewer overflow, wildlife, other
Ohio	Cuyahoga	Euclid State Park	1	Daily	unknown
Ohio	Cuyahoga	Villa Angela State Park	1	Daily	unknown
Wisconsin	Milwaukee	South Shore Beach	1	3/wk	unknown

For 2011, the NRDC data set includes monitoring results for 123,886 samples at 3,325 beaches and beach segments (most state and local officials divide longer beaches into manageable sections for monitoring).[10] Although more beaches were monitored in 2011 than in 2010, fewer samples were collected (131,389 samples were taken at 3,277 beaches and beach segments in 2010).

METHODS BEACH OFFICIALS USE TO SAMPLE, MONITOR, AND/OR PREDICT BEACHWATER QUALITY

Beach officials in all states continue to use traditional methods approved by the EPA that require about 24 hours to quantify bacterial indicator levels in beachwater samples. Because of this, swimmers do not know until the next day if the water they swam in was contaminated. Likewise, beaches may remain closed even after water quality meets standards. There is a great deal of interest in technologies that can provide same-day beachwater quality results. In 2010, pilot studies in Racine, Wisconsin, and in Orange County, California, made the first use of a rapid test method for issuing beachwater quality notifications at coastal beaches in the United States. Additional pilot projects using rapid test methods to issue notifications were conducted in 2011 in Los Angeles County, California; Ocean County, New Jersey; and Racine. All of these pilot studies were demonstrating quantitative polymerase chain reaction (qPCR), an analytical method that quantifies the presence of a targeted genetic sequence. Traditional methods were used to analyze the samples alongside qPCR analysis, and the qPCR results, either alone or in combination with culture method results, were used to determine whether warnings about beachwater quality would be issued and posted. Other states, including Ohio and Michigan, have conducted field research on rapid test methods but have not used them to issue notifications.

Beachwater quality generally depends on many complex factors, but for some beaches, predictions of water quality can be calculated fairly accurately on the basis of measurements of a few physical conditions. Some states have taken advantage of this by creating computer models that rely on data such as rainfall level, wind speed and direction, tides, wave height, and currents. These models rapidly prepare predictions of beachwater quality and allow officials to close beaches or place them under advisory on the day that bacterial levels are expected to be high, rather than 24 hours later. States using computer models to inform closing and advisory decisions for at least some of their beaches in 2011 were California, Illinois, Indiana, New York, Ohio, and Wisconsin. Other states, including Michigan, Minnesota, and Pennsylvania, were building predictive models to use at some of their beaches in the future.

Because the water quality at many beaches is adversely impacted by contaminated stormwater runoff, another means of protecting public health—less sophisticated but often effective—is to preemptively close beaches or issue advisories when indicator bacteria levels are expected to be high after rainfall events. Many states report that they have developed standards for issuing preemptive rainfall advisories based on rainfall intensity or some other rain-related factor for at least some of their beaches. California, Connecticut, Delaware, Florida, Hawaii, Maine, Massachusetts, Michigan, New Jersey, New York, Rhode Island, South Carolina, and Wisconsin all have quantitative rainfall standards at some of their beaches, and New Hampshire is developing them. Ten states reported preemptive rainfall closures or advisories at specific beaches in 2011: California, Connecticut, Hawaii, Illinois, Maine, Massachusetts, Michigan, New Jersey, New York, and Wisconsin.

Some states, including California, Maryland, Minnesota, Mississippi, North Carolina, Rhode Island, South Carolina, and Washington, issue standing advisories warning the public to avoid beachwater contact after heavy rainfall or when storm drains are running. (These standing advisories are not reported in the closing and advisory data that the states send to the EPA.) For example, in North Carolina standing rainfall advisories take the form of permanent signs posted on either side of storm drain outfalls stating that swimming between the signs is not recommended when there is water flowing through the drain.

FACTORS THAT CONFOUND INTERPRETATION OF THE RESULTS

Although it is understandable to expect a correlation between year-to-year changes in water quality and the number of closing/advisory days, there are confounding factors that make such correlations unlikely. While year-to-year change in the percentage of monitoring samples that exceed health standards is an objective assessment of water quality, a year-to-year change in the total number of closing/advisory days is subject to differences in programs and practices. For example, some states or localities:

- **Take multiple samples at each monitoring station.** When making closing/advisory decisions, beach officials might use the average value of all samples taken that day. Using this method, the average value might not exceed the standard even though one (or more) of the multiple samples does. In such a case, the beach would not be closed or put under advisory. Despite this variety of practices, NRDC includes the results of every reported sample when calculating the percent of all samples that exceed the standard in a given year.

- **Resample a beach after an exceedance before issuing a closing or advisory.** In some places, an exceedance triggers a resample, and if the resample does not exceed the standard, the beach is not put under closing or advisory.

- **Preemptively close a beach or issue an advisory without waiting for the results of beachwater monitoring.** In some places, officials may act without current monitoring information if they suspect that pollution has affected beachwater quality or if there are non-pollution reasons to close a beach or issue an advisory. The reasons for these preemptive actions may include heavy rainfall events, known sewage leaks, chemical spills, and high winds and waves.

- **Continue monitoring at beaches that are closed for more than six consecutive weeks during the reporting year.** NRDC does not include extended or permanent beach closings or advisories when comparing closing/advisory days from year to year, but the monitoring data collected at these beaches are included in the percent exceedance analysis.

- **Continue monitoring at beaches that have been closed for reasons other than pollution.** Some places collect monitoring data even at beaches that are closed due to factors such as budget cuts or low attendance. While routine samples continue to be collected and their results reported to the EPA, the beach closing days may not be reported, or they may occur during events that are classified as extended or permanent and excluded from NRDC's analysis.

Also, year-to-year changes in beach monitoring frequency could impact the total number of closing/advisory days but not the percentage of samples that exceed health standards. For example, increasing routine monitoring from once every two weeks to once a week could decrease the number of closing/advisory days for the same number of events because the duration of many events could go from two weeks to one.

RECOMMENDATIONS FOR IMPROVING BEACHWATER QUALITY

To improve beachwater quality nationwide, our leaders need to adopt policies that clean up the sources of beach pollution. There are numerous things that federal, state, and local officials can do to rein in the sources of beach contamination and to improve beachwater monitoring and public information. For example, the federal government can and should increase its contribution to the Clean Water State Revolving Fund, which provides critical assistance for projects that repair and rebuild failing water and wastewater infrastructure. However, there are two national actions that the Environmental Protection Agency (EPA) is undertaking that would have the most significant impact on efforts to make beaches cleaner and safer for swimming.

EPA is working on a pair of initiatives—one establishing recommended standards for beach officials to use to keep people from being exposed to unsafe levels of disease-causing bacteria and viruses, and one that will curb a principal source of contaminants flowing to the nation's waters and polluting our beaches. The agency will finalize its recreational water safety standards in October and will propose revisions to the national requirements for sources of polluted runoff in the next year.

Cleaning Up Polluted Runoff: Stormwater runoff is the most frequently identified source of beach closings and advisory days, and EPA estimates that more than 10 trillion gallons of untreated stormwater make their way into our surface waters each year.[11]

Often, the best way of avoiding runoff-related pollution is to reduce the volume of stormwater flowing into the storm drains that carry it to nearby water bodies or, in some cases, to sewage treatment plants. Green infrastructure, which restores or mimics natural conditions, allows rainwater to infiltrate into the soil, thereby reducing the volume of runoff. Green infrastructure includes the use of porous pavement, green roofs, parks, roadside plantings, and rain barrels to stop rain where it falls, either storing it or letting it filter into the ground naturally. This keeps stormwater runoff from overloading sewage systems and triggering overflows or from carrying pollutants into natural bodies of water.

These smarter water practices on land not only prevent pollution at the beach but also beautify neighborhoods, cool and cleanse the air, reduce asthma and heat-related illnesses, save on heating and cooling energy costs, boost economies, and support American jobs. Many cities and states have embraced green infrastructure practices.

Consequently, EPA needs to make overdue changes to reform its water pollution regulations for stormwater sources. Strong stormwater retention requirements will help spur widespread implementation of green infrastructure and help keep urban and suburban runoff from reaching beaches. EPA's rules must require new and redeveloped impervious areas—wherever they are located—to infiltrate, evaporate, or reuse the rain that falls on such sites, and must ensure that existing sources of runoff pollution are similarly controlled to meet water quality goals.

Likewise, federal, state, and municipal leaders must use existing authorities—such as Clean Water Act permitting, development of sewage overflow control plans, and local planning responsibilities—to promote green infrastructure and reduce runoff-related contamination problems. NRDC's recent report *Rooftops to Rivers II*[12] spotlights how numerous cities around the country are embracing green infrastructure to address runoff pollution and improve the health of our communities. These leaders have demonstrated the feasibility of green infrastructure solutions and are paving the way for policies that advance green infrastructure nationally.

Standards to Protect Beachgoers: EPA is responsible for ensuring that recreational waters are safe for people. One element of this responsibility is establishing criteria—recommended standards—for contaminants in the water, which are supposed to be set at a level sufficient to protect public health. Unfortunately, EPA is proposing new allowable bacteria levels in recreational waters that miss a critical opportunity to better protect the public from the dangers of swimming in polluted water. In fact, in some respects the draft criteria are even less protective than the 25-year-old criteria they would replace. Sound science and good public policy demand better recreational water quality criteria than what EPA is proposing to finalize before October 15, 2012.

Most egregiously, the draft criteria are based on what EPA has determined is an acceptable gastrointestinal illness risk of 3.6 percent. That is, EPA believes it is acceptable for 1 in 28 swimmers to become ill with gastroenteritis from swimming in water that just meets its proposed water quality criteria. This risk is unacceptably high and is not protective of public health. Additionally, EPA does not adequately consider the risks of other health effects such as rashes and ear, eye, and sinus infections, all of which are commonly experienced by swimmers at U.S. beaches. EPA also fails to base the draft criteria on the most recent and best available science.

To address these flaws, EPA must revise the level of acceptable risk so that it is protective of public health. To do so, the latest and best scientific evidence needs to be utilized to determine appropriate water contamination "cut points," above which the public is subject to unacceptable additional health risks on the order of 1 in 100 instead of 1 in 28. The criteria also must adequately address non-gastrointestinal illnesses, such as rash and ear infections. Other needed improvements are discussed in this report's policy recommendations section.

Notes

1 U.S. Environmental Protection Agency (EPA), "Notice of Proposed Rulemaking, NPDES Permit Requirements for Municipal Sanitary Sewer Collection Systems, Municipal Satellite Collection Systems, and Sanitary Sewer Overflows," January 4, 2001; withdrawn January 20, 2001.

2 Yoder, J.S., et al., "Surveillance for Waterborne Disease and Outbreaks Associated with Recreational Water Use and Other Aquatic Facility–Associated Health Events—United States, 2005–2006," Centers for Disease Control and Prevention, September 12, 2008/57(SS09) pp. 1-29, available at www.cdc.gov/mmwr/pdf/ss/ss5709.pdf.

3 Wade, T.J., et al., "Rapidly Measured Indicators of Recreational Water Quality Are Predictive of Swimming-Associated Gastrointestinal Illness," *Environmental Health Perspectives*, Vol. 114, No. 1, January 2006, pp. 24-28.

4 Given, S., et al., "Regional Public Health Cost Estimates of Contaminated Coastal Waters: A Case Study of Gastroenteritis at Southern California Beaches," *Environmental Science and Technology*, 40, 2006, p. 4,851.

5 National Ocean Economic Program, Market Data, Coastal Economy Data, Shore Adjacent Coastal Zone Counties, http://noep.mbari.org/Market/coastal/coastalEcon.asp.

6 Rabinovici, S.J., et al., "Economic and Health Risk Trade-Offs of Swim Closures at a Lake Michigan Beach," *Environmental Science and Technology*, Vol. 38, No. 10, 2004, pp. 2,742.

7 Id.

8 Given et al.

9 For the seventh consecutive year, NRDC used the BEACH Act's single-sample maximum standards for designated beach areas to compare water quality at U.S. beaches. For marine waters, the standard for enterococcus density is 104 cfu per 100 milliliters; for freshwater, the standard is 235 cfu *E. coli* per 100 milliliters.

10 For this year's report, NRDC began to count each managed beach segment of longer beaches in California as individual beaches themselves. This was prompted by California's update of the beach identification system it uses to report beach monitoring and notification data to EPA. For purposes of comparison with previous years, however, NRDC used the older beach identification/counting system.

11 EPA, "Report to Congress: Impacts and Control of CSOs and SSOs," April 26, 2004, EPA 833-R-04-001, pp. 4-29, available at cfpub.epa.gov/npdes/cso/cpolicy_report2004.cfm.

12 Natural Resources Defense Council, *Rooftops to Rivers II: Green Strategies for Controlling Stormwater and Combined Sewer Overflows* (November 2011), available at www.nrdc.org/water/pollution/rooftopsII/default.asp.

Independent Sector's Value of Volunteer Time

National Value of Volunteer Time

The estimated value of volunteer time for 2012 is 22.14 per hour.[1]

The estimate helps acknowledge the millions of individuals who dedicate their time, talents, and energy to making a difference. Charitable organizations can use this estimate to quantify the enormous value volunteers provide.

According to the Corporation for National and Community Service, about 63.4 million Americans, or 26.3 percent of the adult population, gave 8.1 billion hours of volunteer service worth $173 billion in 2010.[2] For the latest information, please see www.volunteeringinamerica.gov.

For more information on the economic impact of nonprofits by state, please visit our state profiles portal.

State Values for Volunteer Time

Value of a Volunteer Hour, by State: 2011

Please note that 2011 is the latest year for which state-by-state numbers are available. There is a lag of almost one year in the government's release of state level data which explains why the state volunteering values are one year behind the national value.

Alabama: $18.26	Indiana: $18.33	Nebraska: $17.10	South Carolina: $17.20
Alaska: $21.96	Iowa: $17.55	Nevada: $18.97	South Dakota: $15.99
Arizona: $20.08	Kansas: $18.45	New Hampshire: $21.70	Tennessee: $19.42
Arkansas: $16.77	Kentucky: $17.91	New Jersey: $25.91	Texas: $22.57
California: $24.75	Louisiana: $19.33	New Mexico: $17.62	Utah: $18.19
Colorado: $22.43	Maine: $17.03	New York: $28.73	Vermont: $18.00
Connecticut: $28.26	Maryland: $23.05	North Carolina: $19.09	Virginia: $22.90
Delaware: $23.02	Massachusetts: $27.43	North Dakota: $19.18	Washington: $22.69
Dist. of Columbia: $34.04	Michigan: $20.63	Ohio: $19.23	West Virginia: $17.57
Florida: $18.85	Minnesota: $21.91	Oklahoma: $18.28	Wisconsin: $18.50
Georgia: $20.77	Mississippi: $15.58	Oregon: $19.33	Wyoming: $19.54
Hawaii: $18.14	Missouri: $19.00	Pennsylvania: $21.25	Puerto Rico: $11.39
Idaho: $16.13	Montana: $15.73	Rhode Island: $19.82	Virgin Islands: $16.03
Illinois: $23.19			

Learn more about these figures, including how they are calculated and how nonprofit organizations often use them, at the bottom of the page.

History of the Dollar Value of a Volunteer Hour: 1980 - 2012

1980: $7.46	**1991:** $11.76	**2002:** $16.74
1981: $8.12	**1992:** $12.05	**2003:** $17.19
1982: $8.60	**1993:** $12.35	**2004:** $17.55
1983: $8.98	**1994:** $12.68	**2005:** $18.04
1984: $9.32	**1995:** $13.05	**2006:** $18.77
1985: $9.60	**1996:** $13.47	**2007:** $19.51
1986: $9.81	**1997:** $13.99	**2008:** $20.25
1987: $10.06	**1998:** $14.56	**2009:** $20.85
1988: $10.39	**1999:** $15.09	**2010:** $21.36
1989: $10.82	**2000:** $20.85	**2011:** $21.79
1990: $11.41	**2001:** 16.27	**2012:** $22.14

SECTOR IMPACT

CHARTING IMPACT

VALUE OF VOLUNTEER TIME
National Volunteer Week

SCOPE OF THE SECTOR

THE SECTOR'S ECONOMIC IMPACT

WHAT IS A NONPROFIT?

Please note: Values starting in 1990 were adjusted to reflect a new data series released by the Bureau of Labor Statistics.

How the Numbers are Calculated

The value of volunteer time is based on the hourly earnings (approximated from yearly values) of all production and non-supervisory workers on private non-farm payrolls average (based on yearly earnings provided by the Bureau of Labor Statistics). Independent Sector indexes this figure to determine state values and increases it by 12 percent to estimate for fringe benefits.

Charitable organizations most frequently use the value of volunteer time for recognition events or communications to show the amount of community support an organization receives from its volunteers.

According to the Financial Accounting Standards Board (FASB), the value of volunteer services can also be used on financial statements - including statements for internal and external purposes, grant proposals, and annual reports - only if a volunteer is performing a specialized skill for a nonprofit. The general rule to follow when determining if contributed services meet the FASB criteria for financial forms is to determine whether the organization would have purchased the services if they had not been donated. Accounting specialists may visit FASB's website for regulations on use of the value of volunteer time on financial forms: http://www.fasb.org/pdf/fas116.pdf.

It is very difficult to put a dollar value on volunteer time. Volunteers provide many intangibles that can not be easily quantified. For example, volunteers demonstrate the amount of support an organization has within a community, provide work for short periods of time, and provide support on a wide range of projects.

The value of volunteer time presented here is the average wage of non-management, non-agricultural workers. This is only a tool and only one way to show the immense value volunteers provide to an organization. The Bureau of Labor Statistics does have hourly wages by occupation that can be used to determine the value of a specialized skill.

It is important to remember that when a doctor, lawyer, craftsman, or anyone with a specialized skill volunteers, the value of his or her work is based on his or her volunteer work, not his or her earning power. In other words, volunteers must be performing their special skill as volunteer work. If a doctor is painting a fence or a lawyer is sorting groceries, he or she is not performing his or her specialized skill for the nonprofit, and their volunteer hour value would not be higher.

Footnotes

1. This is a preliminary number. An updated number may be released in Summer 2013.

2.Corporation for National and Community Service. Research Brief: Volunteering in America Research Highlights (2011).

IS MEMBERS The Center on Philanthropy, Indiana University • Organizational Research Services • The Summit Fund of Washington • McCormic

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Microbial Source Tracking & Identification

A Fact Sheet from the Southern California Coastal Water Research Project

March 2012

Finding Sources of Contamination Helps Managers Protect Public Health

California's coastlines host millions of visitors each year. To protect public health, county health agencies and others regularly monitor water quality in streams, coastal discharges, and at beaches. If an area shows chronically high fecal bacteria levels, managers need a way to track the contamination source. Microbial source tracking and identification methods help characterize site-specific issues. With these tools, managers can better allocate resources to reduce public health risk and beach closures over the long run, improving beach access and the local economy.

Examples of Fecal Bacteria Sources & Pathways in Southern California

- Sewage leaks or spills
- Failing septic tanks
- Illegal dumping
- Homeless camps
- Pet waste
- Wildlife
- Livestock waste
- Growth on storm drain channels, sand, soil, decaying plant matter, and beach debris
- Transport in overland runoff/ stormwater

Source Tracking

Following bacterial signal back to its source (e.g., a specific storm drain, campground, or leaking sewage pipe)

Source Identification

Characterizing the origin of the bacteria (e.g., human, bird, dog, or livestock fecal material)

Indicators vs. Pathogens

Fecal material often contains pathogens (bacteria, viruses, or other microorganisms that can cause disease). Rather than testing for each individual pathogen, scientists look for the presence of "fecal indicator bacteria" (FIB). These bacteria are often found when fecal contamination is present, but may be associated with non-fecal sources like decaying plant matter. To further enhance public health protection, extensive research to investigate new source-specific monitoring methods is ongoing.

How Does Source Tracking and Identification Work?

Source tracking and identification tests detect evidence of sewage or target specific microorganisms' molecular or genetic material (called "markers"). These tests typically aim to separate human from non-human sources; some are designed to differentiate among individual animal species. Routine source-specific identification and tracking standards do not yet exist, and many newer methods are still experimental.

SCCWRP research develops new source tracking and identification methods, evaluates comparative method performance, and provides scientific guidance for management applications.

Source Tracking and Identification Examples

Method	Evidence Detected	Pros	Cons
Optical Brighteners	Laundry detergent additives found in household wastewater	Low-cost; fast results; linked to human sources	Dissipate in sunlight; low sensitivity
FIB Culture	Growth of fecal indicator bacteria	Method already used at many labs	Slow; not source-specific
Human Markers	A microbe (virus, bacteria, or protozoa) found primarily in humans	Relatively fast results; species-specific	Highly technical; higher cost
Animal Markers	A microbe found primarily in one animal species	Relatively fast results; species/ source-specific	Highly technical; higher cost
Community Analysis	Many microbial markers detected simultaneously	May identify dominant source	Highly technical; higher cost

Source Identification Protocol Project (SIPP)

The State Water Resources Control Board's Clean Beach Task Force commissioned the SIPP to develop protocols for tracking and identifying bacteria sources at beaches throughout California. SCCWRP is one of four core laboratories implementing the multi-year study, which will produce a standard guidance manual for beach managers.

Method Comparison Study

Part of the SIPP calls for a large-scale method comparison study. Samples from multiple fecal sources were prepared at SCCWRP and shipped to researchers around the world for analysis. The results will clarify the performance, benefits, and drawbacks of each method; prioritize research; and set the stage for user-based testing.

Management Application: QMRA

One potential application of source tracking and identification methods is quantitative microbial risk assessment (QMRA). QMRA estimates the relative risk to human health based on information about differential microbial behavior among fecal sources. The US Environmental Protection Agency (EPA) is currently evaluating QMRA as a means for developing site-specific beach bacteria standards. SCCWRP will partner with the EPA to assess its applicability in a southern California pilot study.

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The relationship between DOMA and Proposition 8 – *Tom Goldstein*

Kevin Russell *Contributor*
Posted Thu, January 10th, 2013 10:14 am

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Opinion analysis: The Court unanimously agrees with everyone else

It is not hard to predict the outcome of a case in which both parties, and the United States as an *amicus*, agree on the answer to the question presented. Yesterday, the Court made it unanimous by agreeing with everyone else and reversing the Ninth Circuit in *Los Angeles County Flood Control District v. Natural Resources Defense Council, Inc.*, No. 11-460.

As previously described, the question in the case was whether the Clean Water Act's permitting requirements apply when water flows from one portion of a navigable river through a concrete channel and then back into a lower portion of the river. The Act generally requires a permit for any "discharge of pollutants" into a river. And in a prior case, the Supreme Court had held that moving polluted water from one part of a body of water to another did not constitute a discharge. Today, the Court agreed with everyone else that this precedent applies equally when water moves from one part of a river to another through a channelized portion of the riverbed.

The Court refused to go any further to address the NRDC's alternative ground for affirmance, which would have first required deciding whether NRDC was required to file a cross-petition to preserve the argument. Instead, as a simple matter of discretion, the Court stuck to the question upon which it granted certiorari and reversed.

So this proved to be a very straightforward case that raises only two interesting questions in my mind. The first is why the Court bothered setting the case for briefing and argument, rather than just summarily reversing, given that all the parties have agreed on the answer to the question presented from the beginning.

The second odd part of the case is that Justice Alito concurred in the judgment – meaning he agreed with the result, but did not join in the Court's reasoning – but wrote no concurring opinion to explain what part of the Court's analysis he disagreed with. While noting concurrences and dissents without including an opinion used to happen with some frequency, I have not seen many instances of unexplained concurrences in recent times.

Plain English: The Clean Water Act does not regulate movement of water from one part of a river, through a concrete channel, into a lower portion of the same river.

Posted in *LA County Flood Control District v. Natural Resources Defense*, Featured, Merits Cases

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Water: Marine Debris

Marine Debris Impacts

Quick Finder

Assessing and Monitoring Floatable Debris
Basic Information
Interagency Marine Debris Coordinating Committee
International Coastal Cleanup
Laws and Regulations
Marine Debris Factsheet
Marine Debris Home
Marine Debris Impacts
Marine Debris Sources
Monitoring and Research
National Marine Debris Monitoring Program
Marine Debris Prevention Toolkit
Prevention, Control, and Reduction
What You Can Do
Other Resources

On this page: Overview | Environmental Impacts | Economic Impacts | Human Health and Safety Impacts

Overview

Photo Credit: Ocean Conservancy

Marine debris impacts the environment, economy, and human health and safety. The extent of the impacts is determined by the type of marine debris and where it settles in the ocean (e.g., submerged, floating, or within a sensitive habitat). Fishing nets, plastic bags, and tires can sink to the ocean floor and break and smother coral reefs. Fishing line can float along the ocean surface and catch vessel propellers causing costly damage. A syringe can wash up on the beach and be stepped on by a beachgoer resulting in a wound and possibly an infection. Regardless of the type or the location of the marine debris, it can have serious impacts.

Environmental Impacts

Environmental impacts are wide ranging and can be both direct and indirect. Direct impacts occur when marine life is physically harmed by marine debris through ingestion or entanglement (e.g., a turtle mistakes a plastic bag for food) or marine debris physically alters a sensitive ecosystem (e.g., a fishing net is dragged along the ocean floor by strong ocean currents and breaks and smothers a coral reef). Environmental impacts can also be indirect, such as when a marine debris cleanup results in ecological changes.

Direct Environmental Impacts

Ingestion

Seabirds, sea turtles, fish, and marine mammals often ingest marine debris that they mistake for food. Ingesting marine debris can seriously harm marine life. For example, whales and sea turtles often mistake plastic bags for squid, and birds often mistake plastic pellets for fish eggs. Moreover, a study of 38 green turtles found that 61 percent had ingested some form of marine debris including plastic bags, cloth, and rope or string (Bugoni et al., 2001).

Photo Credit: National Oceanic and Atmospheric Administration

At other times, animals accidentally eat the marine debris while feeding on natural food. Ingestion can lead to starvation or malnutrition when the marine debris collects in the animal's stomach causing the animal to feel full. Starvation also occurs when ingested marine debris in the animal's system prevents vital nutrients from being absorbed. Internal injuries and infections may also result from ingestion. Some marine debris, especially some plastics, contain toxic substances that can cause death or reproductive failure in fish, shellfish, or any marine life. In fact, some plastic particles have even been determined to contain certain chemicals up to one million times the amount found in the water alone (Moore, C., 2002).

Entanglement

Marine life can become entangled in marine debris causing serious injury or death. Entanglement can lead to suffocation, starvation, drowning, increased vulnerability to predators, or other injury. Marine debris can constrict an entangled animal's movement which results in exhaustion or development of an infection from deep wounds caused by tightening material. For example, volunteers participating in the 2008 International Coastal Cleanup event discovered 443 animals and birds entangled or trapped by marine debris (2008 ICC Report, Ocean Conservancy).

Ecosystem Alteration

The direct impacts of marine debris are not limited to mobile animals. Plants, other immobile living organisms, and sensitive ecosystems can all be harmed by marine debris. Coral reefs can be damaged by derelict fishing gear that breaks or suffocates coral. Plants can be smothered by plastic bags and fishing nets. The ocean floor ecosystems can be damaged and altered by the movement of an abandoned vessel or other marine debris.

Indirect Environmental Impacts

Ecosystem Alteration

Photo Credit: National Oceanic and Atmospheric Administration

Efforts to remove marine debris can harm ecosystems. Mechanical beach raking uses a tractor or other mechanical device to remove marine debris from beaches and marine shorelines and can adversely impact shoreline habitats. This removal technique can be harmful to aquatic vegetation, nesting birds, sea turtles, and other types of aquatic life. Beach raking also can contribute to beach erosion and disturbance of natural vegetation when the raking is conducted too close to a dune.

Invasive Species

Marine debris can contribute to the transfer and movement of invasive species. Floating marine debris can carry invasive species from one location to another. Invasive species use the marine debris as a type of "raft" to move from one body of water to another. In a study performed by the British Antarctic Survey in 2002, it was estimated that man-made debris found in the oceans has approximately doubled the number of different species found in the subtropics (Barnes, D.K., 2002).

Economic Impacts

Marine debris can harm three important components of our economy: tourism, fishing, and navigation. Economic impacts are felt through loss in tourism dollars and catch revenue, as well as costly vessel repairs.

Tourism

Marine debris is unsightly and unwelcoming to beachgoers, which can result in lost revenue from tourism. In severe cases, marine debris can even cause beach closures. The costs to remove and dispose of the marine debris can be high and the loss of tourism dollars can be even higher. In an attempt to stop the draining of trash to the ocean, the Los Angeles County's Department of Public Works and the Flood Control District spends $18 million each year on street sweeping, catch basin cleanouts, cleanup programs, and litter prevention and education efforts (L.A. County Boards of Supervisors Staff Report, 2007).

Fishing

Fisheries experience significant economic impacts from marine debris. Commercial fisheries are impacted when commercial fish and shellfish become bycatch in lost fishing nets or other fishing gear. This type of bycatch can result in both immediate losses in the standing stock of available seafood, and decreases in the long-term sustainability of the stock due to negative impacts on its reproductive ability. For example, the Gulf States Marine Fisheries Commission has predicted blue crab ghost fishery leads to a loss of up to 4 to 10 million crabs a year in Louisiana alone (Virginia Institute of Marine Science, 2006). Fisheries also can be financially affected when fishing gear and vessels are entangled or damaged by marine debris. The high cost of replacing fishing gear and vessels, as well as loss of days at sea for fishing, can cause small fisheries to go out of business.

Photo Credit: National Oceanic and Atmospheric Administration

Navigation

Floating marine debris is a navigational hazard that entangles propellers and clogs cooling water intake valves. Repairing boats damaged by marine debris is both time consuming and expensive.

Human Health and Safety Impacts

Marine debris impacts humans by endangering health and safety. Beachgoers can be injured by stepping on broken glass, cans, needles or other items. Similar to marine organisms, swimmers and divers can also become entangled in abandoned netting and fishing lines. Passengers on vessels that strike or become entangled in floating or submerged marine debris may be injured or killed if the vessel is damaged or disabled.

Can't find what you want? Try our A-Z Index

Last updated on Tuesday, March 06, 2012

Appendix y-B: Dominguez Channel Trash Reduction Supporting Documents

(Please see Appendix CD for documents)

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PUBLIC EDUCATION PROGRAM

The Problem With Marine Debris

Millions of Californians enjoy the state's coastline and waterways everyday. However, many of those people are unaware how their daily activities, from driving a car, to not properly disposing of their garbage, or even throwing a cigarette butt on the ground, can impact the plants and animals off our shores. This debris can harm or kill beach organisms. Pollution also makes using the beach less enjoyable for humans. Solving our water pollution problems requires everyone's involvement.

HOW DOES TRASH BECOME MARINE DEBRIS?

Look around the next time you walk down the street. When it rains, trash on sidewalks and streets accumulates in the gutter and is swept into your city's storm drain system. Most storm drain systems discharge directly into the nearest waterway, which eventually flows to the ocean. Trash may also be dumped directly into the ocean by recreational and commercial boaters, and it is often left on the beach by beach-goers.

TRASHING CALIFORNIA'S BEACHES

Californian's love their coast and ocean — nine out of ten will visit the beach at least once this year. When they arrive at the beach, they are finding a lot more than sand and surf. During a recent summer, Orange County collected enough garbage from six miles of beach to fill ten garbage trucks full of trash every week, at a cost to taxpayers of $350,000. Other California counties spend even more.

In 1975, the National Academy of Sciences estimated that ocean-based sources, such as cargo ships and cruise liners, dumped 14 billion pounds of garbage into the ocean. In 1988, the U.S. signed onto MARPOL Annex V, joining 64 other countries that signed the international protocol that regulates ocean dumping and made it illegal to dump plastic into the ocean. Laws like MARPOL have reduced the amount of trash on our beaches and in our ocean. Even so, plastic pollution is still a major problem. A recent study found an average of 334,271 pieces of plastic per square mile in the North Pacific Central Gyre, which serves as a natural eddy system to concentrate material.[1] Results of more than 10 years of volunteer beach cleanup data indicate that 60 to 80 percent of beach debris comes from land-based sources. And debris in the marine environment means hazards for animals and humans. Plastic marine debris affects at least 267 species worldwide, including 86 percent of all sea turtle species, 44 percent of all sea bird species, and 43 percent of marine mammal species.[2]

[1] Moore, C. J., S. L. Moore, M. K. Leecaster, and S. B. Weisberg, 2001. A comparison of plastic and plankton in the North Pacific Central Gyre. In: Marine Pollution Bulletin 42, 1297-1300.

[2] Laist, D. W., 1997. Impacts of marine debris: entanglement of marine life in marine debris including a comprehensive list of species with entanglement and ingestion records. In: Coe, J. M. and D. B. Rogers (Eds.), Marine Debris -- Sources, Impacts and Solutions. Springer-Verlag, New York, pp. 99-139

HOW MARINE DEBRIS HARMS WILDLIFE

Entanglement

Common items like fishing line, strapping bands and six-pack rings can hamper the mobility of marine animals. Once entangled, animals have trouble eating, breathing or swimming, all of which can have fatal results. Plastics take hundreds of years to breakdown and may continue to trap and kill animals year after year.

Plastic

Almost 90 percent of floating marine debris is plastic. Due to its durability, buoyancy, and ability to accumulate and concentrate toxins present in the ocean, plastic is especially harmful to marine life

marine life.

Ingestion

Birds, fish and mammals often mistake plastic for food. Some birds even feed it to their young. With plastic filling their stomachs, animals have a false feeling of being full, and may die of starvation. Sea turtles mistake plastic bags for jellyfish, one of their favorite foods. Even gray whales have been found dead with plastic bags and sheeting in their stomachs.

One type of plastic debris found all over the world are plastic pellets, or "nurdles," which are the raw material transported to plastics manufacturing facilities to be melted into products such as disposable forks and bottles, computer monitors, toys, etc. To learn about (and perhaps participate in) a study of these pellets' accumulation of organic pollutants from sea water, visit International Pellet Watch.

Glass

Glass can be recycled to make new glass, insulation, and asphalt. In 1993, we recycled more than 600 tons of glass, sustaining 4,320 jobs.

HOW MARINE DEBRIS HARMS PEOPLE

Beachgoers can cut themselves on glass and metal left on the beach. Marine debris also endangers the safety and livelihood of fishermen and recreational boaters. Nets and monofilament fishing line can obstruct propellers and plastic sheeting and bags can block cooling intakes. Such damage is hazardous and costly in terms of repair and lost fishing time. In one Oregon port, a survey revealed that 58 percent of fishermen had experienced equipment damage due to marine debris. Their average repair cost was $2,725.

HOW DOES REDUCING, REUSING, AND RECYCLING HELP?

Use Less Stuff

Many of our pollution problems are really problems of misplaced resources. For every item we recycle or reuse, that’s one less piece of trash that can become a part of the marine debris cycle threatening people and wildlife.

Everything we use in our daily lives is made from natural resources such as trees, petroleum, sand, water, soil, and metals, many of which are non-renewable.

By throwing these materials into our landfills, we drastically reduce the remaining supply of non-renewable natural resources.

Metal

Nearly 75% of all metal is used just once. Recycling steel reduces air and water pollution and requires 70% less energy than producing it from raw materials.

BE PART OF THE SOLUTION

The debris that we collect from our beaches is a symptom of a much larger water pollution problem that is caused by everyday people doing every day things. Rain scours oil from parking lots, fertilizer from lawns, pet droppings from sidewalks and other contaminants from "nonpoint" sources and transports this toxic stew down storm drains and over land into the ocean. These toxins are poisoning marine life and our water sources. We can all be part of the solution by recycling used motor oil and repairing car leaks, picking up after our pets and switching to non-toxic products and improve other everyday practices to help keep our waterways clear and clean.

HOW CAN I HELP?

- Reduce, reuse and recycle at home, work and school.
- Buy products made from recycled materials with little or no packaging.
- Keep storm drains clean - they drain to beaches.
- Keep cigarette butts off streets and beaches.
- Properly dispose of fishing lines, nets and hooks.

Paper

Waste paper can be turned into raw material for new paper and paper products. Every 2,000 pounds of paper recycled saves 17 trees.

- Participate in the Coastal Commission's programs, call (800) COAST-4U:
  - Volunteer for Coastal Cleanup Day, the third Saturday in September.
  - Volunteer for the year 'round Adopt-A-Beach® program.
  - Buy a "WHALE TAIL® " license plate.
  - Become a "California Coastal Steward".

Have you heard of the **"Pacific Garbage Patch"** and want to learn more? Here are a few links with information on the growing problem of plastic pollution in the Pacific Ocean:

- Algalita Marine Research Foundation
- Project Kaisei
- NOAA Marine Debris Program

To view the Algalita Marine Research Foundation video on the subject, *Synthetic Sea*, borrow it from our Lending Library or view it streaming on their website at www.algalita.org/pelagic_plastic_mov.html.

Photographer Chris Jordan has created a blog, www.midwayjourney.com, documenting the experience of visiting Midway Island with other artists and journalists. The site includes powerful videos depicting the impact of plastic debris on the Laysan albatross population that nests there.

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CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

LOS ANGELES REGION

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WASTE DISCHARGE REQUIREMENTS FOR MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) DISCHARGES WITHIN THE COASTAL WATERSHEDS OF LOS ANGELES COUNTY, EXCEPT THOSE DISCHARGES ORIGINATING FROM THE CITY OF LONG BEACH MS4

The municipal discharges of storm water and non-storm water by the Los Angeles County Flood Control District, the County of Los Angeles, and 84 incorporated cities within the coastal watersheds of Los Angeles County with the exception of the City of Long Beach (hereinafter referred to separately as Permittees and jointly as the Dischargers) from the discharge points identified below are subject to waste discharge requirements as set forth in this Order.

I. FACILITY INFORMATION

Table 1. Discharger Information

Dischargers	The Los Angeles County Flood Control District, the County of Los Angeles, and 84 incorporated cities within the coastal watersheds of Los Angeles County with the exception of the City of Long Beach (See Table 4)
Name of Facility	Municipal Separate Storm Sewer Systems (MS4s) within the coastal watersheds of Los Angeles County with the exception of the City of Long Beach MS4
Facility Address	Various (see Table 2)
The U.S. Environmental Protection Agency (USEPA) and the California Regional Water Quality Control Board, Los Angeles Region (Regional Water Board) have classified the Greater Los Angeles County MS4 as a large municipal separate storm sewer system (MS4) pursuant to 40 CFR section 122.26(b)(4) and a major facility pursuant to 40 CFR section 122.2.	

Table 2. Facility Information

Permittee (WDID)	**Contact Information**	
Agoura Hills (*4B190147001*)	**Mailing Address**	30001 Ladyface Court
		Agoura Hills, CA 91301
	Facility Contact, Title, and E-mail	Ken Berkman, City Engineer kberkman@agoura-hills.ca.us

Permittee (WDID)	Contact Information	
Alhambra (*4B190148001*)	**Mailing Address**	111 South First Street
		Alhambra, CA 91801-3796
	Facility Contact and E-mail	David Dolphin ddolphin@cityofalhambra.org
Arcadia (*4B190149001*)	**Mailing Address**	11800 Goldring Road
		Arcadia, CA 91006-5879
	Facility Contact, Title, Phone, and E-mail	Vanessa Hevener, Environmental Services Officer (626) 305-5327 vhevener@ci.arcadia.ca.us
Artesia (*4B190150001*)	**Mailing Address**	18747 Clarkdale Avenue
		Artesia, CA 90701-5899
	Facility Contact, Title, and E-mail	Maria Dadian, Director of Public Works mdadian@cityofartesia.ci.us
Azusa (*4B190151001*)	**Mailing Address**	213 East Foothill Boulevard
		Azusa, CA 91702
	Facility Contact, Title, and E-mail	Carl Hassel, City Engineer chassel@ci.azusa.ca.us
Baldwin Park (*4B190152001*)	**Mailing Address**	14403 East Pacific Avenue
		Baldwin Park, CA 91706-4297
	Facility Contact, Title, and E-mail	David Lopez, Associate Engineer dlopez@baldwinpark.com
Bell (*4B190153001*)	**Mailing Address**	6330 Pine Avenue
		Bell, CA 90201-1291
	Facility Contact, Title, and E-mail	Terri Rodrigue, City Engineer trodrigue@cityofbell.org
Bell Gardens (*4B190139002*)	**Mailing Address**	7100 South Garfield Avenue
		Bell Gardens, CA 90201-3293
	Facility Contact, Title, and Phone	John Oropeza, Director of Public Works (562) 806-7700
Bellflower (*4B190154001*)	**Mailing Address**	16600 Civic Center Drive
		Bellflower, CA 90706-5494
	Facility Contact, Title, and E-mail	Bernie Iniguez, Environmental Services Manager biniguez@bellflower.org
Beverly Hills (*4B190132002*)	**Mailing Address**	455 North Rexford Drive
		Beverly Hills, CA 90210
	Facility Contact, Title, and E-mail	Vincent Chee, Project Civil Engineer kgettler@beverlyhills.org
Bradbury (*4B190155001*)	**Mailing Address**	600 Winston Avenue
		Bradbury, CA 91010-1199
	Facility Contact, Title, and E-mail	Elroy Kiepke, City Engineer mkeith@cityofbradbury.org
Burbank (*4B190101002*)	**Mailing Address**	P.O. Box 6459
		Burbank, CA 91510
	Facility Contact, Title, and E-mail	Bonnie Teaford, Public Works Director bteaford@ci.burbank.ca.us
Calabasas (*4B190157001*)	**Mailing Address**	100 Civic Center Way
		Calabasas, CA 91302-3172
	Facility Contact, Title, and E-mail	Alex Farassati, ESM afarassati@cityofcalabasas.com
Carson (*4B190158001*)	**Mailing Address**	P.O. Box 6234
		Carson, CA 90745
	Facility Contact, Title,	Patricia Elkins, Building Construction Manager

Permittee (WDID)	Contact Information	
	and E-mail	pelkins@carson.ca.us
Cerritos (*4B190159001*)	**Mailing Address**	P.O. Box 3130
		Cerritos, CA 90703-3130
	Facility Contact, Title, and E-mail	Mike O'Grady, Environmental Services mo'grady@cerritos.us
Claremont (*4B190160001*)	**Mailing Address**	207 Harvard Avenue
		Claremont, CA 91711-4719
	Facility Contact, Title, and E-mail	Craig Bradshaw, City Engineer cbradshaw@ci.claremont.ca.us
Commerce (*4B190161001*)	**Mailing Address**	2535 Commerce Way
		Commerce, CA 90040-1487
	Facility Contact and E-mail	Gina Nila gnila@ci.commerce.ca.us
Compton (*4B190162001*)	**Mailing Address**	205 South Willowbrook Avenue
		Compton, CA 90220-3190
	Facility Contact, Title, and Phone	Hien Nguyen, Assistant City Engineer (310) 761-1476
Covina (*4B190163001*)	**Mailing Address**	125 East College Street
		Covina, CA 91723-2199
	Facility Contact, Title, and E-mail	Vivian Castro, Environmental Services Manager vcastro@covinaca.gov
Cudahy (*4B190164001*)	**Mailing Address**	P.O. Box 1007
		Cudahy, CA 90201-6097
	Facility Contact, Title, and E-mail	Hector Rodriguez, City Manager hrodriguez@cityofcudahy.ca.us
Culver City (*4B190165001*)	**Mailing Address**	9770 Culver Boulevard
		Culver City, CA 90232-0507
	Facility Contact, Title, and Phone	Damian Skinner, Manager (310) 253-6421
Diamond Bar (*4B190166001*)	**Mailing Address**	21825 East Copley Drive
		Diamond Bar, CA 91765-4177
	Facility Contact, Title, and E-mail	David Liu, Director of Public Works dliu@diamondbarca.gov
Downey (*4B190167001*)	**Mailing Address**	P.O. Box 7016
		Downey, CA 90241-7016
	Facility Contact , Title, and E-mail	Yvonne Blumberg yblumberg@downeyca.org
Duarte (*4B190168001*)	**Mailing Address**	1600 Huntington Drive
		Duarte, CA 91010-2592
	Facility Contact, Title, and Phone	Steve Esbenshades, Engineering Division Manager (626) 357-7931 ext. 233
El Monte (*4B190169001*)	**Mailing Address**	P.O. Box 6008
		El Monte, CA 91731
	Facility Contact, Title, and Phone	James A Enriquez, Director of Public Works (626) 580-2058
El Segundo (*4B190170001*)	**Mailing Address**	350 Main Street
		El Segundo, CA 90245-3895
	Facility Contact, Title, Phone, and E-mail	Stephanie Katsouleas, Public Works Director (310) 524-2356 skatsouleas@elsegundo.org
Gardena (*4B190118002*)	**Mailing Address**	P.O. Box 47003
		Gardena, CA 90247-3778

Permittee (WDID)	Contact Information	
	Facility Contact, Title, and E-mail	Ron Jackson, Building Maintenance Supervisor jfelix@ci.gardena.ci.us
Glendale (*4B190171001*)	**Mailing Address**	Engineering Section, 633 East Broadway, Room 209
		Glendale, CA 91206-4308
	Facility Contact, Title, and E-mail	Maurice Oillataguerre, Senior Environmental Program Scientist moillataguerre@ci.glendale.ca.us
Glendora (*4B190172001*)	**Mailing Address**	116 East Foothill Boulevard
		Glendora, CA 91741
	Facility Contact, Title, and E-mail	Dave Davies, Deputy Director of Public Works ddavies@ci.glendora.ca.us
Hawaiian Gardens (*4B190173001*)	**Mailing Address**	21815 Pioneer Boulevard
		Hawaiian Gardens, CA 90716
	Facility Contact, Title, and E-mail	Joseph Colombo, Director of Community Development jcolombo@ghcity.org
Hawthorne (*4B190174001*)	**Mailing Address**	4455 West 126th Street
		Hawthorne, CA 90250-4482
	Facility Contact, Title, and E-mail	Arnold Shadbehr, Chief General Service and Public Works ashadbehr@cityofhawthorne.org
Hermosa Beach (*4B190175001*)	**Mailing Address**	1315 Valley Drive
		Hermosa Beach, CA 90254-3884
	Facility Contact, Title, and E-mail	Homayoun Behboodi, Associate Engineer hbehboodi@hermosabch.org
Hidden Hills (*4B190176001*)	**Mailing Address**	6165 Spring Valley Road
		Hidden Hills, CA 91302
	Facility Contact, Title, and Phone	Kimberly Colberts, Environmental Coordinator (310) 257-2004
Huntington Park (*4B190177001*)	**Mailing Address**	6550 Miles Avenue
		Huntington Park, CA 90255
	Facility Contact, Title, and Phone	Craig Melich, City Engineer and City Official (323) 584-6253
Industry (*4B190178001*)	**Mailing Address**	P.O. Box 3366
		Industry, CA 91744-3995
	Facility Contact and Title	Mike Nagaoka, Director of Public Safety
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La Canada Flintridge (*4B190181001*)	**Mailing Address**	1327 Foothill Boulevard
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	Facility Contact, Title, and E-mail	John DiMario, Director of Development Services jdimario@lapuente.org
La Verne (*4B190185001*)	**Mailing Address**	3660 "D" Street
		La Verne, CA 91750-3599
	Facility Contact, Title, and E-mail	Daniel Keesey, Director of Public Works dkeesey@ci.la-verne.ca.us
Lakewood (*4B190186001*)	**Mailing Address**	P.O. Box 158
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		Lawndale, CA 90260
	Facility Contact and Title	Marlene Miyoshi, Senior Administrative Analyst
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Los Angeles (*4B190188001*)	**Mailing Address**	1149 S. Broadway, 10th Floor
		Los Angeles, CA 90015
	Facility Contact, Title, and Phone	Shahram Kharaghani, Program Manager (213) 485-0587
Lynwood (*4B190189001*)	**Mailing Address**	11330 Bullis Road
		Lynwood, CA 90262-3693
	Facility Contact and Phone	Josef Kekula (310) 603-0220 ext. 287
Malibu (*4B190190001*)	**Mailing Address**	23825 Stuart Ranch Road
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	Facility Contact, Title, and E-mail	Jennifer Brown, Environmental Program Analyst jbrown@malibucity.org
Manhattan Beach (*4B190191001*)	**Mailing Address**	1400 Highland Avenue
		Manhattan Beach, CA 90266-4795
	Facility Contact, Title, and Email	Brian Wright, Water Supervisor bwright@citymb.info
Maywood (*4B190192001*)	**Mailing Address**	4319 East Slauson Avenue
		Maywood, CA 90270-2897
	Facility Contact, Title, and Phone	Andre Dupret, Project Manager (323) 562-5721
Monrovia (*4B190193001*)	**Mailing Address**	415 South Ivy Avenue
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Permittee (WDID)	Contact Information	
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Norwalk (*4B190196001*)	**Mailing Address**	P.O. Box 1030
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Pasadena (*4B190199001*)	**Mailing Address**	P.O. Box 7115
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Pico Rivera (*4B190200001*)	**Mailing Address**	P.O. Box 1016
		Pico Rivera, CA 90660-1016
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Pomona (*4B190145003*)	**Mailing Address**	P.O. Box 660
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Rosemead (*4B190204001*)	**Mailing Address**	8838 East Valley Boulevard
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	Facility Contact, Title, and Phone	Chris Marcarello, Director of PW (626) 569-2118
San Dimas (*4B190205001*)	**Mailing Address**	245 East Bonita Avenue
		San Dimas, CA 91773-3002
	Facility Contact, Title,	Latoya Cyrus, Environmental Services Coordinator

Permittee (WDID)	Contact Information	
	and E-mail	lcyrus@ci.san-dimas.ca.us
San Fernando (*4B190206001*)	**Mailing Address**	117 Macneil Street
		San Fernando, CA 91340
	Facility Contact, Title, and E-mail	Ron Ruiz, Director of Public Works rruiz@sfcity.org
San Gabriel (*4B190207001*)	**Mailing Address**	425 South Mission Drive
		San Gabriel, CA 91775
	Facility Contact, Title, and Phone	Daren T. Grilley, City Engineer (626) 308-2806 ext. 4631
San Marino (*4B190208001*)	**Mailing Address**	2200 Huntington Drive
		San Marino, CA 91108-2691
	Facility Contact, Title, and E-mail	Chuck Richie, Director of Parks and Public Works crichie@cityofsanmarino.org
Santa Clarita (*4B190117001*)	**Mailing Address**	23920 West Valencia Boulevard, Suite 300
		Santa Clarita, CA 91355
	Facility Contact, Title, and Phone	Travis Lange, Environmental Services Manager (661) 255-4337
Santa Fe Springs (*4B190108003*)	**Mailing Address**	P.O. Box 2120
		Santa Fe Springs, CA 90670-2120
	Facility Contact, Title, and E-mail	Sarina Morales-Choate, Civil Engineer Assistant smorales-choate@santafesprings.org
Santa Monica (*4B190122002*)	**Mailing Address**	1685 Main Street
		Santa Monica, CA 90401-3295
	Facility Contact, Title, and E-mail	Neal Shapiro, Urban Runoff Coordinator nshapiro@smgov.net
Sierra Madre (*4B190209001*)	**Mailing Address**	232 West Sierra Madre Boulevard
		Sierra Madre, CA 91024-2312
	Facility Contact, Title, and Phone	James Carlson, Management Analyst (626) 355-7135 ext. 803
Signal Hill (*4B190210001*)	**Mailing Address**	2175 Cherry Avenue
		Signal Hill, CA 90755
	Facility Contact, Phone, and E-mail	John Hunter (562) 802-7880 jhunter@jlha.net
South El Monte (*4B190211001*)	**Mailing Address**	1415 North Santa Anita Avenue
		South El Monte, CA 91733-3389
	Facility Contact and Phone	Anthony Ybarra, City Manager (626) 579-6540
South Gate (*4B190212001*)	**Mailing Address**	8650 California Avenue
		South Gate, CA 90280
	Facility Contact, Phone, and E-mail	John Hunter (562) 802-7880 jhunter@jlha.net
South Pasadena (*4B190213001*)	**Mailing Address**	1414 Mission Street
		South Pasadena, CA 91030-3298
	Facility Contact, Phone, and E-mail	John Hunter (562) 802-7880 jhunter@jlha.net
Temple City (*4B190214001*)	**Mailing Address**	9701 Las Tunas Drive
		Temple City, CA 91780-2249
	Facility Contact,	Joe Lambert at (626) 285-2171 or

Permittee (WDID)	**Contact Information**	
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		Torrance, CA 90503-5059
	Facility Contact and Title	Leslie Cortez, Senior Administrative Assistant
Vernon (*4B190216001*)	**Mailing Address**	4305 Santa Fe Avenue
		Vernon, CA 90058-1786
	Facility Contact and Phone	Claudia Arellano (323) 583-8811
Walnut (*4B190217001*)	**Mailing Address**	P.O. Box 682
		Walnut, CA 91788
	Facility Contact and Title	Jack Yoshino, Senior Management Assistant
West Covina (*4B190218001*)	**Mailing Address**	P.O. Box 1440
		West Covina, CA 91793-1440
	Facility Contact, Title, and E-mail	Samuel Gutierrez, Engineering Technician sam.gutierrez@westcovina.org
West Hollywood (*4B190219001*)	**Mailing Address**	8300 Santa Monica Boulevard
		West Hollywood, CA 90069-4314
	Facility Contact, Title, and E-mail	Sharon Perlstein, City Engineer sperlstein@weho.org
Westlake Village (*4B190220001*)	**Mailing Address**	31200 Oak Crest Drive
		Westlake Village, CA 91361
	Facility Contact, Title, Phone, and E-mail	Joe Bellomo, Stormwater Program Manager (805) 279-6856 jbellomo@willdan.com
Whittier (*4B190221001*)	**Mailing Address**	13230 Penn Street
		Whittier, CA 90602-1772
	Facility Contact, Title, and E-mail	David Mochizuki, Director of Public Works dmochizuki@cityofwhittier.org
County of Los Angeles (*4B190107099*)	**Mailing Address**	900 South Fremont Avenue
		Alhambra, CA 91803
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		Alhambra, CA 91803
	Facility Contact, Title, Phone, and E-mail	Gary Hildebrand, Assistant Deputy Director, Division Engineer (626) 458-4300 ghildeb@dpw.lacounty.gov

Table 3. Discharge Location

Discharge Point	Effluent Description	Discharge Point Latitude	Discharge Point Longitude	Receiving Water
All Municipal Separate Storm Sewer System discharge points within Los Angeles County with the exception of the City of Long Beach	Storm Water and Non-Storm Water	Numerous	Numerous	Surface waters identified in Tables 2-1, 2-1a, 2-3, and 2-4, and Appendix 1, Table 1 of the *Water Quality Control Plan - Los Angeles Region* (*Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties*), and other unidentified tributaries to these surface waters within the following Watershed Management Areas: (1) Santa Clara River Watershed; (2) Santa Monica Bay Watershed Management Area, including Malibu Creek Watershed and Ballona Creek Watershed; (3) Los Angeles River Watershed; (4) Dominguez Channel and Greater Los Angeles/Long Beach Harbors Watershed Management Area; (5) Los Cerritos Channel and Alamitos Bay Watershed Management Area; (6) San Gabriel River Watershed; and (7) Santa Ana River Watershed.[1]

Table 4. Administrative Information

This Order was adopted by the California Regional Water Quality Control Board, Los Angeles Region on:	**November 8, 2012**
This Order becomes effective on:	**December 28, 2012**
This Order expires on:	**December 28, 2017**
In accordance with Title 23, Division 3, Chapter 9 of the California Code of Regulations and Title 40, Part 122 of the Code of Federal Regulations, each Discharger shall file a Report of Waste Discharge as application for issuance of new waste discharge requirements no later than:	**180 days prior to the Order expiration date above**

[1] Note that the Santa Ana River Watershed lies primarily within the boundaries of the Santa Ana Regional Water Quality Control Board. However, a portion of the Chino Basin subwatershed lies within the jurisdictions of Pomona and Claremont in Los Angeles County. The primary receiving waters within the Los Angeles County portion of the Chino Basin subwatershed are San Antonio Creek and Chino Creek.

In accordance with section 2235.4 of Title 23 of the California Code of Regulations, the terms and conditions of an expired permit are automatically continued pending issuance of a new permit if all requirements of the federal NPDES regulations on continuation of expired permits are complied with. Accordingly, if a new order is not adopted by the expiration date above, then the Permittees shall continue to implement the requirements of this Order until a new one is adopted.

I, Samuel Unger, Executive Officer, do hereby certify that this Order with all attachments is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Los Angeles Region, on November 8, 2012.

Samuel Unger

Samuel Unger, Executive Officer

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II. FINDINGS

The California Regional Water Quality Control Board, Los Angeles Region (hereinafter Regional Water Board) finds:

A. Nature of Discharges and Sources of Pollutants

Storm water and non-storm water discharges consist of surface runoff generated from various land uses, which are conveyed via the municipal separate storm sewer system and ultimately discharged into surface waters throughout the region. Discharges of storm water and non-storm water from the Municipal Separate Storm Sewer Systems (MS4s) within the Coastal Watersheds of Los Angeles County convey pollutants to surface waters throughout the Los Angeles Region. In general, the primary pollutants of concern in these discharges identified by the Los Angeles County Flood Control District Integrated Receiving Water Impacts Report (1994-2005) are indicator bacteria, total aluminum, copper, lead, zinc, diazinon, and cyanide. Aquatic toxicity, particularly during wet weather, is also a concern based on a review of Annual Monitoring Reports from 2005-10. Storm water and non-storm water discharges of debris and trash are also a pervasive water quality problem in the Los Angeles Region though significant strides have been made by a number of Permittees in addressing this problem through the implementation of control measures to achieve wasteload allocations established in trash TMDLs.

Pollutants in storm water and non-storm water have damaging effects on both human health and aquatic ecosystems. Water quality assessments conducted by the Regional Water Board have identified impairment of beneficial uses of water bodies in the Los Angeles Region caused or contributed to by pollutant loading from municipal storm water and non-storm water discharges. As a result of these impairments, there are beach postings and closures, fish consumption advisories, local and global ecosystem and aesthetic impacts from trash and debris, reduced habitat for threatened and endangered species, among others. The Regional Water Board and USEPA have established 33 total maximum daily loads (TMDLs) that identify Los Angeles County MS4 discharges as one of the pollutant sources causing or contributing to these water quality impairments.

B. Permit History

Prior to the issuance of this Order, Regional Water Board Order No. 01-182 served as the NPDES Permit for MS4 storm water and non-storm water discharges within the Coastal Watersheds of the County of Los Angeles. The requirements of Order No. 01-182 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.

Under Order No. 01-182, the Los Angeles County Flood Control District was designated the Principal Permittee, and the County of Los Angeles and 84 incorporated Cities were each designated Permittees. The Principal Permittee coordinated and facilitated activities necessary to comply with the requirements of Order No. 01-182, but was not responsible for ensuring compliance of any of the other Permittees. The designation of a Principal Permittee has not been carried over from Order No. 01-182.

Order No. 01-182 was subsequently amended by the Regional Water Board on September 14, 2006 by Order No. R4-2006-0074 to incorporate provisions consistent with the assumptions and requirements of the Santa Monica Bay Beaches Dry Weather Bacteria TMDL (SMB Dry Weather Bacteria TMDL) waste load allocations (WLAs). As a result of a legal challenge to Order No. R4-2006-0074, the Los Angeles County Superior Court issued a peremptory writ of mandate on July 23, 2010 requiring the Regional Water Board to void and set aside the amendments adopted through Order No. R4-2006-0074 in Order No. 01-182. The Court concluded that the permit proceeding at which Order No. R4-2006-0074 was adopted was procedurally deficient. The Court did not address the substantive merits of the amendments themselves, and thus made no determination about the substantive validity of Order No. R4-2006-0074. In compliance with the writ of mandate, the Regional Water Board voided and set aside the amendments adopted through Order No. R4-2006-0074 on April 14, 2011. This Order reincorporates requirements equivalent to the 2006 provisions to implement the SMB Dry Weather Bacteria TMDL.

In addition, Order No. 01-182 was amended on August 9, 2007 by Order No. R4-2007-0042 to incorporate provisions consistent with the assumptions and requirements of the Marina del Rey Harbor Mothers' Beach and Back Basins Bacteria TMDL, and was again amended on December 10, 2009 by Order No. R4-2009-0130 to incorporate provisions consistent with the assumptions and requirements of the Los Angeles River Watershed Trash TMDL.

C. Permit Application

On June 12, 2006, prior to the expiration date of Order No. 01-182, all of the Permittees filed Reports of Waste Discharge (ROWD) applying for renewal of their waste discharge requirements that serve as an NPDES permit to discharge storm water and authorized and conditionally exempt non-storm water through their MS4 to surface waters. Specifically, the Los Angeles County Flood Control District (LACFCD) submitted an ROWD application on behalf of itself, the County of Los Angeles, and 78 other Permittees. Several Permittees under Order No. 01-182 elected to not be included as part of the Los Angeles County Flood Control District's ROWD. On June 12, 2006, the Cities of Downey and Signal Hill each submitted an individual ROWD application requesting a separate MS4 Permit; and the Upper San Gabriel River Watershed Coalition, comprised of the cities of Azusa, Claremont, Glendora, Irwindale, and Whittier also submitted an individual ROWD application requesting a separate MS4 Permit for these cities. In 2010, the LACFCD withdrew from its participation in the 2006 ROWD submitted in conjunction with the County and 78 other co-permittees, and submitted a new ROWD also requesting an individual MS4 permit. The LACFCD also requested that, if an individual MS4 permit was not issued to it, it no longer be designated as the

Principal Permittee and it be relieved of Principal Permittee responsibilities. The Regional Water Board evaluated each of the 2006 ROWDs and notified all of the Permittees that their ROWDs did not satisfy federal storm water regulations contained in the USEPA Interpretive Policy Memorandum on Reapplication Requirements for Municipal Separate Storm Sewer Systems; Final Rule, August 9, 1996 (61 *Fed Reg.* 41697). Because each ROWD did not satisfy federal requirements, the Regional Water Board deemed all four 2006 ROWDs incomplete. The Regional Water Board also evaluated the LACFCD's 2010 ROWD and found that it too did not satisfy federal requirements for MS4s.

Though five separate ROWDs were submitted, the Regional Water Board retains discretion as the permitting authority to determine whether to issue permits for discharges from MS4s on a system-wide or jurisdiction-wide basis (Clean Water Act (CWA) § 402(p)(3)(B)(i); 40 CFR section 122.26, subdivisions (a)(1)(v) and (a)(3)(ii)). Because of the complexity and networking of the MS4 within Los Angeles County, which often results in commingled discharges, the Regional Water Board has previously adopted a system-wide approach to permitting MS4 discharges within Los Angeles County.

In evaluating the five separate ROWDs, the Regional Water Board considered the appropriateness of permitting discharges from MS4s within Los Angeles County on a system-wide or jurisdiction-wide basis or a combination of both. Based on that evaluation, the Regional Water Board again determined that, because of the complexity and networking of the MS4 within Los Angeles County, that one system-wide permit is appropriate. In order to provide individual Permittees with more specific requirements, certain provisions of this Order are organized by watershed management area, which is appropriate given the requirements to implement 33 watershed-based TMDLs. The Regional Water Board also determined that because the LACFCD owns and operates large portions of the MS4 infrastructure, including but not limited to catch basins, storm drains, outfalls and open channels, in each coastal watershed management area within Los Angeles County, the LACFCD should remain a Permittee in the single system-wide permit; however, this Order relieves the LACFCD of its role as "Principal Permittee."

D. Permit Coverage and Facility Description

The Los Angeles County Flood Control District, the County of Los Angeles, and 84 incorporated cities within the Los Angeles County Flood Control District with the exception of the City of Long Beach (see Table 5, List of Permittees), hereinafter referred to separately as Permittees and jointly as the Dischargers, discharge storm water and non-storm water from municipal separate storm sewer systems (MS4s), also called storm drain systems. For the purposes of this Order, references to the "Discharger" or "Permittee" in applicable federal and state laws, regulations, plans, or policy are held to be equivalent to references to the Discharger, or Permittees herein.

The area covered under this Order encompasses more than 3,000 square miles. This area contains a vast drainage network that serves incorporated and unincorporated areas in every Watershed Management Area within the Los Angeles Region. Maps

depicting the major drainage infrastructure within the area covered under this Order are included in Attachment C of this Order.

Table 5. List of Permittees

Agoura Hills	Hawaiian Gardens	Pomona
Alhambra	Hawthorne	Rancho Palos Verdes
Arcadia	Hermosa Beach	Redondo Beach
Artesia	Hidden Hills	Rolling Hills
Azusa	Huntington Park	Rolling Hills Estates
Baldwin Park	Industry	Rosemead
Bell	Inglewood	San Dimas
Bell Gardens	Irwindale	San Fernando
Bellflower	La Canada Flintridge	San Gabriel
Beverly Hills	La Habra Heights	San Marino
Bradbury	La Mirada	Santa Clarita
Burbank	La Puente	Santa Fe Springs
Calabasas	La Verne	Santa Monica
Carson	Lakewood	Sierra Madre
Cerritos	Lawndale	Signal Hill
Claremont	Lomita	South El Monte
Commerce	Los Angeles	South Gate
Compton	Lynwood	South Pasadena
Covina	Malibu	Temple City
Cudahy	Manhattan Beach	Torrance
Culver City	Maywood	Vernon
Diamond Bar	Monrovia	Walnut
Downey	Montebello	West Covina
Duarte	Monterey Park	West Hollywood
El Monte	Norwalk	Westlake Village
El Segundo	Palos Verdes Estates	Whittier
Gardena	Paramount	County of Los Angeles
Glendale	Pasadena	Los Angeles County Flood Control District
Glendora	Pico Rivera	

E. Los Angeles County Flood Control District

In 1915, the California Legislature enacted the Los Angeles County Flood Control Act, establishing the Los Angeles County Flood Control District (LACFCD). The objects and purposes of the Act are to provide for the control and conservation of the flood, storm and other waste waters within the flood control district. Among its other powers, the LACFCD also has the power to preserve, enhance, and add recreational features to lands or interests in lands contiguous to its properties for the protection, preservation, and use of the scenic beauty and natural environment for the properties or the lands. The LACFCD is governed, as a separate entity, by the County of Los Angeles Board of Supervisors.

The LACFCD's system includes the majority of drainage infrastructure within incorporated and unincorporated areas in every watershed, including approximately 500 miles of open channel, 3,500 miles of underground drains, and an estimated 88,000 catch basins, and several dams. Portions of the LACFCD's current system were originally unmodified natural rivers and water courses.

The LACFCD's system conveys both storm and non-storm water throughout the Los Angeles basin. Other Permittees' MS4s connect and discharge to the LACFCD's system.

The waters and pollutants discharged from the LACFCD's system come from various sources. These sources can include storm water and non-storm water from the Permittees under this permit and other NPDES and non-NPDES Permittees discharging into the LACFCD's system, including industrial waste water dischargers, waste water treatment facilities, industrial and construction stormwater Permittees, water suppliers, government entities, CERCLA potentially responsible parties, and Caltrans. Sources can also include discharges from school districts that do not operate large or medium-sized municipal storm sewers and discharges from entities that have waste discharge requirements or waivers of waste discharge requirements.

Unlike other Permittees, including the County of Los Angeles, the LACFCD does not own or operate any municipal sanitary sewer systems, public streets, roads, or highways.

The LACFCD in contrast to the County of Los Angeles has no planning, zoning, development permitting or other land use authority over industrial or commercial facilities, new developments or re-development projects, or development construction sites located in any incorporated or unincorporated areas within its service area. The Permittees that have such land use authority are responsible for implementing a storm water management program to inspect and control pollutants from industrial and commercial facilities, new development and re-development projects, and development construction sites within their jurisdictional boundaries. Nonetheless, as an owner and operator of MS4s, the LACFCD is required by federal regulations to control pollutant discharges into and from its MS4, including the ability to control through interagency agreements among co-Permittees and other owners of a MS4 the contribution of pollutants from one portion of the MS4 to another portion of the MS4.

F. Permit Scope

This Order regulates municipal discharges of storm water and non-storm water from the Permittees' MS4s. Section 122.26(b)(8) of title 40 of the Code of Federal Regulations (CFR) defines an MS4 as "a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains): (i) [o]wned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian

tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States; (ii) [d]esigned or used for collecting or conveying storm water; (iii) [w]hich is not a combined sewer; and (iv) [w]hich is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2."

Storm water discharges consist of those discharges that originate from precipitation events. Federal regulations define "storm water" as "storm water runoff, snow melt runoff, and surface runoff and drainage." (40 CFR § 122.26(b)(13).) While "surface runoff and drainage" is not defined in federal law, USEPA's preamble to its final storm water regulations demonstrates that the term is related to precipitation events such as rain and/or snowmelt. (55 *Fed. Reg.* 47990, 47995-96 (Nov. 16, 1990)).

Non-storm water discharges consist of all discharges through an MS4 that do not originate from precipitation events. Non-storm water discharges through an MS4 are prohibited unless authorized under a separate NPDES permit; authorized by USEPA pursuant to Sections 104(a) or 104(b) of the federal Comprehensive Environmental Response, Compensation and Liability Act (CERCLA); composed of natural flows; the result of emergency fire fighting activities; or conditionally exempted in this Order.

A permit issued to more than one Permittee for MS4 discharges may contain separate storm water management programs for particular Permittees or groups of Permittees. 40 CFR § 122.26(d)(2)(iv). Given 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.

G. Geographic Coverage and Watershed Management Areas

The municipal storm water and non-storm water discharges flow into receiving waters in the Watershed Management Areas of the Santa Clara River Watershed; Santa Monica Bay Watershed Management Area, including Malibu Creek Watershed and Ballona Creek Watershed; Los Angeles River Watershed; Dominguez Channel and Greater Los Angeles/Long Beach Harbors Watershed Management Area; Los Cerritos Channel and Alamitos Bay Watershed Management Area; San Gabriel River Watershed; and Santa Ana River Watershed.

This Order redefines Watershed Management Areas (WMAs) consistent with the delineations used in the Regional Water Board's Watershed Management Initiative. Permittees included in each of the WMAs are listed in Attachment K.

Maps depicting each WMA, its subwatersheds, and the major receiving waters therein are included in Attachment B.

Federal, state, regional or local entities in jurisdictions outside the Los Angeles County Flood Control District, and not currently named as Permittee to this Order, may operate MS4 facilities and/or discharge to the MS4 and water bodies covered by this Order. Pursuant to 40 CFR sections 122.26(d)(1)(ii) and 122.26(d)(2)(iv), each Permittee shall maintain the necessary legal authority to control the contribution of pollutants to its MS4 and shall include in its storm water management program a comprehensive planning process that includes intergovernmental coordination, where necessary.

Sources of MS4 discharges into receiving waters in the County of Los Angeles but not covered by this Order include the following:

- About 34 square miles of unincorporated area in Ventura County, which drain into Malibu Creek and then to Santa Monica Bay,
- About 9 square miles of the City of Thousand Oaks, which also drain into Malibu Creek and then to Santa Monica Bay, and
- About 86 square miles of area in Orange County, which drain into Coyote Creek and then into the San Gabriel River.

Specifically, the Orange County Flood Control District (OCFCD) owns and operates the Los Alamitos Retarding Basin and Pumping Station (Los Alamitos Retarding Basin). The Los Alamitos Retarding Basin is within the San Gabriel River Watershed, and is located adjacent to the Los Angeles and Orange County boundary. The majority of the 30-acre Los Alamitos Retarding Basin is in Orange County; however, the northwest corner of the facility is located in the County of Los Angeles. Storm water and non-storm water discharges, which drain to the Los Alamitos Retarding Basin, are pumped to the San Gabriel River Estuary (SGR Estuary) through pumps and subterranean piping. The pumps and discharge point are located in the County of Los Angeles.

The OCFCD pumps the water within the Los Alamitos Retarding Basin to the San Gabriel River Estuary through four discharge pipes, which are covered by tide gates. The discharge point is located approximately 700 feet downstream from the 2nd Street Bridge in Long Beach. The total pumping capacity of the four pumps is 800 cubic feet per second (cfs). There is also a 5 cfs sump pump that discharges nuisance flow continuously to the Estuary though a smaller diameter uncovered pipe.

The discharge from the Los Alamitos Retarding Basin is covered under the Orange County Municipal NPDES Storm Water Permit (NPDES Permit No. CAS618030, Santa Ana Regional Water Quality Control Board Order No. R8-2010-0062), which was issued to the County of Orange, Orange County Flood Control District and Incorporated Cities on May 22, 2009. The Orange County MS4 Permit references the San Gabriel River Metals and Selenium TMDL (Metals TMDL). The waste load allocations listed in the

Metals TMDL for Coyote Creek are included in the Orange County MS4 Permit. However, the Orange County MS4 Permit does not contain the dry weather copper waste load allocations assigned to the Estuary.

H. Legal Authorities

This Order is issued pursuant to CWA section 402 and implementing regulations adopted by the USEPA and chapter 5.5, division 7 of the California Water Code (commencing with section 13370). This Order serves as an NPDES permit for point source discharges from the Permittees' MS4s to surface waters. This Order also serves as waste discharge requirements (WDRs) pursuant to article 4, chapter 4, division 7 of the California Water Code (commencing with Section 13260).

I. Municipal Separate Storm Sewer System Requirements. The 1972 Clean Water Act[2] established the NPDES Program to regulate the discharge of pollutants from point sources to waters of the United States. However, pollution from storm water and dry-weather urban runoff was largely unabated for over a decade. In response to the 1987 Amendments to the Clean Water Act, USEPA developed Phase I of the NPDES Storm Water Permitting Program in 1990, which established a framework for regulating municipal and industrial discharges of storm water and non-storm water. The Phase I program addressed sources of storm water and dry-weather urban runoff that had the greatest potential to negatively impact water quality. In particular, under Phase I, USEPA required NPDES Permit coverage for discharges from medium and large MS4 with populations of 100,000 or more. Operators of MS4s regulated under the Phase I NPDES Storm Water Program were required to obtain permit coverage for municipal discharges of storm water and non-storm water to waters of the United States

Early in the history of this MS4 Permit, the Regional Water Board designated the MS4s owned and/or operated by the incorporated cities and Los Angeles County unincorporated areas within the Coastal Watersheds of Los Angeles County as a large MS4 due to the total population of Los Angeles County, including that of unincorporated and incorporated areas, and the interrelationship between the Permittees' MS4s, pursuant to 40 CFR section 122.26(b)(4). The total population of the cities and County unincorporated areas covered by this Order was 9,519,338 in 2000 and has increased by approximately 300,000 to 9,818,605 in 2010, according to the United States Census.

This Order implements the federal Phase I NPDES Storm Water Program requirements. These requirements include three fundamental elements: (i) a requirement to effectively prohibit non-storm water discharges through the MS4, (ii) requirements to implement controls to reduce the discharge of pollutants to the maximum extent practicable, and (iii) other provisions the Regional Water Board has determined appropriate for the control of such pollutants.

J. Background and Rationale for Requirements. The Regional Water Board developed the requirements in this Order based on information submitted as part of the Permittees' applications, through monitoring and reporting programs, and other available

[2] Federal Water Pollution Control Act; 33 U.S.C. § 1251 et seq., which, as amended in 1977, is commonly known as the Clean Water Act.

information. In accordance with federal regulations at 40 CFR section 124.8, a Fact Sheet (Attachment F) has been prepared to explain the principal facts and the significant factual, legal, methodological, and policy questions considered in preparing this Order. The Fact Sheet is hereby incorporated into this Order and also constitutes part of the Findings of the Regional Water Board for this Order. Attachments A through E and G through R are also incorporated into this Order.

K. Water Quality Control Plans. The Clean Water Act requires the Regional Water Board to establish water quality standards for each water body in its region. Water quality standards include beneficial uses, water quality objectives and criteria that are established at levels sufficient to protect those beneficial uses, and an antidegradation policy to prevent degrading waters. The Regional Water Board adopted a *Water Quality Control Plan - Los Angeles Region* (hereinafter Basin Plan) on June 13, 1994 and has amended it on multiple occasions since 1994. The Basin Plan designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters in the Los Angeles Region. Pursuant to California Water Code section 13263(a), the requirements of this Order implement the Basin Plan. Beneficial uses applicable to the surface water bodies that receive discharges from the Los Angeles County MS4 generally include those listed below.

Table 6. Basin Plan Beneficial Uses

Discharge Point	Receiving Water Name	Beneficial Uses
All Municipal Separate Storm Sewer Systems (MS4s) discharge points within Los Angeles County coastal watersheds with the exception of the City of Long Beach	Multiple surface water bodies of the Los Angeles Region	Municipal and Domestic Supply (MUN); Agricultural Supply (AGR); Industrial Service Supply (IND); Industrial Process Supply (PROC); Ground Water Recharge (GWR); Freshwater Replenishment (FRSH); Navigation (NAV); Hydropower Generation (POW); Water Contact Recreation (REC-1); Limited Contact Recreation (LREC-1); Non-Contact Water Recreation (REC-2); Commercial and Sport Fishing (COMM); Warm Freshwater Habitat (WARM); Cold Freshwater Habitat (COLD); Preservation of Areas of Special Biological Significance (BIOL); Wildlife Habitat (WILD); Preservation of Rare and Endangered Species (RARE); Marine Habitat (MAR); Wetland Habitat (WET); Migration of Aquatic Organisms (MIGR); Spawning, Reproduction, and/or Early Development (SPWN); Shellfish Harvesting (SHELL)

1. Total Maximum Daily Loads (TMDLs)

Clean Water Act section 303(d)(1) requires each state to identify the waters within its boundaries that do not meet water quality standards. Water bodies that do not meet water quality standards are considered impaired and are placed on the state's "CWA Section 303(d) List". For each listed water body, the state is required to establish a TMDL of each pollutant impairing the water quality standards in that water body. A TMDL is a tool for implementing water quality standards and is based on the relationship between pollution sources and in-stream water quality conditions. The

TMDL establishes the allowable pollutant loadings for a water body and thereby provides the basis to establish water quality-based controls. These controls should provide the pollution reduction necessary for a water body to meet water quality standards. A TMDL is the sum of the allowable pollutant loads of a single pollutant from all contributing point sources (the waste load allocations or WLAs) and non-point sources (load allocations or LAs), plus the contribution from background sources and a margin of safety. (40 CFR section 130.2(i).) MS4 discharges are considered point source discharges.

Numerous receiving waters within Los Angeles County do not meet water quality standards or fully support beneficial uses and therefore have been classified as impaired on the State's 303(d) List. The Regional Water Board and USEPA have each established TMDLs to address many of these water quality impairments. Pursuant to CWA section 402(p)(B)(3)(iii) and 40 CFR section 122.44(d)(1)(vii)(B), this Order includes requirements that are consistent with and implement WLAs that are assigned to discharges from the Los Angeles County MS4 from 33 State-adopted and USEPA established TMDLs. This Order requires Permittees to comply with the TMDL Provisions in Part VI.E and Attachments L through R, which are consistent with the assumptions and requirements of the TMDL WLAs assigned to discharges from the Los Angeles County MS4. A comprehensive list of TMDLs by watershed management area and the Permittees subject to each TMDL is included in Attachment K.

Waste load allocations in these TMDLs are expressed in several ways depending on the nature of the pollutant and its impacts on receiving waters and beneficial uses. Bacteria WLAs assigned to MS4 discharges are expressed as the number of allowable exceedance days that a water body may exceed the Basin Plan water quality objectives for protection of the REC-1 beneficial use. Since the TMDLs and the WLAs contained therein are expressed as receiving water conditions, receiving water limitations have been included in this Order that are consistent with and implement the allowable exceedance day WLAs. Water quality-based effluent limitations are also included equivalent to the Basin Plan water quality objectives to allow the opportunity for Permittees to individually demonstrate compliance at an outfall or jurisdictional boundary, thus isolating the Permittee's pollutant contributions from those of other Permittees and from other pollutant sources to the receiving water.

WLAs for trash are expressed as progressively decreasing allowable amounts of trash discharges from a Permittee's jurisdictional area within the drainage area to the impaired water body. The Trash TMDLs require each Permittee to make annual reductions of its discharges of trash over a set period, until the numeric target of zero trash discharged from the MS4 is achieved. The Trash TMDLs specify a specific formula for calculating and allocating annual reductions in trash discharges from each jurisdictional area within a watershed. The formula results in specified annual amounts of trash that may be discharged from each jurisdiction into the receiving waters. Translation of the WLAs or compliance points described in the TMDLs into jurisdiction-specific load reductions from the baseline levels, as specified

in the TMDL, logically results in the articulation of an annual limitation on the amount of a pollutant that may be discharged. The specification of allowable annual trash discharge amounts meets the definition of an "effluent limitation", as that term is defined in subdivision (c) of section 13385.1 of the California Water Code. Specifically, the trash discharge limitations constitute a "numeric restriction … on the quantity [or] discharge rate … of a pollutant or pollutants that may be discharged from an authorized location."

TMDL WLAs for other pollutants (e.g., metals and toxics) are expressed as concentration and/or mass and water quality-based effluent limitations have been specified consistent with the expression of the WLA, including any applicable averaging periods. Some TMDLs specify that, if certain receiving water conditions are achieved, such achievement constitutes attainment of the WLA. In these cases, receiving water limitations and/or provisions outlining these alternate means of demonstrating compliance are included in the TMDL provisions in Part VI.E of this Order.

The inclusion of water quality-based effluent limitations and receiving water limitations to implement applicable WLAs provides a clear means of identifying required water quality outcomes within the permit and ensures accountability by Permittees to implement actions necessary to achieve the limitations.

A number of the TMDLs for bacteria, metals, and toxics establish WLAs that are assigned jointly to a group of Permittees whose storm water and/or non-storm water discharges are or may be commingled in the MS4 prior to discharge to the receiving water subject to the TMDL. TMDLs address commingled MS4 discharges by assigning a WLA to a group of MS4 Permittees based on co-location within the same subwatershed. Permittees with co-mingled MS4 discharges are jointly responsible for meeting the water quality-based effluent limitations and receiving water limitations assigned to MS4 discharges in this Order. "Joint responsibility" means that the Permittees that have commingled MS4 discharges are responsible for implementing programs in their respective jurisdictions, or within the MS4 for which they are an owner and/or operator, to meet the water quality-based effluent limitations and/or receiving water limitations assigned to such commingled MS4 discharges.

In these cases, federal regulations state that co-permittees need only comply with permit conditions relating to discharges from the MS4 for which they are owners or operators (40 CFR § 122.26(a)(3)(vi)). Individual co-permittees are only responsible for their contributions to the commingled MS4 discharge. This Order does not require a Permittee to individually ensure that a commingled MS4 discharge meets the applicable water quality-based effluent limitations included in this Order, unless such Permittee is shown to be solely responsible for an exceedance.

Additionally, this Order allows a Permittee to clarify and distinguish their individual contributions and demonstrate that its MS4 discharge did not cause or contribute to exceedances of applicable water quality-based effluent limitations and/or receiving

water limitations. If such a demonstration is made, though the Permittee's discharge may commingle with that of other Permittees, the Permittee would not be held jointly responsible for the exceedance of the water quality-based effluent limitation or receiving water limitation. Individual co-permittees who demonstrate compliance with the water quality-based effluent limitations will not be held responsible for violations by non-compliant co-permittees.

Given the interconnected nature of the Permittees' MS4s, however, the Regional Water Board expects Permittees to work cooperatively to control the contribution of pollutants from one portion of the MS4 to another portion of the system through inter-agency agreements or other formal arrangements.

L. Ocean Plan. In 1972, the State Water Resources Control Board (State Water Board) adopted the Water Quality Control Plan for Ocean Waters of California, California Ocean Plan (hereinafter Ocean Plan). The State Water Board adopted the most recent amended Ocean Plan on September 15, 2009. The Office of Administration Law approved it on March 10, 2010. On October 8, 2010, USEPA approved the 2009 Ocean Plan. The Ocean Plan is applicable, in its entirety, to the ocean waters of the State. In order to protect beneficial uses, the Ocean Plan establishes water quality objectives and a program of implementation. Pursuant to California Water Code section 13263(a), the requirements of this Order implement the Ocean Plan. The Ocean Plan identifies beneficial uses of ocean waters of the State to be protected as summarized in the table below.

Table 7. Ocean Plan Beneficial Uses

Discharge Point	Receiving Water Name	Beneficial Uses
All Municipal Separate Storm Sewer Systems (MS4s) discharge points within Los Angeles County coastal watersheds with the exception of the City of Long Beach	Pacific Ocean	Industrial Water Supply (IND); Water Contact (REC-1) and Non-Contact Recreation (REC-2), including aesthetic enjoyment; Navigation (NAV); Commercial and Sport Fishing (COMM); Mariculture; Preservation and Enhancement of Designated Areas of Special Biological Significance (ASBS); Rare and Endangered Species (RARE); Marine Habitat (MAR); Fish Migration (MIGR); Fish Spawning (SPWN) and Shellfish Harvesting (SHELL)

M. Antidegradation Policy

40 CFR section 131.12 requires that state water quality standards include an antidegradation policy consistent with the federal antidegradation policy. The State Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16 ("Statement of Policy with Respect to Maintaining the Quality of the Waters of the State"). Resolution No. 68-16 incorporates the federal antidegradation policy where the federal policy applies under federal law. Resolution No. 68-16 requires that existing water quality be maintained unless degradation is

justified based on specific findings. The Regional Water Board's Basin Plan implements, and incorporates by reference, both the state and federal antidegradation policies. The permitted discharge is consistent with the antidegradation provision of section 131.12 and State Water Board Resolution No. 68-16.

N. Anti-Backsliding Requirements. Section 402(o)(2) of the CWA and federal regulations at 40 CFR section 122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require effluent limitations in a reissued permit to be as stringent as those in the previous permit, with some exceptions where limitations may be relaxed. All effluent limitations in this Order are at least as stringent as the effluent limitations in the previous permit.

O. Endangered Species Act. This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code, §§ 2050 to 2115.5) or the Federal Endangered Species Act (16 U.S.C.A., §§ 1531 to 1544). This Order requires compliance with requirements to protect the beneficial uses of waters of the United States. Permittees are responsible for meeting all requirements of the applicable Endangered Species Act.

P. Monitoring and Reporting. Section 308(a) of the federal Clean Water Act, and 40 CFR sections 122.41(h), (j)-(l), 122.41(i), and 122.48, require that all NPDES permits specify monitoring and reporting requirements. Federal regulations applicable to large and medium MS4s also specify additional monitoring and reporting requirements. (40 C.F.R. §§ 122.26(d)(2)(i)(F) & (d)(2)(iii)(D), 122.42(c).) California Water Code section 13383 authorizes the Regional Water Board to establish monitoring, inspection, entry, reporting, and recordkeeping requirements. The Monitoring and Reporting Program establishes monitoring, reporting, and recordkeeping requirements that implement the federal and State laws and/or regulations. This Monitoring and Reporting Program is provided in Attachment E.

Q. Standard and Special Provisions. Standard Provisions, which apply to all NPDES permits in accordance with 40 CFR section 122.41, and additional conditions applicable to specified categories of permits in accordance with 40 CFR section 122.42, are provided in Attachment D. Dischargers must comply with all standard provisions and with those additional conditions that are applicable under 40 CFR section 122.42 provided in Attachment D. The Regional Water Board has also included in Part VI of this Order various special provisions applicable to the Dischargers. A rationale for the various special provisions contained in this Order is provided in the attached Fact Sheet (Attachment F).

R. State Mandates

Article XIII B, Section 6(a) of the California Constitution provides that whenever "any state agency mandates a new program or higher level of service on any local government, the state shall provide a subvention of funds to reimburse that local government for the costs of the program or increased level of service." The requirements of this Order do not constitute state mandates that are subject to a

subvention of funds for several reasons as described in detail in the attached Fact Sheet (Attachment F).

S. California Water Code Section 13241. The California Supreme Court has ruled that although California Water Code section 13263 requires the State and Regional Water Boards (collectively, Water Boards) to consider the factors set forth in California Water Code section 13241 when issuing an NPDES permit, the Water Boards may not consider the factors to justify imposing pollutant restriction that are less stringent than the applicable federal regulations require. (*City of Burbank v. State Water Resources Control Bd.* (2005) 35 Cal.4th 613, 618, 626-627). However, when the pollutant restrictions in an NPDES permit are more stringent than federal law requires, California Water Code section 13263 requires that the Water Boards consider the factors described in section 13241 as they apply to those specific restrictions. As noted in the preceding finding, the Regional Water Board finds that the requirements in this permit are not more stringent than the minimum federal requirements. Therefore, a 13241 analysis is not required for permit requirements that implement the effective prohibition on the discharge of non-storm water discharges into the MS4, or for controls to reduce the discharge of pollutants in storm water to the maximum extent practicable, or other provisions that the Regional Water Board has determined appropriate to control such pollutants, as those requirements are mandated by federal law. Notwithstanding the above, the Regional Water Board has developed an economic analysis of the permit's requirements, consistent with California Water Code section 13241. That analysis is provided in the Fact Sheet (Attachment F of this Order).

T. California Environmental Quality Act (CEQA). This action to adopt an NPDES Permit is exempt from the provisions of Chapter 3 of the California Environmental Quality Act (CEQA) (Public Resources Code, § 21100, et seq.) pursuant to California Water Code section 13389. (*County of Los Angeles v. Cal. Water Boards* (2006) 143 Cal.App.4th 985.)

U. Notification of Interested Parties. In accordance with State and federal laws and regulations, the Regional Water Board has notified the Permittees and interested agencies and persons of its intent to prescribe waste discharge requirements for the discharges authorized by this Order and has provided them with an opportunity to provide written and oral comments. Details of notification, as well as the meetings and workshops held on drafts of the permit, are provided in the Fact Sheet of this Order.

V. Consideration of Public Comment. The Regional Water Board, in a public meeting, heard and considered all oral and written comments pertaining to the discharges authorized by this Order and the requirements contained herein. The Regional Water Board has prepared written responses to all timely comments, which are incorporated by reference as part of this Order.

W. This Order serves as an NPDES permit pursuant to CWA section 402 or amendments thereto, and becomes effective fifty (50) days after the date of its adoption, provided that the Regional Administrator, USEPA, Region IX, expresses no objections.

X. This Order supersedes Order No. 01-182 as amended, except for enforcement purposes.

Y. Review by the State Water Board. Any person aggrieved by this action of the Regional Water Board may petition the State Water Board to review the action in accordance with California Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must *receive* the petition by 5:00 p.m., 30 days after the Regional Water Board action, except that if the thirtieth day following the action falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at: http://www.waterboards.ca.gov/public_notices/petitions/water_quality or will be provided upon request.

THEREFORE, IT IS HEREBY ORDERED, that the Dischargers, in order to meet the provisions contained in Division 7 of the California Water Code (commencing with section 13000), and regulations, plans, and policies adopted thereunder, and the provisions of the Clean Water Act and regulations and guidelines adopted thereunder, shall comply with the following requirements:

III. DISCHARGE PROHIBITIONS

A. Prohibitions – Non-Storm Water Discharges

1. **Prohibition of Non-Storm Water Discharges.** Each Permittee shall, for the portion of the MS4 for which it is an owner or operator, prohibit non-storm water discharges through the MS4 to receiving waters except where such discharges are either:

   a. Authorized non-storm water discharges separately regulated by an individual or general NPDES permit;

   b. Temporary non-storm water discharges authorized by USEPA[3] pursuant to sections 104(a) or 104(b) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) that either: (i) will comply with water quality standards as applicable or relevant and appropriate requirements ("ARARs") under section 121(d)(2) of CERCLA; or (ii) are subject to either (a) a written waiver of ARARs by USEPA pursuant to section 121(d)(4) of CERCLA or (b) a written determination by USEPA that compliance with ARARs is not practicable considering the exigencies of the situation pursuant to 40 CFR. section 300.415(j);

   c. Authorized non-storm water discharges from emergency fire fighting activities (i.e., flows necessary for the protection of life or property)[4];

   d. Natural flows, including:

      i. Natural springs;

[3] These typically include short-term, high volume discharges resulting from the development or redevelopment of groundwater extraction wells, or USEPA or State-required compliance testing of potable water treatment plants, as part of a USEPA authorized groundwater remediation action under CERCLA.

[4] Discharges from vehicle washing, building fire suppression system maintenance and testing (e.g., sprinkler line flushing), fire hydrant maintenance and testing, and other routine maintenance activities are not considered emergency fire fighting activities.

ii. Flows from riparian habitats and wetlands;

iii. Diverted stream flows, authorized by the State or Regional Water Board;

iv. Uncontaminated ground water infiltration[5];

v. Rising ground waters, where ground water seepage is not otherwise covered by a NPDES permit[6]; or

e. Conditionally exempt non-storm water discharges in accordance with Parts III.A.2 and III.A.3 below.

2. Conditional Exemptions from Non-Storm Water Discharge Prohibition. The following categories of non-storm water discharges are conditionally exempt from the non-storm water discharge prohibition, provided they meet all required conditions specified below, or as otherwise approved by the Regional Water Board Executive Officer, in all areas regulated by this Order with the exception of direct discharges to Areas of Special Biological Significance (ASBS) within Los Angeles County. Conditional exemptions from the prohibition on non-storm water discharges through the MS4 to an ASBS are identified in Part III.A.3 below.

a. Conditionally Exempt Essential Non-Storm Water Discharges: These consist of those discharges that fall within one of the categories below; meet all required best management practices (BMPs) as specified in i. and ii. below, including those enumerated in the referenced BMP manuals; are essential public services discharge activities; and are directly or indirectly required by other state or federal statute and/or regulation:

i. Discharges from essential *non-emergency* fire fighting activities[7] provided appropriate BMPs are implemented based on the CAL FIRE, Office of the State Fire Marshal's *Water-Based Fire Protection Systems Discharge Best Management Practices Manual* (September 2011) for water-based fire protection system discharges, and based on Riverside County's *Best Management Practices Plan for Urban Runoff Management* (May 1, 2004) or equivalent BMP manual for fire training activities and post-emergency fire fighting activities;

ii. Discharges from drinking water supplier distribution systems, where not otherwise regulated by an individual or general NPDES permit[8], provided

[5] Uncontaminated ground water infiltration is water other than waste water that enters the MS4 (including foundation drains) from the ground through such means as defective pipes, pipe joints, connections, or manholes. Infiltration does not include, and is distinguished from, inflow. (See 40 CFR § 35.2005(20).)

[6] A NPDES permit for discharges associated with ground water dewatering is required within the Los Angeles Region.

[7] This includes fire fighting training activities, which simulate emergency responses, and routine maintenance and testing activities necessary for the protection of life and property, including building fire suppression system maintenance and testing (e.g. sprinkler line flushing) and fire hydrant testing and maintenance. Discharges from vehicle washing are not considered essential and as such are not conditionally exempt from the non-storm water discharge prohibition.

[8] Drinking water supplier distribution system releases means sources of flows from drinking water storage, supply and distribution systems (including flows from system failures), pressure releases, system maintenance, distribution line testing, and flushing and dewatering of pipes, reservoirs, and vaults, and minor non-invasive well maintenance activities not involving chemical addition(s) where not otherwise regulated by NPDES Permit No. CAG674001, NPDES Permit No. CAG994005, or another separate NPDES permit.

appropriate BMPs are implemented based on the American Water Works Association (California-Nevada Section) *Guidelines for the Development of Your Best Management Practices (BMP) Manual for Drinking Water System Releases* (2005) or equivalent industry standard BMP manual. Additionally, each Permittee shall work with drinking water suppliers that may discharge to the Permittee's MS4 to ensure for all discharges greater than 100,000 gallons: (1) notification at least 72 hours prior to a planned discharge and as soon as possible after an unplanned discharge; (2) monitoring of any pollutants of concern[9] in the drinking water supplier distribution system release; and (3) record keeping by the drinking water supplier. Permittees shall require that the following information is maintained by the drinking water supplier(s) for all discharges to the MS4 (planned and unplanned) greater than 100,000 gallons: name of discharger, date and time of notification (for planned discharges), method of notification, location of discharge, discharge pathway, receiving water, date of discharge, time of the beginning and end of the discharge, duration of the discharge, flow rate or velocity, total number of gallons discharged, type of dechlorination equipment used, type of dechlorination chemicals used, concentration of residual chlorine, type(s) of sediment controls used, pH of discharge, type(s) of volumetric and velocity controls used, and field and laboratory monitoring data. Records shall be retained for five years and made available upon request by the Permittee or Regional Water Board.

b. Those discharges that fall within one of the categories below, provided that the discharge itself is not a source of pollutants and meets all required conditions specified in Table 8 or as otherwise specified or approved by the Regional Water Board Executive Officer:

i. Dewatering of lakes[10];

ii. Landscape irrigation;

iii. Dechlorinated/debrominated swimming pool/spa discharges[11], where not otherwise regulated by a separate NPDES permit;

iv. Dewatering of decorative fountains[12];

v. Non-commercial car washing by residents or by non-profit organizations;

[9] Pollutants of concern from drinking water supplier distribution system releases may include trash and debris, including organic matter, total suspended solids (TSS), residual chlorine, pH, and any pollutant for which there is a water quality-based effluent limitation (WQBEL) in Part VI.E applicable to discharges from the MS4 to the receiving water. Determination of the pollutants of concern for a particular discharge shall be based on an evaluation of the potential for the constituent(s) to be present in the discharge at levels that may cause or contribute to exceedances of applicable WQBELs or receiving water limitations.

[10] Dewatering of lakes does not include dewatering of drinking water reservoirs. Dewatering of drinking water reservoirs is addressed in Part III.A.2.a.ii.

[11] Conditionally exempt dechlorinated/debrominated swimming pool/spa discharges do not include swimming pool/spa filter backwash or swimming pool/spa water containing bacteria, detergents, wastes, or algaecides, or any other chemicals including salts from pools commonly referred to as "salt water pools" in excess of applicable water quality objectives.

[12] Conditionally exempt discharges from dewatering of decorative fountains do not include fountain water containing bacteria, detergents, wastes, or algaecides, or any other chemicals in excess of applicable water quality objectives.

vi. Street/sidewalk wash water[13].

3. **Conditional Exemptions from Non-Storm Water Discharge Prohibition within an ASBS**. The following non-storm water discharges from the MS4 directly to an ASBS are conditionally exempt pursuant to the California Ocean Plan as specified below, provided that:

a. The discharges are essential for emergency response purposes, structural stability, slope stability or occur naturally, including the following discharges:

i. Discharges associated with emergency fire fighting activities (i.e., flows necessary for the protection of life or property)[14];

ii. Foundation and footing drains;

iii. Water from crawl space or basement pumps;

iv. Hillside dewatering;

v. Naturally occurring ground water seepage via a MS4; and

vi. Non-anthropogenic flows from a naturally occurring stream via a culvert or MS4, as long as there are no contributions of anthropogenic runoff.

b. The discharges fall within one of the conditionally exempt essential non-storm water discharge categories in Part III.A.2.a. above.

c. Conditionally exempt non-storm water discharges shall not cause or contribute[15] to an exceedance of applicable receiving water limitations and/or water quality-based effluent limitations in this Order or the water quality objectives in Chapter II of the Ocean Plan, or alter natural ocean water quality in an ASBS.

4. **Permittee Requirements.** Each Permittee shall:

a. Develop and implement procedures to ensure that a discharger, if not a named Permittee in this Order, fulfills the following for non-storm water discharges to the Permittee's MS4:

i. Notifies the Permittee of the planned discharge in advance, consistent with requirements in Table 8 or recommendations pursuant to the applicable BMP manual;

ii. Obtains any local permits required by the MS4 owner(s) and/or operator(s);

[13] Conditionally exempt non-storm water discharges of street/sidewalk wash water only include those discharges resulting from use of high pressure, low volume spray washing using only potable water with no cleaning agents at an average usage of 0.006 gallons per square feet of sidewalk area in accordance with Regional Water Board Resolution No. 98-08. Conditionally exempt non-storm water discharges of street/sidewalk wash water do not include hosing of any sidewalk or street with a garden hose with a pressure nozzle.
[14] See note 4.
[15] Based on the water quality characteristics of the conditionally exempt non-storm water discharge itself.

iii. Provides documentation that it has obtained any other necessary permits or water quality certifications[16] for the discharge;

iv. Conducts monitoring of the discharge, if required by the Permittee;

v. Implements BMPs and/or control measures as specified in Table 8 or in the applicable BMP manual(s) as a condition of the approval to discharge into the Permittee's MS4; and

vi. Maintains records of its discharge to the MS4, consistent with requirements in Table 8 or recommendations pursuant to the applicable BMP manual. For lake dewatering, Permittees shall require that the following information is maintained by the lake owner / operator: name of discharger, date and time of notification, method of notification, location of discharge, discharge pathway, receiving water, date of discharge, time of the beginning and end of the discharge, duration of the discharge, flow rate or velocity, total number of gallons discharged, type(s) of sediment controls used, pH of discharge, type(s) of volumetric and velocity controls used, and field and laboratory monitoring data. Records shall be made available upon request by the Permittee or Regional Water Board.

b. Develop and implement procedures that minimize the discharge of landscape irrigation water into the MS4 by promoting conservation programs.

i. Permittees shall coordinate with the local water purveyor(s), where applicable, to promote landscape water use efficiency requirements for existing landscaping, use of drought tolerant, native vegetation, and the use of less toxic options for pest control and landscape management.

ii. Permittees shall develop and implement a coordinated outreach and education program to minimize the discharge of irrigation water and pollutants associated with irrigation water consistent with Part VI.D.4.c of this Order (Public Information and Participation Program).

c. Evaluate monitoring data collected pursuant to the Monitoring and Reporting Program (MRP) of this Order (Attachment E), and any other associated data or information, and determine whether any of the authorized or conditionally exempt non-storm water discharges identified in Parts III.A.1, III.A.2, and III.A.3 above are a source of pollutants that may be causing or contributing to an exceedance of applicable receiving water limitations in Part V and/or water quality-based effluent limitations in Part VI.E. To evaluate monitoring data, the Permittee shall either use applicable interim or final water quality-based effluent limitations for the pollutant or, if there are no applicable interim or final water quality-based effluent limitations for the pollutant, use applicable action levels provided in Attachment G. Based on non-storm water outfall-based monitoring as implemented through the MRP, if monitoring data show

[16] Pursuant to the Federal Clean Water Act § 401.

exceedances of applicable water quality-based effluent limitations or action levels, the Permittee shall take further action to determine whether the discharge is causing or contributing to exceedances of receiving water limitations in Part V.

d. If the Permittee determines that any of the conditionally exempt non-storm water discharges identified in Part III.A.2.b above is a source of pollutants that causes or contributes to an exceedance of applicable receiving water limitations and/or water quality-based effluent limitations, the Permittee(s) shall report its findings to the Regional Water Board in its annual report. Based on this determination, the Permittee(s) shall also either:

i. Effectively prohibit[17] the non-storm water discharge to the MS4; or

ii. Impose conditions in addition to those in Table 8, subject to approval by the Regional Water Board Executive Officer, on the non-storm water discharge such that it will not be a source of pollutants; or

iii. Require diversion of the non-storm water discharge to the sanitary sewer; or

iv. Require treatment of the non-storm water discharge prior to discharge to the receiving water.

e. If the Permittee determines that any of the authorized or conditionally exempt essential non-storm water discharges identified in Parts III.A.1.a through III.A.1.c, III.A.2.a, or III.A.3 above is a source of pollutants that causes or contributes to an exceedance of applicable receiving water limitations and/or water quality-based effluent limitations, the Permittee shall notify the Regional Water Board within 30 days if the non-storm water discharge is an authorized discharge with coverage under a separate NPDES permit or authorized by USEPA under CERCLA in the manner provided in Part III.A.1.b above, or a conditionally exempt essential non-storm water discharge or emergency non-storm water discharge.

f. If the Permittee prohibits the discharge from the MS4, as per Part III.A.4.d.i, then the Permittee shall implement procedures developed under Part VI.D.9 (Illicit Connections and Illicit Discharges Elimination Program) in order to eliminate the discharge to the MS4.

5. If a Permittee demonstrates that the water quality characteristics of a specific authorized or conditionally exempt essential non-storm water discharge resulted in an exceedance of applicable receiving water limitations and/or water quality-based effluent limitations during a specific sampling event, the Permittee shall not be found in violation of applicable receiving water limitations and/or water quality-based effluent limitations for that specific sampling event. Such

[17] To "effectively prohibit" means to not allow the non-storm water discharge through the MS4 unless the discharger obtains coverage under a separate NPDES permit prior to discharge to the MS4.

demonstration must be based on source specific water quality monitoring data from the authorized or conditionally exempt essential non-storm water discharge or other relevant information documenting the characteristics of the specific non-storm water discharge as identified in Table 8.

6. Notwithstanding the above, the Regional Water Board Executive Officer, based on an evaluation of monitoring data and other relevant information for specific categories of non-storm water discharges, may modify a category or remove categories of conditionally exempt non-storm water discharges from Parts III.A.2 and III.A.3 above if the Executive Officer determines that a discharge category is a source of pollutants that causes or contributes to an exceedance of applicable receiving water limitations and/or water quality-based effluent limitations, or may require that a discharger obtain coverage under a separate individual or general State or Regional Water Board permit for a non-storm water discharge.

Table 8. Required Conditions for Conditionally Exempt Non-Storm Water Discharges

Discharge Category	General Conditions Under Which Discharge Through the MS4 is Allowed	Conditions/BMPs that are Required to be Implemented Prior to Discharge Through the MS4
All Discharge Categories	See discharge specific conditions below.	Ensure conditionally exempt non-storm water discharges avoid potential sources of pollutants in the flow path to prevent introduction of pollutants to the MS4 and receiving water. Whenever there is a discharge of 100,000 gallons or more into the MS4, Permittees shall require advance notification by the discharger to the potentially affected MS4 Permittees, including at a minimum the LACFCD, if applicable, and the Permittee with jurisdiction over the land area from which the discharge originates.
Dewatering of lakes	Discharge allowed only if all necessary permits/water quality certifications for dredge and fill activities, including water diversions, are obtained prior to discharge.	Ensure procedures for advanced notification by the lake owner / operator to the Permittee(s) no less than 72 hours prior to the planned discharge. Immediately prior to discharge, visible trash on the shoreline or on the surface of the lake shall be removed and disposed of in a legal manner. Immediately prior to discharge, the discharge pathway and the MS4 inlet to which the discharge is directed, shall be inspected and cleaned out. Discharges shall be volumetrically and velocity controlled to minimize resuspension of sediments. Measures shall be taken to stabilize lake bottom sediments. Ensure procedures for water quality monitoring for pollutants of concern[18] in the lake. Ensure record-keeping of lake dewatering by the lake owner / operator.

[18] Pollutants of concern include, at a minimum, trash and debris, including organic matter, TSS, and any pollutant for which there is a water quality-based effluent limitation in Part VI.E for the lake and/or receiving water.

Landscape irrigation using potable water	Discharge allowed if runoff due to potable landscape irrigation is minimized through the implementation of an ordinance specifying water efficient landscaping standards, as well as an outreach and education program focusing on water conservation and landscape water use efficiency.	Implement BMPs to minimize runoff and prevent introduction of pollutants to the MS4 and receiving water. Implement water conservation programs to minimize discharge by using less water.
Landscape irrigation using reclaimed or recycled water	Discharge of reclaimed or recycled water runoff from landscape irrigation is allowed if the discharge is in compliance with the producer and distributor operations and management (O&M) plan, and all relevant portions thereof, including the Irrigation Management Plan.	Discharges must comply with applicable O&M Plans, and all relevant portions thereof, including the Irrigation Management Plan.

Dechlorinated/ debrominated swimming pool/spa discharges	Discharges allowed after implementation of specified BMPs. Pool or spa water containing copper-based algaecides is not allowed to be discharged to the MS4. Discharges of cleaning waste water and filter backwash allowed only if authorized by a separate NPDES permit.	Implement BMPs and ensure discharge avoids potential sources of pollutants in the flow path to prevent introduction of pollutants prior to discharge to the MS4 and receiving water. Swimming pool water must be dechlorinated or debrominated using holding time, aeration, and/or sodium thiosulfate. Chlorine residual in the discharge shall not exceed 0.1 mg/L. Swimming pool water shall not contain any detergents, wastes, or algaecides, or any other chemicals including salts from pools commonly referred to as “salt water pools” in excess of applicable water quality objectives.[19] Swimming pool discharges are to be pH adjusted, if necessary, and be within the range of 6.5 and 8.5 standard units. Swimming pool discharges shall be volumetrically and velocity controlled to promote evaporation and/or infiltration. Ensure procedures for advanced notification by the pool owner to the Permittee(s) at least 72 hours prior to planned discharge for discharges of 100,000 gallons or more. For discharges of 100,000 gallons or more, immediately prior to discharge, the discharge pathway and the MS4 inlet to which the discharge is directed, shall be inspected and cleaned out.
Dewatering of decorative fountains	Discharges allowed after implementation of specified BMPs. Fountain water containing copper-based algaecides may not be discharged to the MS4. Fountain water containing dyes my not be discharged to the MS4.	Implement BMPs and ensure discharge avoids potential sources of pollutants in the flow path to prevent introduction of pollutants prior to discharge to the MS4 and receiving water. Fountain water must be dechlorinated or debrominated using holding time, aeration, and/or sodium thiosulfate. Chlorine residual in the discharge shall not exceed 0.1 mg/L. Fountain discharges are to be pH adjusted, if necessary, and be within the range of 6.5 and 8.5 standard units. Fountain discharges shall be volumetrically and velocity controlled to promote evaporation and/or infiltration. Ensure procedures for advanced notification by the fountain owner to the Permittee(s) at least 72 hours prior to planned discharge for discharges of 100,000 gallons or more. For discharges of 100,000 gallons or more, immediately prior to discharge, the discharge pathway and the MS4 inlet to which the discharge is directed, shall be inspected and cleaned out.
Non-commercial car washing by residents or by non-	Discharges allowed after implementation of specified BMPs.	Implement BMPs and ensure discharge avoids potential sources of pollutants in the flow path to prevent introduction of pollutants prior to discharge to the MS4 and receiving water. Minimize the amount of water used by employing water conservation practices such as turning off

[19] Applicable mineral water quality objectives for surface waters are contained in Chapter 3 of the Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties.

profit organizations		nozzles or kinking the hose when not spraying a car, and using a low volume pressure washer. Encourage use of biodegradable, phosphate free detergents and non-toxic cleaning products. Where possible, wash cars on a permeable surface where wash water can percolate into the ground (e.g. gravel or grassy areas). Empty buckets of soapy or rinse water into the sanitary sewer system (e.g., sinks or toilets).
Street/sidewalk wash water	Discharges allowed after implementation of specified BMPs.	Sweeping should be used as an alternate BMP whenever possible and sweepings should be disposed of in the trash. BMPs shall be in accordance with Regional Water Board Resolution No. 98-08 that requires: 1) removal of trash, debris, and free standing oil/grease spills/leaks (use absorbent material if necessary) from the area before washing and 2) use of high pressure, low volume spray washing using only potable water with no cleaning agents at an average usage of 0.006 gallons per square feet of sidewalk area. In areas of unsanitary conditions (e.g., areas where the congregation of transient populations can reasonably be expected to result in a significant threat to water quality), whenever practicable, Permittees shall collect and divert street and alley wash water from the Permittee's street and sidewalk cleaning public agency activities to the sanitary sewer.

IV. EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

A. Effluent Limitations

1. **Technology Based Effluent Limitations**: Each Permittee shall reduce pollutants in storm water discharges from the MS4 to the maximum extent practicable (MEP).

2. **Water Quality-Based Effluent Limitations (WQBELs).** This Order establishes WQBELs consistent with the assumptions and requirements of all available TMDL waste load allocations assigned to discharges from the Permittees' MS4s.

   a. Each Permittee shall comply with applicable WQBELs as set forth in Part VI.E of this Order, pursuant to applicable compliance schedules.

B. Land Discharge Specifications – Not Applicable

C. Reclamation Specifications – Not Applicable

V. RECEIVING WATER LIMITATIONS

A. Receiving Water Limitations

1. Discharges from the MS4 that cause or contribute to the violation of receiving water limitations are prohibited.

2. Discharges from the MS4 of storm water, or non-storm water, for which a Permittee is responsible[20], shall not cause or contribute to a condition of nuisance.

3. The Permittees shall comply with Parts V.A.1 and V.A.2 through timely implementation of control measures and other actions to reduce pollutants in the discharges in accordance with the storm water management program and its components and other requirements of this Order including any modifications. The storm water management program and its components shall be designed to achieve compliance with receiving water limitations. If exceedances of receiving water limitations persist, notwithstanding implementation of the storm water management program and its components and other requirements of this Order, the Permittee shall assure compliance with discharge prohibitions and receiving water limitations by complying with the following procedure:

   a. Upon a determination by either the Permittee or the Regional Water Board that discharges from the MS4 are causing or contributing to an exceedance of an applicable Receiving Water Limitation, the Permittee shall promptly notify and thereafter submit an Integrated Monitoring Compliance Report (as described in the Program Reporting Requirements, Part XVIII.A.5 of the Monitoring and Reporting Program) to the Regional Water Board for approval. The Integrated Monitoring Compliance shall describe the BMPs that are currently being

[20] Pursuant to 40 CFR § 122.26(a)(3)(vi), a Permittee is only responsible for discharges of storm water and non-storm water from the MS4 for which it is an owner or operator.

implemented by the Permittee and additional BMPs, including modifications to current BMPs that will be implemented to prevent or reduce any pollutants that are causing or contributing to the exceedances of receiving water limitations. The Integrated Monitoring Compliance Report shall include an implementation schedule. This Integrated Monitoring Compliance Report shall be incorporated in the annual Storm Water Report unless the Regional Water Board directs an earlier submittal. The Regional Water Board may require modifications to the Integrated Monitoring Compliance Report.

b. The Permittee shall submit any modifications to the Integrated Monitoring Compliance Report required by the Regional Water Board within 30 days of notification.

c. Within 30 days following the Regional Water Board Executive Officer's approval of the Integrated Monitoring Compliance Report, the Permittee shall revise the storm water management program and its components and monitoring program to incorporate the approved modified BMPs that have been and will be implemented, an implementation schedule, and any additional monitoring required.

d. The Permittee shall implement the revised storm water management program and its components and monitoring program according to the approved implementation schedule.

4. So long as the Permittee has complied with the procedures set forth in Part V.A.3. above and is implementing the revised storm water management program and its components, the Permittee does not have to repeat the same procedure for continuing or recurring exceedances of the same receiving water limitations unless directed by the Regional Water Board to modify current BMPs or develop additional BMPs.

B. Ground Water Limitations – Not Applicable

VI. PROVISIONS

A. Standard Provisions

1. Federal Standard Provisions. Each Permittee shall comply with all Standard Provisions included in Attachment D of this Order, in accordance with 40 CFR sections 122.41 and 122.42.

2. Legal Authority

a. Each Permittee must establish and maintain adequate legal authority, within its respective jurisdiction, to control pollutant discharges into and from its MS4 through ordinance, statute, permit, contract or similar means. This legal authority must, at a minimum, authorize or enable the Permittee to:

i. Control the contribution of pollutants to its MS4 from storm water discharges associated with industrial and construction activity and control the quality of storm water discharged from industrial and construction sites. This requirement applies both to industrial and construction sites with coverage under an NPDES permit, as well as to those sites that do not have coverage under an NPDES permit.

ii. Prohibit all non-storm water discharges through the MS4 to receiving waters not otherwise authorized or conditionally exempt pursuant to Part III.A;

iii. Prohibit and eliminate illicit discharges and illicit connections to the MS4;

iv. Control the discharge of spills, dumping, or disposal of materials other than storm water to its MS4;

v. Require compliance with conditions in Permittee ordinances, permits, contracts or orders (i.e., hold dischargers to its MS4 accountable for their contributions of pollutants and flows);

vi. Utilize enforcement mechanisms to require compliance with applicable ordinances, permits, contracts, or orders;

vii. Control the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements among Co-permittees;

viii. Control of the contribution of pollutants from one portion of the shared MS4 to another portion of the MS4 through interagency agreements with other owners of the MS4 such as the State of California Department of Transportation;

ix. Carry out all inspections, surveillance, and monitoring procedures necessary to determine compliance and noncompliance with applicable municipal ordinances, permits, contracts and orders, and with the provisions of this Order, including the prohibition of non-storm water discharges into the MS4 and receiving waters. This means the Permittee must have authority to enter, monitor, inspect, take measurements, review and copy records, and require regular reports from entities discharging into its MS4;

x. Require the use of control measures to prevent or reduce the discharge of pollutants to achieve water quality standards/receiving water limitations;

xi. Require that structural BMPs are properly operated and maintained; and

xii. Require documentation on the operation and maintenance of structural BMPs and their effectiveness in reducing the discharge of pollutants to the MS4.

b. Each Permittee must submit a statement certified by its chief legal counsel that the Permittee has the legal authority within its jurisdiction to implement and enforce each of the requirements contained in 40 CFR § 122.26(d)(2)(i)(A-F) and this Order. Each Permittee shall submit this certification annually as part of its Annual Report beginning with the first Annual Report required under this Order. These statements must include:

i. Citation of applicable municipal ordinances or other appropriate legal authorities and their relationship to the requirements of 40 CFR § 122.26(d)(2)(i)(A)-(F) and of this Order; and

ii. Identification of the local administrative and legal procedures available to mandate compliance with applicable municipal ordinances identified in subsection (i) above and therefore with the conditions of this Order, and a statement as to whether enforcement actions can be completed administratively or whether they must be commenced and completed in the judicial system.

3. Fiscal Resources

a. Each Permittee shall conduct a fiscal analysis of the annual capital and operation and maintenance expenditures necessary to implement the requirements of this Order.

b. Each Permittee shall also enumerate and describe in its Annual Report the source(s) of funds used in the past year, and proposed for the coming year, to meet necessary expenditures on the Permittee's storm water management program.

4. Responsibilities of the Permittees

a. Each Permittee is required to comply with the requirements of this Order applicable to discharges within its boundaries. Permittees are not responsible for the implementation of the provisions applicable to other Permittees. Each Permittee shall:

i. Comply with the requirements of this Order and any modifications thereto.

ii. Coordinate among its internal departments and agencies, as necessary, to facilitate the implementation of the requirements of this Order applicable to such Permittees in an efficient and cost-effective manner.

iii. Participate in intra-agency coordination (e.g. Planning Department, Fire Department, Building and Safety, Code Enforcement, Public Health, Parks and Recreation, and others) and inter-agency coordination (e.g. co-Permittees, other NPDES permittees) necessary to successfully implement the provisions of this Order.

5. Public Review

a. All documents submitted to the Regional Water Board in compliance with the terms and conditions of this Order shall be made available to members of the public pursuant to the Freedom of Information Act (5 U.S.C. § 552 (as amended)) and the Public Records Act (Cal. Government Code § 6250 et seq.).

b. All documents submitted to the Regional Water Board Executive Officer for approval shall be made available to the public for a 30-day period to allow for public comment.

6. Regional Water Board Review

Any formal determination or approval made by the Regional Water Board Executive Officer pursuant to the provisions of this Order may be reviewed by the Regional Water Board. A Permittee(s) or a member of the public may request such review upon petition within 30 days of the effective date of the notification of such decision to the Permittee(s) and interested parties on file at the Regional Water Board.

7. Reopener and Modification

a. This Order may be modified, revoked, reissued, or terminated in accordance with the provisions of 40 CFR sections 122.44, 122.62, 122.63, 122.64, 124.5, 125.62, and 125.64. Causes for taking such actions include, but are not limited to:

i. Endangerment to human health or the environment resulting from the permitted activity, including information that the discharge(s) regulated by this Order may have the potential to cause or contribute to adverse impacts on water quality and/or beneficial uses;

ii. Acquisition of newly-obtained information that would have justified the application of different conditions if known at the time of Order adoption;

iii. To address changed conditions identified in required reports or other sources deemed significant by the Regional Water Board;

iv. To incorporate provisions as a result of future amendments to the Basin Plan, such as a new or revised water quality objective or the adoption or reconsideration of a TMDL, including the program of implementation. Within 18 months of the effective date of a revised TMDL or as soon as practicable thereafter, where the revisions warrant a change to the provisions of this Order, the Regional Water Board may modify this Order consistent with the assumptions and requirements of the revised WLA(s), including the program of implementation;

v. To incorporate provisions as a result of new or amended statewide water quality control plans or policies adopted by the State Water Board, or in consideration of any State Water Board action regarding the precedential language of State Water Board Order WQ 99-05;

vi. To incorporate provisions as a result of the promulgation of new or amended federal or state laws or regulations, USEPA guidance concerning regulated activities, or judicial decisions that becomes effective after adoption of this Order.

vii. To incorporate effluent limitations for toxic constituents determined to be present in significant amount in the discharge through a more comprehensive monitoring program included as part of this Order and based on the results of the reasonable potential analysis;

viii. In accordance with the provisions set forth in 40 CFR Parts 122 and 124, to include requirements for the implementation of the watershed management approach or to include new Minimum Levels (MLs); and/or

ix. To include provisions or modifications to WQBELs in Part VI.E and Attachments L-R in this Order prior to the final compliance deadlines, if practicable, that would allow an action-based, BMP compliance demonstration approach with regard to final WQBELs for storm water discharges. Such modifications shall be based on the Regional Water Board's evaluation of whether Watershed Management Programs in Part VI.C. have resulted in attainment of interim WQBELs for storm water and review of relevant research, including but not limited to data and information provided by Permittees and other stakeholders, on storm water quality and the efficacy and reliability of storm water control technologies. Provisions or modifications to WQBELs in Part VI.E. shall only be included in this Order where there is evidence that storm water control technologies can reliably achieve final WQBELs.

b. After notice and opportunity for a hearing, this Order may be terminated or modified for cause, including, but not limited to:

i. Violation of any term or condition contained in this Order;

ii. Obtaining this Order by misrepresentation, or failure to disclose all relevant facts; or

iii. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

c. The filing of a request by a Permittee for a modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any condition of this Order.

d. This Order may be modified to make corrections or allowances for changes in the permitted activity, following the procedures at 40 CFR section 122.63, if processed as a minor modification. Minor modifications may only:

i. Correct typographical errors; or

ii. Require more frequent monitoring or reporting by a Permittee.

8. Any discharge of waste to any point(s) other than specifically described in this Order is prohibited, and constitutes a violation of this Order.

9. A copy of this Order shall be maintained by each Permittee so as to be available during normal business hours to Permittee employees responsible for implementation of the provisions of this Order and members of the public.

10. The discharge of any product registered under the Federal Insecticide, Fungicide, and Rodenticide Act to any waste stream that may ultimately be released to waters of the United States, is prohibited, unless specifically authorized elsewhere in this Order or another NPDES permit. This requirement is not applicable to products used for lawn and agricultural purposes.

11. Oil or oily material, chemicals, refuse, or other pollutionable materials shall not be stored or deposited in areas where they may be picked up by rainfall and carried off of the property and/or discharged to surface waters. Any such spill of such materials shall be contained and removed immediately.

12. If there is any storage of hazardous or toxic materials or hydrocarbons at a facility owned and/or operated by a Permittee and if the facility is not manned at all times, a 24-hour emergency response telephone number shall be prominently posted where it can easily be read from the outside.

13. Enforcement

a. Violation of any of the provisions of this Order may subject the violator to any of the penalties described herein or in Attachment D of this Order, or any combination thereof, at the discretion of the prosecuting authority; except that only one kind of penalty may be applied for each kind of violation.

b. Failure to comply with provisions or requirements of this Order, or violation of other applicable laws or regulations governing discharges through the MS4 to receiving waters, may subject a Permittee to administrative or civil liabilities, criminal penalties, and/or other enforcement remedies to ensure compliance. Additionally, certain violations may subject a Permittee to civil or criminal enforcement from appropriate local, state, or federal law enforcement entities.

c. The California Water Code provides that any person who violates a waste discharge requirement or a provision of the California Water Code is subject to civil penalties of up to $5,000 per day, $10,000 per day, or $25,000 per day of

violation, or when the violation involves the discharge of pollutants, is subject to civil penalties of up to $10 per gallon per day or $25 per gallon per day of violation; or some combination thereof, depending on the violation, or upon the combination of violations.

d. California Water Code section 13385(h)(1) requires the Regional Water Board to assess a mandatory minimum penalty of three-thousand dollars ($3,000) for each serious violation. Pursuant to California Water Code section 13385(h)(2), a "serious violation" is defined as any waste discharge that violates the effluent limitations contained in the applicable waste discharge requirements for a Group II pollutant by 20 percent or more, or for a Group I pollutant by 40 percent or more. Appendix A of 40 CFR section 123.45 specifies the Group I and II pollutants. Pursuant to California Water Code section 13385.1(a)(1), a "serious violation" is also defined as "a failure to file a discharge monitoring report required pursuant to Section 13383 for each complete period of 30 days following the deadline for submitting the report, if the report is designed to ensure compliance with limitations contained in waste discharge requirements that contain effluent limitations."

e. California Water Code section 13385(i) requires the Regional Water Board to assess a mandatory minimum penalty of three-thousand dollars ($3,000) for each violation whenever a person violates a waste discharge requirement effluent limitation in any period of six consecutive months, except that the requirement to assess the mandatory minimum penalty shall not be applicable to the first three violations within that time period.

f. Pursuant to California Water Code section 13385.1(d), for the purposes of section 13385.1 and subdivisions (h), (i), and (j) of section 13385, "effluent limitation" means a numeric restriction or a numerically expressed narrative restriction, on the quantity, discharge rate, concentration, or toxicity units of a pollutant or pollutants that may be discharged from an authorized location. An effluent limitation may be final or interim, and may be expressed as a prohibition. An effluent limitation, for these purposes, does not include a receiving water limitation, a compliance schedule, or a best management practice.

g. Unlike subdivision (c) of California Water Code section 13385, where violations of effluent limitations may be assessed administrative civil liability on a per day basis, the mandatory minimum penalties provisions identified above require the Regional Water Board to assess mandatory minimum penalties for "each violation" of an effluent limitation. Some water quality-based effluent limitations in Attachments L through R of this Order (e.g., trash, as described immediately below) are expressed as annual effluent limitations. Therefore, for such limitations, there can be no more than one violation of each interim or final effluent limitation per year.

h. Trash TMDLs.

i. Consistent with the 2009 amendments to Order No. 01-182 to incorporate the Los Angeles River Trash TMDL, the water quality-based effluent limitations in Attachments L through R of this Order for trash are expressed as annual effluent limitations. Therefore, for such limitations, there can be no more than one violation of each interim or final effluent limitation per year. Trash is considered a Group I pollutant, as specified in Appendix A to 40 CFR section 123.45. Therefore, each annual violation of a trash effluent limitation in Attachments L through R of this Order by forty percent or more would be considered a "serious violation" under California Water Code section 13385(h). With respect to the final effluent limitation of zero trash, any detectable discharge of trash necessarily is a serious violation, in accordance with the State Water Board's Enforcement Policy. Violations of the effluent limitations in Attachments L through R of this Order would not constitute "chronic" violations that would give rise to mandatory liability under California Water Code section 13385(i) because four or more violations of the effluent limitations subject to a mandatory penalty cannot occur in a period of six consecutive months.

ii. For the purposes of enforcement under California Water Code section 13385, subdivisions (a), (b), and (c), not every storm event may result in trash discharges. In trash TMDLs adopted by the Regional Water Board, the Regional Water Board states that improperly deposited trash is mobilized during storm events of greater than 0.25 inches of precipitation. Therefore, violations of the effluent limitations are limited to the days of a storm event of greater than 0.25 inches. Once a Permittee has violated the annual effluent limitation, any subsequent discharges of trash during any day of a storm event of greater than 0.25 inches during the same storm year constitutes an additional "day in which the violation [of the effluent limitation] occurs".

14. This Order does not exempt any Permittee from compliance with any other laws, regulations, or ordinances that may be applicable.

15. The provisions of this Order are severable. If any provisions of this Order or the application of any provision of this Order to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this Order shall not be affected.

B. Monitoring and Reporting Program (MRP) Requirements

Dischargers shall comply with the MRP and future revisions thereto, in Attachment E of this Order or may, in coordination with an approved Watershed Management Program per Part VI.C, implement a customized monitoring program that achieves the five Primary Objectives set forth in Part II.A. of Attachment E and includes the elements set forth in Part II.E. of Attachment E.

C. Watershed Management Programs

1. General

a. The purpose of this Part VI.C is to allow Permittees the flexibility to develop Watershed Management Programs to implement the requirements of this Order on a watershed scale through customized strategies, control measures, and BMPs.

b. Participation in a Watershed Management Program is voluntary and allows a Permittee to address the highest watershed priorities, including complying with the requirements of Part V.A. (Receiving Water Limitations), Part VI.E (Total Maximum Daily Load Provisions) and Attachments L through R, by customizing the control measures in Parts III.A.4 (Prohibitions – Non-Storm Water Discharges) and VI.D (Minimum Control Measures).

c. Customized strategies, control measures, and BMPs shall be implemented on a watershed basis, where applicable, through each Permittee's storm water management program and/or collectively by all participating Permittees through a Watershed Management Program.

d. The Watershed Management Programs shall ensure that discharges from the Permittee's MS4: (i) achieve applicable water quality-based effluent limitations in Part VI.E and Attachments L through R pursuant to the corresponding compliance schedules, (ii) do not cause or contribute to exceedances of receiving water limitations in Parts V.A and VI.E and Attachments L through R, and (iii) do not include non-storm water discharges that are effectively prohibited pursuant to Part III.A. The programs shall also ensure that controls are implemented to reduce the discharge of pollutants to the maximum extent practicable (MEP) pursuant to Part IV.A.1.

e. Watershed Management Programs shall be developed either collaboratively or individually using the Regional Water Board's Watershed Management Areas (WMAs). Where appropriate, WMAs may be separated into subwatersheds to focus water quality prioritization and implementation efforts by receiving water.

f. Each Watershed Management Program shall be consistent with Part VI.C.5-C.8 and shall:

i. Prioritize water quality issues resulting from storm water and non-storm water discharges from the MS4 to receiving waters within each WMA,

ii. Identify and implement strategies, control measures, and BMPs to achieve the outcomes specified in Part VI.C.1.d,

iii. Execute an integrated monitoring program and assessment program pursuant to Attachment E – MRP, Part IV to determine progress towards achieving applicable limitations and/or action levels in Attachment G, and

iv. Modify strategies, control measures, and BMPs as necessary based on analysis of monitoring data collected pursuant to the MRP to ensure that applicable water quality-based effluent limitations and receiving water limitations and other milestones set forth in the Watershed Management Program are achieved in the required timeframes.

v. Provide appropriate opportunity for meaningful stakeholder input, including but not limited to, a permit-wide watershed management program technical advisory committee (TAC) that will advise and participate in the development of the Watershed Management Programs and enhanced Watershed Management Programs from month 6 through the date of program approval. The composition of the TAC may include at least one Permittee representative from each Watershed Management Area for which a Watershed Management Program will be developed, and must include a minimum of one public representative from a non-governmental organization with public membership, and staff from the Regional Water Board and USEPA Region IX.

g. Permittees may elect to develop an enhanced Watershed Management Program (EWMP). An EWMP is one that comprehensively evaluates opportunities, within the participating Permittees' collective jurisdictional area in a Watershed Management Area, for collaboration among Permittees and other partners on multi-benefit regional projects that, wherever feasible, retain (i) all non-storm water runoff and (ii) all storm water runoff from the 85th percentile, 24-hour storm event for the drainage areas tributary to the projects, while also achieving other benefits including flood control and water supply, among others. In drainage areas within the EWMP area where retention of the 85th percentile, 24-hour storm event is not feasible, the EWMP shall include a Reasonable Assurance Analysis to demonstrate that applicable water quality based effluent limitations and receiving water limitations shall be achieved through implementation of other watershed control measures. An EWMP shall:

i. Be consistent with the provisions in Part VI.C.1.a.-f and VI.C.5-C.8;

ii. Incorporate applicable State agency input on priority setting and other key implementation issues;

iii. Provide for meeting water quality standards and other CWA obligations by utilizing provisions in the CWA and its implementing regulations, policies and guidance;

iv. Include multi-benefit regional projects to ensure that MS4 discharges achieve compliance with all final WQBELs set forth in Part VI.E. and do not cause or contribute to exceedances of receiving water limitations in Part V.A. by retaining through infiltration or capture and reuse the storm water volume from the 85th percentile, 24-hour storm for the drainage areas tributary to the multi-benefit regional projects.;

v. In drainage areas where retention of the storm water volume from the 85th percentile, 24-hour event is not technically feasible, include other watershed control measures to ensure that MS4 discharges achieve compliance with all interim and final WQBELs set forth in Part VI.E. with compliance deadlines occurring after approval of a EWMP and to ensure that MS4 discharges do not cause or contribute to exceedances of receiving water limitations in Part V.A.;

vi. Maximize the effectiveness of funds through analysis of alternatives and the selection and sequencing of actions needed to address human health and water quality related challenges and non-compliance;

vii. Incorporate effective innovative technologies, approaches and practices, including green infrastructure;

viii. Ensure that existing requirements to comply with technology-based effluent limitations and core requirements (e.g., including elimination of non-storm water discharges of pollutants through the MS4, and controls to reduce the discharge of pollutants in storm water to the maximum extent practicable) are not delayed;

ix. Ensure that a financial strategy is in place.

2. Compliance with Receiving Water Limitations Not Otherwise Addressed by a TMDL through a WMP or EWMP

a. For receiving water limitations in Part V.A. associated with water body-pollutant combinations not addressed through a TMDL, but which a Permittee elects to address through a Watershed Management Program or EWMP as set forth in this Part VI.C., a Permittee shall comply as follows:

i. For pollutants that are in the same class[21] as those addressed in a TMDL for the watershed and for which the water body is identified as impaired on the State's Clean Water Act Section 303(d) List as of the effective date of this Order:

(1) Permittees shall demonstrate that the Watershed Control Measures to achieve the applicable TMDL provisions identified pursuant to Part VI.C.5.b.iv.(3) will also adequately address contributions of the pollutant(s) within the same class from MS4 discharges to receiving waters, consistent with the assumptions and requirements of the corresponding TMDL provisions, including interim and final requirements and deadlines for their achievement, such that the MS4 discharges of the pollutant(s) will not cause or contribute to exceedances of receiving water limitations in Part V.A.

[21] Pollutants are considered in a similar class if they have similar fate and transport mechanisms, can be addressed via the same types of control measures, and within the same timeline already contemplated as part of the Watershed Management Program for the TMDL.

(2) Permittees shall include the water body-pollutant combination(s) in the Reasonable Assurance Analysis in Part VI.C.5.b.iv.(5).

(3) Permittees shall identify milestones and dates for their achievement consistent with those in the corresponding TMDL.

ii. For pollutants that are not in the same class as those addressed in a TMDL for the watershed, but for which the water body is identified as impaired on the State's Clean Water Act Section 303(d) List as of the effective date of this Order:

(1) Permittees shall assess contributions of the pollutant(s) from MS4 discharges to the receiving waters and sources of the pollutant(s) within the drainage area of the MS4 pursuant to Part VI.C.5.a.iii.
(2) Permittees shall identify Watershed Control Measures pursuant to Part VI.C.5.b. that will adequately address contributions of the pollutant(s) from MS4 discharges to receiving waters such that the MS4 discharges of the pollutant(s) will not cause or contribute to exceedances of receiving water limitations in Part V.A.
(3) Permittees shall include the water body-pollutant in the Reasonable Assurance Analysis in Part VI.C.5.b.iv.(5).
(4) Permittees shall identify enforceable requirements and milestones and dates for their achievement to control MS4 discharges such that they do not cause or contribute to exceedances of receiving water limitations within a timeframe(s) that is as short as possible, taking into account the technological, operation, and economic factors that affect the design, development, and implementation of the control measures that are necessary. The time between dates shall not exceed one year. Milestones shall relate to a specific water quality endpoint (e.g., x% of the MS4 drainage area is meeting the receiving water limitations) and dates shall relate either to taking a specific action or meeting a milestone.

(5) Where the final date(s) in (4) is beyond the term of this Order, the following conditions shall apply:

(a) For an EWMP, in drainage areas where retention of (i) all non-storm water runoff and (ii) all storm water runoff from the 85th percentile, 24-hour storm event will be achieved, each participating Permittee shall continue to target implementation of watershed control measures in its existing storm water management program, including watershed control measures to eliminate non-storm water discharges that are a source of pollutants to receiving waters.

(b) For a WMP and in areas of a EWMP where retention of the volume in (a) is technically infeasible and where the Regional Water Board determines that MS4 discharges cause or

contribute to the water quality impairment, participating Permittees may initiate development of a stakeholder-proposed TMDL upon approval of the Watershed Management Program or EWMP. For MS4 discharges from these drainage areas to the receiving waters, any extension of this compliance mechanism beyond the term of this Order shall be consistent with the implementation schedule in a TMDL for the waterbody pollutant combination(s) adopted by the Regional Water Board.

iii. For pollutants for which there are exceedances of receiving water limitations in Part V.A., but for which the water body is not identified as impaired on the State's Clean Water Act Section 303(d) List as of the effective date of this Order:

(1) Upon an exceedance of a receiving water limitation, based on data collected pursuant to the MRP and approved IMPs and CIMPs, Permittees shall assess contributions of the pollutant(s) from MS4 discharges to the receiving waters and sources of the pollutant(s) within the drainage area of the MS4 pursuant to Part VI.C.5.a.iii.

(2) If MS4 discharges are identified as a source of the pollutant(s) that has caused or contributed to, or has the potential to cause or contribute to, the exceedance(s) of receiving water limitations in Part V.A., Permittees shall address contributions of the pollutant(s) from MS4 discharges through modifications to the WMP or EWMP pursuant to Part VI.C.8.a.ii.

(a) In a modified WMP or EWMP, Permittees shall identify Watershed Control Measures pursuant to Part VI.C.5.b. that will adequately address contributions of the pollutant(s) from MS4 discharges to receiving waters such that the MS4 discharges of the pollutant(s) will not cause or contribute to exceedances of receiving water limitations in Part V.A.

(b) Permittees shall modify the Reasonable Assurance Analysis pursuant to Part VI.C.5.b.iv.(5) to address the pollutant(s).

(c) Permittees shall identify enforceable requirements and milestones and dates for their achievement to control MS4 discharges such that they do not cause or contribute to exceedances of receiving water limitations within a timeframe(s) that is as short as possible, taking into account the technological, operation, and economic factors that affect the design, development, and implementation of the control measures that are necessary. The time between dates shall not exceed one year. Milestones shall relate to a specific water quality endpoint (e.g., x% of the MS4 drainage area is meeting the receiving water limitations) and dates shall relate either to taking a specific action or meeting a milestone.

(d) Where the final date(s) in (4) is beyond the term of this Order, the following conditions shall apply:

(i) For an EWMP, in drainage areas where retention of (i) all non-storm water runoff and (ii) all storm water runoff from the 85th percentile, 24-hour storm event will be achieved, each participating Permittee shall continue to target implementation of watershed control measures in its existing storm water management program, including watershed control measures to eliminate non-storm water discharges that are a source of pollutants to receiving waters.

(ii) For a WMP and in areas of a EWMP where retention of the volume in (a) is technically infeasible, for newly identified exceedances of receiving water limitations, a Permittee may request that the Regional Water Board approve a modification to its WMP or EWMP to include these additional water body-pollutant combinations.

b. A Permittee's full compliance with all requirements and dates for their achievement in an approved Watershed Management Program or EWMP shall constitute a Permittee's compliance with the receiving water limitations provisions in Part V.A. of this Order for the specific water body-pollutant combinations addressed by an approved Watershed Management Program or EWMP.

c. If a Permittee fails to meet any requirement or date for its achievement in an approved Watershed Management Program or EWMP, the Permittee shall be subject to the provisions of Part V.A. for the waterbody-pollutant combination(s) that were to be addressed by the requirement.

d. Upon notification of a Permittee's intent to develop a WMP or EWMP and prior to approval of its WMP or EWMP, a Permittee's full compliance with all of the following requirements shall constitute a Permittee's compliance with the receiving water limitations provisions in Part V.A. not otherwise addressed by a TMDL, if all the following requirements are met:

i. Provides timely notice of its intent to develop a WMP or EWMP,

ii. Meets all interim and final deadlines for development of a WMP or EWMP,

iii. For the area to be covered by the WMP or EWMP, targets implementation of watershed control measures in its existing storm water management program, including watershed control measures to eliminate non-storm water discharges of pollutants through the MS4 to receiving waters, to address known contributions of

pollutants from MS4 discharges that cause or contribute to exceedances of receiving water limitations, and

iv. Receives final approval of its WMP or EWMP within 28 or 40 months, respectively.

3. Compliance with Receiving Water Limitations Addressed by a TMDL through a WMP or EWMP

a. A Permittee's full compliance with all requirements and dates for their achievement in an approved Watershed Management Program or EWMP shall constitute a Permittee's compliance with provisions pertaining to applicable interim water quality based effluent limitations and interim receiving water limitations in Part VI.E. and Attachments L-R for the pollutant(s) addressed by the approved Watershed Management Program or EWMP.

b. Upon notification of a Permittee's intent to develop a WMP or EWMP and prior to approval of its WMP or EWMP, a Permittee's full compliance with all of the following requirements shall constitute a Permittee's compliance with the receiving water limitations provisions in Part V.A., if all the following requirements are met:

i. Provides timely notice of its intent to develop a WMP or EWMP,

ii. Meets all interim and final deadlines for development of a WMP or EWMP,

iii. For the area to be covered by the WMP or EWMP, targets implementation of watershed control measures in its existing storm water management program, including watershed control measures to eliminate non-storm water discharges of pollutants through the MS4 to receiving waters, to address known contributions of pollutants from MS4 discharges that cause or contribute to exceedances of receiving water limitations, and

iv. Receives final approval of its WMP or EWMP within 28 or 40 months, respectively.

c. Subdivision b. does not apply to receiving water limitations corresponding to final compliance deadlines pursuant to TMDL provisions in Part VI.E. that have passed or will occur prior to approval of a WMP or EWMP.

4. Process

a. Timelines for Implementation

i. Implementation of the following requirements shall occur per the schedule specified in Table 9 below:

Table 9. Watershed Management Program Implementation Requirements

Part	Provision	Due Date
VI.C.4.b	Notify Regional Water Board of intent to develop Watershed Management Program or enhanced WMP and request submittal date for draft program plan	6 months after Order effective date
VI.C.4.c	For Permittee(s) that elect not to implement the conditions of Part VI.C.4.c.i or c.ii, submit draft plan to Regional Water Board	1 year after Order effective date
VI.C.4.c	For Permittee(s) that elect to implement the conditions of Part VI.C.4.c.i or c.ii, submit draft plan to Regional Water Board	18 months after Order effective date
VI.C.4.c.iv	For Permittees that elect to collaborate on an enhanced WMP that meets the requirements of Part VI.C.4.c.iv,submit draft plan to Regional Water Board	18 months after Order effective date, provide final work plan for development of enhanced WMP 30 months after Order effective date, submit draft plan
VI.C.4.c	Comments provided to Permittees by Regional Water Board	4 months after submittal of draft plan
VI.C.4.c	Submit final plan to Regional Water Board	3 months after receipt of Regional Water Board comments on draft plan
VI.C.4.c	Approval or denial of final plan by Regional Water Board or by the Executive Officer on behalf of the Regional Water Board	3 months after submittal of final plan
VI.C.6	Begin implementation of Watershed Management Program or EWMP	Upon approval of final plan
VI.C.8	Comprehensive evaluation of Watershed Management	Every two years from date of

	Program or EWMP and submittal of modifications to plan	approval

b. Permittees that elect to develop a Watershed Management Program or EWMP must notify the Regional Water Board no later than six months after the effective date of this Order.

i. Such notification shall specify if the Permittee(s) are requesting a 12-month or 18-month submittal date for the draft Watershed Management Program, per Part VI.C.4.c.i – ii, or if the Permittees are requesting a 18/30-month submittal date for the draft EWMP per Part VI.C.4.c.iv.

ii. As part of their notice of intent to develop a WMP or EWMP, Permittees shall identify all applicable interim and final trash WQBELs and all other final WQBELs and receiving water limitations pursuant to Part VI.E. and the applicable attachment(s) with compliance deadlines occurring prior to approval of a WMP or EWMP. Permittees shall identify watershed control measures, where possible from existing TMDL implementation plans, that will be implemented by participating Permittees concurrently with the development of a Watershed Management Program or EWMP to ensure that MS4 discharges achieve compliance with applicable interim and final trash WQBELs and all other final WQBELs and receiving water limitations set forth in Part VI.E. and the applicable attachment(s) by the applicable compliance deadlines occurring prior to approval of a WMP or EWMP.

iii. As part of their notification, Permittees electing to develop an EWMP shall submit all of the following in addition to the requirements of Part VI.C.4.b.i.-ii.:

(1) Plan concept and geographical scope,

(2) Cost estimate for plan development,

(3) Executed MOU/agreement among participating Permittees to fund plan development, or final draft MOU among participating Permittees along with a signed letter of intent from each participating City Manager or head of agency. If a final draft MOU is submitted, the MOU shall be fully executed by all participating Permittees within 12 months of the effective date of this Order.

(4) Interim milestones for plan development and deadlines for their achievement,

(5) Identification of, and commitment to fully implement, one structural BMP or a suite of BMPs at a scale that provides meaningful water quality improvement within each watershed covered by the plan within 30 months of the effective date of this Order in addition to

watershed control measures to be implemented pursuant to b.ii. above. The structural BMP or suite of BMPs shall be subject to approval by the Regional Water Board Executive Officer, and

(6) Demonstration that the requirements in Parts VI.C.4.c.iv.(1) and (2) have been met.

c. Permittees that elect to develop a Watershed Management Program shall submit a draft plan to the Regional Water Board as follows:

i. For Permittees that elect to collaborate on the development of a Watershed Management Program, Permittees shall submit the draft Watershed Management Program no later than 18 months after the effective date of this Order if the following conditions are met in greater than 50% of the land area covered by the WMP:

(1) Demonstrate that there are LID ordinances in place and/or commence development of a Low Impact Development (LID) ordinance(s) meeting the requirements of this Order's Planning and Land Development Program within 60 days of the effective date of the Order and have a draft ordinance within 6 months of the effective date of the Order, and

(2) Demonstrate that there are green streets policies in place and/or commence development of a policy(ies) that specifies the use of green street strategies for transportation corridors within 60 days of the effective date of the Order and have a draft policy within 6 months of the effective date of the Order.

(3) Demonstrate in the notification of the intent to develop a Watershed Management Program that Parts VI.C.4.c.i(1) and (2) have been met in greater than 50% of the watershed area.

ii. For a Permittee that elects to develop an individual Watershed Management Program, the Permittee shall submit the draft Watershed Management Program no later than 18 months after the effective date of this Order if the following conditions are met:

(1) Demonstrate that there is a LID ordinance in place for the Permittee's jurisdiction and/or commence development of a Low Impact Development (LID) ordinance for the Permittee's jurisdiction meeting the requirements of this Order's Planning and Land Development Program within 60 days of the effective date of the Order and have a draft ordinance within 6 months of the effective date of the Order, and

(2) Demonstrate that there is a green streets policy in place for the Permittee's jurisdiction and/or commence development of a policy

that specifies the use of green street strategies for transportation corridors within the Permittee's jurisdiction within 60 days of the effective date of the Order and have a draft policy within 6 months of the effective date of the Order.

(3) Demonstrate in the notification of the intent to develop a Watershed Management Program that Parts VI.C.4.c.ii.(1) and (2) have been met.

iii. For Permittees that elect not to implement the conditions under Part VI.C.4.c.i. or Part VI.C.4.c.ii., Permittees shall submit the draft Watershed Management Program no later than 12 months after the effective date of this Order.

iv. For Permittees that elect to collaborate on the development of an EWMP, Permittees shall submit the work plan for development of the EWMP no later than 18 months after the effective date of this Order, and shall submit the draft program no later than 30 months after the effective date of this Order if the following conditions are met in greater than 50% of the land area in the watershed:

(1) Demonstrate that there are LID ordinances in place and/or commence development of a Low Impact Development (LID) ordinance(s) meeting the requirements of this Order's Planning and Land Development Program within 60 days of the effective date of the Order and have a draft ordinance within 6 months of the effective date of the Order, and

(2) Demonstrate that there are green streets policies in place and/or commence development of a policy(ies) that specifies the use of green street strategies for transportation corridors within 60 days of the effective date of the Order and have a draft policy within 6 months of the effective date of the Order.

(3) Demonstrate in the notification of the intent to develop an EWMP that Parts VI.C.4.c.iv.(1) and (2) have been met in greater than 50% of the watershed area.

d. Until the Watershed Management Program or EWMP is approved by the Regional Water Board or by the Executive Officer on behalf of the Regional Water Board, Permittees that elect to develop a Watershed Management Program or EWMP shall:

i. Continue to implement watershed control measures in their existing storm water management programs, including actions within each of the six categories of minimum control measures consistent with 40 CFR section 122.26(d)(2)(iv),

ii. Continue to implement watershed control measures to eliminate non-storm water discharges through the MS4 that are a source of pollutants to receiving waters consistent with CWA section 402(p)(3)(B)(ii), and

iii. Implement watershed control measures, where possible from existing TMDL implementation plans, to ensure that MS4 discharges achieve compliance with interim and final trash WQBELs and all other final WQBELs and receiving water limitations pursuant to Part VI.E. and set forth in Attachments L through R by the applicable compliance deadlines occurring prior to approval of a WMP or EWMP.

e. Permittees that do not elect to develop a Watershed Management Program or EWMP, or that do not have an approved WMP or EWMP within 28 or 40 months, respectively, of the effective date of this Order, shall be subject to the baseline requirements in Part VI.D and shall demonstrate compliance with receiving water limitations pursuant to Part V.A. and with applicable interim water quality-based effluent limitations in Part VI.E pursuant to subparts VI.E.2.d.i.(1)-(3).

f. Permittees subject to the Middle Santa Ana River Watershed Bacteria Indicator TMDL shall submit a Comprehensive Bacteria Reduction Plan (CBRP) for dry weather to the Regional Water Board Executive Officer no later than nine months after the effective date of this Order. The CBRP shall describe, in detail, the specific actions that have been taken or will be taken to achieve compliance with the dry weather water quality-based effluent limitations and the receiving water limitations for the Middle Santa Ana River Watershed Bacteria Indicator TMDL by December 31, 2015. The CBRP shall also establish a schedule for developing a CBRP to comply with the water quality-based effluent limitations and the receiving water limitations for the Middle Santa Ana River Bacteria TMDL during wet weather by December 31, 2025. The CBRP may be developed in lieu of the Watershed Management Program for MS4 discharges of bacteria within the Middle Santa Ana River Watershed.

5. Program Development

a. Identification of Water Quality Priorities

Permittees shall identify the water quality priorities within each WMA that will be addressed by the Watershed Management Program. At a minimum, these priorities shall include achieving applicable water quality-based effluent limitations and/or receiving water limitations established pursuant to TMDLs, as set forth in Part VI.E and Attachments L through R of this Order.

i. Water Quality Characterization. Each plan shall include an evaluation of existing water quality conditions, including characterization of storm water and non-storm water discharges from the MS4 and receiving water quality,

to support identification and prioritization/sequencing of management actions.

ii. Water Body-Pollutant Classification. On the basis of the evaluation of existing water quality conditions, water body-pollutant combinations shall be classified into one of the following three categories:

(1) Category 1 (Highest Priority): Water body-pollutant combinations for which water quality-based effluent limitations and/or receiving water limitations are established in Part VI.E and Attachments L through R of this Order.

(2) 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) and for which MS4 discharges may be causing or contributing to the impairment.

(3) 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 contained in this Order and for which MS4 discharges may be causing or contributing to the exceedance.

iii. Source Assessment. Utilizing existing information, potential sources within the watershed for the water body-pollutant combinations in Categories 1 - 3 shall be identified.

(1) Permittees shall identify known and suspected storm water and non-storm water pollutant sources in discharges to the MS4 and from the MS4 to receiving waters and any other stressors related to MS4 discharges causing or contributing to the water quality priorities. The identification of known and suspected sources of the highest water quality priorities shall consider the following:

(a) Review of available data, including but not limited to:

(i) Findings from the Permittees' Illicit Connections and Illicit Discharge Elimination Programs;

(ii) Findings from the Permittees' Industrial/Commercial Facilities Programs;

(iii) Findings from the Permittees' Development Construction Programs;

(iv) Findings from the Permittees' Public Agency Activities Programs;

(v) TMDL source investigations;

(vi) Watershed model results;

(vii) Findings from the Permittees' monitoring programs, including but not limited to TMDL compliance monitoring and receiving water monitoring; and

(viii) Any other pertinent data, information, or studies related to pollutant sources and conditions that contribute to the highest water quality priorities.

(b) Locations of the Permittees' MS4s, including, at a minimum, all MS4 major outfalls and major structural controls for storm water and non-storm water that discharge to receiving waters.

(c) Other known and suspected sources of pollutants in non-storm water or storm water discharges from the MS4 to receiving waters within the WMA.

iv. Prioritization. Based on the findings of the source assessment, the issues within each watershed shall be prioritized and sequenced. Watershed priorities shall include at a minimum:

(1) TMDLs

(a) Controlling pollutants for which there are water quality-based effluent limitations and/or receiving water limitations with interim or final compliance deadlines within the permit term, or TMDL compliance deadlines that have already passed and limitations have not been achieved.

(b) Controlling pollutants for which there are water quality-based effluent limitations and/or receiving water limitations with interim or final compliance deadlines between September 6, 2012 and October 25, 2017.

(2) Other Receiving Water Considerations

(a) Controlling pollutants for which data indicate impairment or exceedances of receiving water limitations in the receiving water and the findings from the source assessment implicates discharges from the MS4 shall be considered the second highest priority.

b. Selection of Watershed Control Measures

i. Permittees shall identify strategies, control measures, and BMPs to implement through their individual storm water management programs, and collectively on a watershed scale, with the goal of creating an efficient program to focus individual and collective resources on watershed priorities.

ii. The objectives of the Watershed Control Measures shall include:

(1) Prevent or eliminate non-storm water discharges to the MS4 that are a source of pollutants from the MS4 to receiving waters.

(2) Implement pollutant controls necessary to achieve all applicable interim and final water quality-based effluent limitations and/or receiving water limitations pursuant to corresponding compliance schedules.

(3) Ensure that discharges from the MS4 do not cause or contribute to exceedances of receiving water limitations.

iii. Watershed Control Measures may include:

(1) Structural and/or non-structural controls and operation and maintenance procedures that are designed to achieve applicable water quality-based effluent limitations, receiving water limitations in Part VI.E and/or Attachments L through R;

(2) Retrofitting areas of existing development known or suspected to contribute to the highest water quality priorities with regional or sub-regional controls or management measures; and

(3) Stream and/or habitat rehabilitation or restoration projects where stream and/or habitat rehabilitation or restoration are necessary for, or will contribute to demonstrable improvements in the physical, chemical, and biological receiving water conditions and restoration and/or protection of water quality standards in receiving waters.

iv. The following provisions of this Order shall be incorporated as part of the Watershed Management Program:

(1) Minimum Control Measures.

(a) Permittees shall assess the minimum control measures (MCMs) as defined in Part VI.D.4 to Part VI.D.10 of this Order to identify opportunities for focusing resources on the high priority issues in each watershed. For each of the following minimum control measures, Permittees shall identify potential modifications that will address watershed priorities:

(i) Development Construction Program

(ii) Industrial/Commercial Facilities Program

(iii) Illicit Connection and Illicit Discharges Detection and Elimination Program

(iv) Public Agency Activities Program

(v) Public Information and Participation Program

(b) At a minimum, the Watershed Management Program shall include management programs consistent with 40 CFR section 122.26(d)(2)(iv)(A)-(D).

(c) If the Permittee(s) elects to eliminate a control measure identified in Parts VI.D.4, VI.D.5, VI.D.6 and VI.D.8 to VI.D.10 because that specific control measure is not applicable to the Permittee(s), the Permittee(s) shall provide a justification for its elimination. The Planning and Land Development Program is not eligible for elimination.

(d) Such customized actions, once approved as part of the Watershed Management Program, shall replace in part or in whole the requirements in Parts VI.D.4, VI.D.5, VI.D.6 and VI.D.8 to VI.D.10 for participating Permittees.

(2) Non-Storm Water Discharge Measures. Where Permittees identify non-storm water discharges from the MS4 as a source of pollutants that cause or contribute to exceedance of receiving water limitations, the Watershed Control Measures shall include strategies, control measures, and/or BMPs that must be implemented to effectively eliminate the source of pollutants consistent with Parts III.A and VI.D.10. These may include measures to prohibit the non-storm water discharge to the MS4, additional BMPs to reduce pollutants in the non-storm water discharge or conveyed by the non-storm water discharge, diversion to a sanitary sewer for treatment, or strategies to require the non-storm water discharge to be separately regulated under a general NPDES permit.

(3) TMDL Control Measures. Permittees shall compile control measures that have been identified in TMDLs and corresponding implementation plans. Permittees shall identify those control measures to be modified, if any, to most effectively address TMDL requirements within the watershed. If not sufficiently identified in previous documents, or if implementation plans have not yet been developed (e.g., USEPA established TMDLs), the Permittees shall evaluate and identify control measures to achieve water quality-based effluent limitations and/or

receiving water limitations established in this Order pursuant to these TMDLs.

(a) TMDL control measures shall include where necessary control measures to address both storm water and non-storm water discharges from the MS4.

(b) TMDL control measures may include baseline or customized activities covered under the general MCM categories in Part VI.D as well as BMPs and other control measures covered under the non-storm water discharge provisions of Part III.A of this Order.

(c) The WMP shall include, at a minimum, those actions that will be implemented during the permit term to achieve interim and/or final water quality-based effluent limitations and/or receiving water limitations with compliance deadlines within the permit term.

(4) Each plan shall include the following components:

(a) Identification of specific structural controls and non-structural best management practices, including operational source control and pollution prevention, and any other actions or programs to achieve all water quality-based effluent limitations and receiving water limitations contained in this Part VI.E and Attachments L through R to which the Permittee(s) is subject;

(b) For each structural control and non-structural best management practice, the number, type, and location(s) and/or frequency of implementation;

(c) For any pollution prevention measures, the nature, scope, and timing of implementation;

(d) For each structural control and non-structural best management practice, interim milestones and dates for achievement to ensure that TMDL compliance deadlines will be met; and

(e) The plan shall clearly identify the responsibilities of each participating Permittee for implementation of watershed control measures.

(5) Permittees shall conduct a Reasonable Assurance Analysis for each water body-pollutant combination addressed by the Watershed Management Program. A Reasonable Assurance Analysis (RAA) shall be quantitative and performed using a peer-reviewed model in the public domain. Models to be considered for the RAA, without exclusion, are the Watershed Management Modeling System (WMMS), Hydrologic Simulation Program-FORTRAN (HSPF), and the Structural BMP Prioritization and Analysis Tool (SBPAT). The RAA shall commence with assembly of all available, relevant subwatershed data collected within the last 10 years, including land use and pollutant

loading data, establishment of quality assurance/quality control (QA/QC) criteria, QA/QC checks of the data, and identification of the data set meeting the criteria for use in the analysis. Data on performance of watershed control measures needed as model input shall be drawn only from peer-reviewed sources. These data shall be statistically analyzed to determine the best estimate of performance and the confidence limits on that estimate for the pollutants to be evaluated. The objective of the RAA shall be to demonstrate the ability of Watershed Management Programs and EWMPs to ensure that Permittees' MS4 discharges achieve applicable water quality based effluent limitations and do not cause or contribute to exceedances of receiving water limitations.

(a) Permittees shall demonstrate using the RAA that the activities and control measures identified in the Watershed Control Measures will achieve applicable water quality-based effluent limitations and/or receiving water limitations in Attachments L through R with compliance deadlines during the permit term.

(b) Where the TMDL Provisions in Part VI.E and Attachments L through R do not include interim or final water quality-based effluent limitations and/or receiving water limitations with compliance deadlines during the permit term, Permittees shall identify interim milestones and dates for their achievement to ensure adequate progress toward achieving interim and final water quality-based effluent limitations and/or receiving water limitations with deadlines beyond the permit term.

(c) For water body-pollutant combinations not addressed by TMDLs, Permittees shall demonstrate using the RAA that the activities and control measures identified in the Watershed Control Measures will achieve applicable receiving water limitations as soon as possible.

(6) Permittees shall provide documentation that they have the necessary legal authority to implement the Watershed Control Measures identified in the plan, or that other legal authority exists to compel implementation of the Watershed Control Measures.

c. Compliance Schedules

Permittees shall incorporate compliance schedules in Attachments L through R into the plan and, where necessary develop interim milestones and dates for their achievement. Compliance schedules and interim milestones and dates for their achievement shall be used to measure progress towards addressing the highest water quality priorities and achieving applicable water quality-based effluent limitations and/or receiving water limitations.

i. Schedules must be adequate for measuring progress on a watershed scale once every two years.

ii. Schedules must be developed for both the strategies, control measures and BMPs implemented by each Permittee within its jurisdiction and for those that will be implemented by multiple Permittees on a watershed scale.

iii. Schedules shall incorporate the following:

(1) Compliance deadlines occurring within the permit term for all applicable interim and/or final water quality-based effluent limitations and/or receiving water limitations in Part VI.E and Attachments L through R of this Order,

(2) Interim milestones and dates for their achievement within the permit term for any applicable final water quality-based effluent limitation and/or receiving water limitation in Part VI.E and Attachments L through R, where deadlines within the permit term are not otherwise specified.

(3) For watershed priorities related to addressing exceedances of receiving water limitations in Part V.A and not otherwise addressed by Part VI.E:

(a) Milestones based on measureable criteria or indicators, to be achieved in the receiving waters and/or MS4 discharges,

(a) A schedule with dates for achieving the milestones, and

(b) A final date for achieving the receiving water limitations as soon as possible.

(c) The milestones and implementation schedule in (a)-(c) fulfill the requirements in Part V.A.3.a to prepare an Integrated Monitoring Compliance Report.

6. Watershed Management Program Implementation

Each Permittee shall begin implementing the Watershed Management Program or EWMP immediately upon approval of the plan by the Regional Water Board or the Executive Officer on behalf of the Regional Water Board.

a. Permittees may request an extension of deadlines for achievement of interim milestones established pursuant to Part VI.C.4.c.iii.(3) only. Permittees shall provide requests in writing at least 90 days prior to the deadline and shall include in the request the justification for the extension. Extensions shall be subject to approval by the Regional Water Board Executive Officer.

7. Integrated Watershed Monitoring and Assessment

Permittees in each WMA shall develop an integrated monitoring program as set forth in Part IV of the MRP (Attachment E) or implement a customized monitoring program with the primary objective of allowing for the customization of the outfall monitoring program (Parts VIII and IX) in conjunction with an approved Watershed Management Program or EWMP, as defined below. Each monitoring program shall assess progress toward achieving the water quality-based effluent limitations and/or receiving water limitations per the compliance schedules, and progress toward addressing the water quality priorities for each WMA. The customized monitoring program shall be submitted as part of the Watershed Management Program, or where Permittees elect to develop an EWMP, shall be submitted within 18 months of the effective date of this Order. If pursuing a customized monitoring program, the Permittee(s) shall provide sufficient justification for each element of the program that differs from the monitoring program requirements as set forth in Attachment E. Monitoring programs shall be subject to approval by the Executive Officer following a public comment period. The customized monitoring program shall be designed to address the Primary Objectives detailed in Attachment E, Part II.A and shall include the following program elements:

- Receiving Water Monitoring
- Storm Water Outfall Monitoring
- Non-Storm Water Outfall Monitoring
- New Development/Re-Development Effectiveness Tracking
- Regional Studies

8. Adaptive Management Process

a. Watershed Management Program Adaptive Management Process

i. Permittees in each WMA shall implement an adaptive management process, every two years from the date of program approval, adapting the Watershed Management Program or EWMP to become more effective, based on, but not limited to a consideration of the following:

(1) Progress toward achieving interim and/or final water quality-based effluent limitations and/or receiving water limitations in Part VI.E and Attachments L through R, according to established compliance schedules;

(2) Progress toward achieving improved water quality in MS4 discharges and achieving receiving water limitations through implementation of the watershed control measures based on an evaluation of outfall-based monitoring data and receiving water monitoring data;

(3) Achievement of interim milestones;

(4) Re-evaluation of the water quality priorities identified for the WMA based on more recent water quality data for discharges from the MS4 and the receiving water(s) and a reassessment of sources of pollutants in MS4 discharges;

(5) Availability of new information and data from sources other than the Permittees' monitoring program(s) within the WMA that informs the effectiveness of the actions implemented by the Permittees;

(6) Regional Water Board recommendations; and

(7) Recommendations for modifications to the Watershed Management Program solicited through a public participation process.

ii. Based on the results of the adaptive management process, Permittees shall report any modifications, including where appropriate new compliance deadlines and interim milestones, with the exception of those compliance deadlines established in a TMDL, necessary to improve the effectiveness of the Watershed Management Program or EWMP in the Annual Report, as required pursuant to Part XVIII.A.6 of the MRP (Attachment E), and as part of the Report of Waste Discharge (ROWD) required pursuant to Part II.B of Attachment D – Standard Provisions.

(1) The adaptive management process fulfills the requirements in Part V.A.4 to address continuing exceedances of receiving water limitations.

iii. Permittees shall implement any modifications to the Watershed Management Program or EWMP upon approval by the Regional Water Board Executive Officer or within 60 days of submittal if the Regional Water Board Executive Officer expresses no objections.

D. Storm Water Management Program Minimum Control Measures

1. General Requirements

a. Each Permittee shall implement the requirements in Parts VI.D.4 through VI.D.10 below, or may in lieu of the requirements in Parts VI.D.4 through VI.D.10 implement customized actions within each of these general categories of control measures as set forth in an approved Watershed Management Program per Part VI.C. Implementation shall be consistent with the requirements of 40 CFR § 122.26(d)(2)(iv).

b. Timelines for Implementation

i. Unless otherwise noted in Part VI.D, each Permittee that does not elect to develop a Watershed Management Program or EWMP per Part VI.C shall implement the requirements contained in Part VI.D within 6 months after the

effective date of this Order. In the interim, a Permittee shall continue to implement its existing storm water management program, including actions within each of the six categories of minimum control measures consistent with 40 CFR section 122.26(d)(2)(iv).

ii. Permittees that elect to develop a Watershed Management Program or EWMP shall continue to implement their existing storm water management programs, including actions within each of the six categories of minimum control measures consistent with 40 CFR section 122.26(d)(2)(iv) until the Watershed Management Program or EWMP is approved by the Regional Water Board Executive Officer.

2. Progressive Enforcement and Interagency Coordination

a. Each Permittee shall develop and implement a Progressive Enforcement Policy to ensure that (1) regulated Industrial/Commercial facilities, (2) construction sites, (3) development and redevelopment sites with post-construction controls, and (4) illicit discharges are each brought into compliance with all storm water and non-storm water requirements within a reasonable time period as specified below.

i. Follow-up Inspections

In the event that a Permittee determines, based on an inspection or illicit discharge investigation conducted, that a facility or site operator has failed to adequately implement all necessary BMPs, that Permittee shall take progressive enforcement actions which, at a minimum, shall include a follow-up inspection within 4 weeks from the date of the initial inspection and/or investigation.

ii. Enforcement Action

In the event that a Permittee determines that a facility or site operator has failed to adequately implement BMPs after a follow-up inspection, that Permittee shall take enforcement action as established through authority in its municipal code and ordinances, through the judicial system, or refer the case to the Regional Water Board, per the Interagency Coordination provisions below.

iii. Records Retention

Each Permittee shall maintain records, per their existing record retention policies, and make them available on request to the Regional Water Board, including inspection reports, warning letters, notices of violations, and other enforcement records, demonstrating a good faith effort to bring facilities into compliance.

iv. Referral of Violations of Municipal Ordinances and California Water Code § 13260

A Permittee may refer a violation(s) of its municipal storm water ordinances and/or California Water Code section 13260 by Industrial and Commercial facilities and construction site operators to the Regional Water Board

provided that the Permittee has made a good faith effort of applying its Progressive Enforcement Policy to achieve compliance with its own ordinances. At a minimum, a Permittee's good faith effort must be documented with:

(1) Two follow-up inspections, and

(2) Two warning letters or notices of violation.

v. Referral of Violations of the Industrial and Construction General Permits, including Requirements to File a Notice of Intent or No Exposure Certification

For those facilities or site operators in violation of municipal storm water ordinances and subject to the Industrial and/or Construction General Permits, Permittees may escalate referral of such violations to the Regional Water Board (promptly via telephone or electronically) after one inspection and one written notice of violation (copied to the Regional Water Board) to the facility or site operator regarding the violation. In making such referrals, Permittees shall include, at a minimum, the following documentation:

(1) Name of the facility or site,

(2) Operator of the facility or site,

(3) Owner of the facility or site,

(4) WDID Number (if applicable),

(5) Records of communication with the facility/site operator regarding the violation, which shall include at least one inspection report,

(6) The written notice of violation (copied to the Regional Water Board),

(7) For industrial sites, the industrial activity being conducted at the facility that is subject to the Industrial General Permit, and

(8) For construction sites, site acreage and Risk Factor rating.

b. Investigation of Complaints Transmitted by the Regional Water Board Staff

Each Permittee shall initiate, within one business day,[22] investigation of complaints from facilities within its jurisdiction. The initial investigation shall include, at a minimum, a limited inspection of the facility to confirm validity of the complaint and to determine if the facility is in compliance with municipal storm water ordinances and, if necessary, to oversee corrective action.

c. Assistance with Regional Water Board Enforcement Actions

As directed by the Regional Water Board Executive Officer, Permittees shall assist Regional Water Board enforcement actions by:

i. Assisting in identification of current owners, operators, and lessees of properties and sites.

[22] Permittees may comply with the Permit by taking initial steps (such as logging, prioritizing, and tasking) to "initiate" the investigation within that one business day. However, the Regional Water Board would expect that the initial investigation, including a site visit, to occur within four business days.

ii. Providing staff, when available, for joint inspections with Regional Water Board inspectors.

iii. Appearing to testify as witnesses in Regional Water Board enforcement hearings.

iv. Providing copies of inspection reports and documentation demonstrating application of its Progressive Enforcement Policy.

3. Modifications/Revisions

a. Each Permittee shall modify its storm water management programs, protocols, practices, and municipal codes to make them consistent with the requirements in this Order.

4. Requirements Applicable to the Los Angeles County Flood Control District

a. Public Information and Participation Program (PIPP)

i. General

(1) The LACFCD shall participate in a regional Public Information and Participation Program (PIPP) or alternatively, shall implement its own PIPP that includes the requirements listed in this part. The LACFCD shall collaborate, as necessary, with other Permittees to implement PIPP requirements. The objectives of the PIPP are as follows:

(a) To measurably increase the knowledge of the target audience about the MS4, the adverse impacts of storm water pollution on receiving waters and potential solutions to mitigate the impacts.

(b) To measurably change the waste disposal and storm water pollution generation behavior of target audiences by encouraging the implementation of appropriate alternatives by providing information to the public.

(c) To involve and engage a diversity of socio-economic groups and ethnic communities in Los Angeles County to participate in mitigating the impacts of stormwater pollution.

ii. PIPP Implementation

(1) The LACFCD shall implement the PIPP requirements listed in this Part VI.D.5 using one or more of the following approaches:

(a) By participating in a collaborative PIPP covering the entire service area of the Los Angeles County Flood Control District,

(b) By participating in one or more Watershed Group sponsored PIPPs, and/or

(c) Individually within the service area of the Los Angeles County Flood Control District.

(2) If the LACFCD participates in a collaborative District-wide or Watershed Group PIPP, the LACFCD shall provide the contact information for their appropriate staff responsible for storm water public education activities to the designated PIPP coordinator and contact information changes no later than 30 days after a change occurs.

iii. Public Participation

(1) The LACFCD, in collaboration with the County of Los Angeles, shall continue to maintain the countywide hotline (888-CLEAN-LA) for public reporting of clogged catch basin inlets and illicit discharges/dumping, faded or missing catch basin labels, and general storm water management information.

(a) The LACFCD shall include the reporting information, updated when necessary, in public information, and the government pages of the telephone book, as they are developed or published.

(b) The LACFCD, in collaboration with the County of Los Angeles, shall continue to maintain the www.888cleanla.com website.

iv. Residential Outreach Program

(1) Working in conjunction with a District-wide or Watershed Group sponsored PIPP or individually, the LACFCD shall implement the following activities:

(a) Conduct storm water pollution prevention public service announcements and advertising campaigns

(b) Facilitate the dissemination of public education materials including, at a minimum, information on the proper handling (i.e., disposal, storage and/or use) of:

(i) Vehicle waste fluids

(ii) Household waste materials (i.e., trash and household hazardous waste)

(iii) Construction waste materials

(iv) Pesticides and fertilizers (including integrated pest management practices [IPM] to promote reduced use of pesticides),

(v) Green waste (including lawn clippings and leaves)

(vi) Animal wastes

(c) Facilitate the dissemination of activity-specific storm water pollution prevention public education materials, at a minimum, for the following points of purchase:

(i) Automotive parts stores

(ii) Home improvement centers / lumber yards / hardware stores / paint stores

(iii) Landscaping / gardening centers

(iv) Pet shops / feed stores

(d) Maintain a storm water website, which shall include educational material and opportunities for the public to participate in storm water pollution prevention and clean-up activities listed in Part VI.D.5.

(e) When implementing activities in (a)-(d), the LACFCD shall use effective strategies to educate and involve ethnic communities in storm water pollution prevention through culturally effective methods.

b. Industrial/Commercial Facilities Program

If the LACFCD operates, or has authority over, any facility(ies) identified in Part VI.D.6.b, LACFCD shall comply with the requirements in Part VI.D.6 for those facilities.

c. Public Agency Activities Program

i. General

(1) The LACFCD shall implement a Public Agency Activities Program to minimize storm water pollution impacts from LACFCD-owned or operated facilities and activities. Requirements for Public Agency Facilities and Activities consist of the following components:

(a) Public Construction Activities Management.

(b) Public Facility Inventory

(c) Public Facility and Activity Management

(d) Vehicle and Equipment Washing

(e) Landscape and Recreational Facilities Management

(f) Storm Drain Operation and Maintenance

(g) Parking Facilities Management

(h) Emergency Procedures

(i) Employee and Contractor Training

ii. Public Construction Activities Management

(1) The LACFCD shall implement and comply with the Planning and Land Development Program requirements in Part VI.D.7 of this Order at LACFCD-owned or operated public construction projects that are categorized under the project types identified in Part VI.D.7 of this Order.

(2) The LACFCD shall implement and comply with the appropriate Development Construction Program requirements in Part VI.D.8 of this Order at LACFCD-owned or operated construction projects as applicable.

(3) For LACFCD-owned or operated projects that disturb less than one acre of soil, the LACFCD shall require the implementation of an effective combination of erosion and sediment control BMPs from Table 13 (see Construction Development Program).

(4) The LACFCD shall obtain separate coverage under the Construction General Permit for all LACFCD-owned or operated construction sites that require coverage.

iii. Public Facility Inventory

(1) The LACFCD shall maintain an updated watershed-based inventory and map of all LACFCD-owned or operated facilities that are potential sources of storm water pollution. The incorporation of facility information into a GIS is recommended. Sources to be tracked include but are not limited to the following:

(a) Chemical storage facilities

(b) Equipment storage and maintenance facilities (including landscape maintenance-related operations)

(c) Fueling or fuel storage facilities

(d) Materials storage yards

(e) Pesticide storage facilities

(f) LACFCD buildings

(g) LACFCD vehicle storage and maintenance yards

(h) All other LACFCD-owned or operated facilities or activities that the LACFCD determines may contribute a substantial pollutant load to the MS4.

(2) The LACFCD shall include the following minimum fields of information for each LACFCD-owned or operated facility in its watershed-based inventory and map.

(a) Name of facility

(b) Name of facility manager and contact information

(c) Address of facility (physical and mailing)

(d) A narrative description of activities performed and principal products used at each facility and status of exposure to storm water.

(e) Coverage under the Industrial General Permit or other individual or general NPDES permits or any applicable waiver issued by the Regional or State Water Board pertaining to storm water discharges.

(3) The LACFCD shall update its inventory and map once during the Permit term. The update shall be accomplished through a collection of new information obtained through field activities.

iv. Public Agency Facility and Activity Management

(1) The LACFCD shall obtain separate coverage under the Industrial General Permit for all LACFCD-owned or operated facilities where industrial activities are conducted that require coverage under the Industrial General Permit.

(2) The LACFCD shall implement the following measures for flood management projects:

(a) Develop procedures to assess the impacts of flood management projects on the water quality of receiving waterbodies; and

(b) Evaluate existing structural flood control facilities during the planning phases of major maintenance or rehabilitation projects to determine if retrofitting the facility to provide additional pollutant removal from storm water is feasible.

(3) The LACFCD shall implement and maintain the general and activity-specific BMPs listed in Table 18 (BMPs for Public Agency Facilities and Activities) or an equivalent set of BMPs when such activities occur at LACFCD-owned or operated facilities and field activities (e.g., project sites) including but not limited to the facility types listed in Part VI.D.9.c above, and at any area that includes the activities described in Table 18, or that have the potential to discharge pollutants in storm water.

(4) Any contractors hired by the LACFCD to conduct Public Agency Activities shall be contractually required to implement and maintain the general and activity specific BMPs listed in Table 18 or an equivalent set of BMPs. The LACFCD shall conduct oversight of contractor activities to ensure these BMPs are implemented and maintained.

(5) Effective source control BMPs for the activities listed in Table 18 shall be implemented at LACFCD-owned or operated facilities, unless the pollutant generating activity does not occur. The LACFCD shall require implementation of additional BMPs where storm water from the MS4 discharges to a significant ecological area (SEA, see Attachment A for definition), a water body subject to TMDL Provisions in Part VI.E, or a CWA section 303(d) listed water body (see Part VI.E below). Likewise, for those BMPs that are not adequately protective of water quality standards, the LACFCD shall implement additional site-specific controls.

v. Vehicle and Equipment Washing

(1) The LACFCD shall implement and maintain the activity specific BMPs listed in Table 18 (BMPs for Public Agency Facilities and Activities) or an equivalent set of BMPs for all fixed vehicle and equipment washing areas;

(2) The LACFCD shall prevent discharges of wash waters from vehicle and equipment washing to the MS4 by implementing any of the following measures at existing facilities with vehicle or equipment wash areas:

(a) Self-contain, and haul off for disposal; or

(b) Equip with a clarifier or an alternative pre-treatment device and plumb to the sanitary sewer in accordance with applicable waste water provider regulations

(3) The LACFCD shall ensure that any LACFCD facilities constructed, redeveloped, or replaced shall not discharge wastewater from vehicle and equipment wash areas to the MS4 by plumbing all areas to the sanitary sewer in accordance with applicable waste water provider regulations, or self-containing all waste water/ wash water and hauling to a point of legal disposal.

vi. Landscape and Recreational Facilities Management

(1) The LACFCD shall implement and maintain the activity specific BMPs listed in Table 18 (BMPs for Public Agency Facilities and Activities) or an equivalent set of BMPs for all its public right-of-ways, flood control facilities and open channels and reservoirs, and landscape and recreational facilities and activities.

(2) The LACFCD shall implement an IPM program that includes the following:

(a) Pesticides are used only if monitoring indicates they are needed, and pesticides are applied according to applicable permits and established guidelines.

(b) Treatments are made with the goal of removing only the target organism.

(c) Pest controls are selected and applied in a manner that minimizes risks to human health, beneficial non-target organisms, and the environment.

(d) The use of pesticides, including Organophosphates and Pyrethroids, does not threaten water quality.

(e) Partner, as appropriate, with other agencies and organizations to encourage the use of IPM.

(f) Adopt and verifiably implement policies, procedures, and/ or ordinances requiring the minimization of pesticide use and encouraging the use of IPM techniques (including beneficial insects) for Public Agency Facilities and Activities.

(g) Policies, procedures, and ordinances shall include a schedule to reduce the use of pesticides that cause impairment of surface waters by implementing the following procedures:

(i) Prepare and annually update an inventory of pesticides used by all internal departments, divisions, and other operational units.

(ii) Quantify pesticide use by staff and hired contractors.

(iii) Demonstrate implementation of IPM alternatives where feasible to reduce pesticide use.

(3) The LACFCD shall implement the following requirements:

(a) Use a standardized protocol for the routine and non-routine application of pesticides (including pre-emergents), and fertilizers.

(b) Ensure there is no application of pesticides or fertilizers (1) when two or more consecutive days with greater than 50% chance of rainfall are predicted by NOAA, (2) within 48 hours of a ½-inch rain event, or (3) when water is flowing off the area where the application is to occur. This requirement does not apply to the application of aquatic pesticides or pesticides which require water for activation.

(c) Ensure that no banned or unregistered pesticides are stored or applied.

(d) Ensure that all staff applying pesticides are certified in the appropriate category by the California Department of Pesticide Regulation, or are under the direct supervision of a pesticide applicator certified in the appropriate category.

(e) Implement procedures to encourage the retention and planting of native vegetation to reduce water, pesticide and fertilizer needs; and

(f) Store pesticides and fertilizers indoors or under cover on paved surfaces, or use secondary containment.

(i) Reduce the use, storage, and handling of hazardous materials to reduce the potential for spills.

(ii) Regularly inspect storage areas.

vii. Storm Drain Operation and Management

(1) The LACFCD shall implement and maintain the activity specific BMPs listed in Table 18 or equivalent set of BMPs for storm drain operation and maintenance.

(2) Ensure that all the material removed from the MS4 does not reenter the system. Solid material shall be dewatered in a contained area and liquid material shall be disposed in accordance with any of the following measures:

(a) Self-contain, and haul off for legal disposal; or

(b) Equip with a clarifier or an alternative pre-treatment device; and plumb to the sanitary sewer in accordance with applicable waste water provider regulations.

(3) Catch Basin Cleaning

(a) In areas that are not subject to a trash TMDL, the LACFCD shall determine priority areas and shall update its map or list of catch basins with their GPS coordinates and priority:

Priority A: Catch basins that are designated as consistently generating the highest volumes of trash and/or debris.

Priority B: Catch basins that are designated as consistently generating moderate volumes of trash and/or debris.

Priority C: Catch basins that are designated as generating low volumes of trash and/or debris.

The map or list shall contain the rationale or data to support priority designations.

(b) In areas not subject to a trash TMDL, the LACFCD shall inspect its catch basins according to the following schedule:

Priority A: A minimum of 3 times during the wet season (October 1 through April 15) and once during the dry season every year.

Priority B: A minimum of once during the wet season and once during the dry season every year.

Priority C: A minimum of once per year.

Catch basins shall be cleaned as necessary on the basis of inspections. At a minimum, LACFCD shall ensure that any catch basin that is determined to be at least 25% full of trash shall be cleaned out. LACFCD shall maintain inspection and cleaning records for Regional Water Board review.

(c) In areas that are subject to a trash TMDL, the subject Permittees shall implement the applicable provisions in Part VI.E.

(4) Catch Basin Labels and Open Channel Signage

(a) LACFCD shall label all catch basin inlets that they own with a legible “no dumping” message.

(b) The LACFCD shall inspect the legibility of the catch basin stencil or label nearest the inlet prior to the wet season every year.

(c) The LACFCD shall record all catch basins with illegible stencils and re-stencil or re-label within 180 days of inspection.

(d) The LACFCD shall post signs, referencing local code(s) that prohibit littering and illegal dumping, at designated public access points to open channels, creeks, urban lakes, and other relevant waterbodies.

(5) Open Channel Maintenance

The LACFCD shall implement a program for Open Channel Maintenance that includes the following:

(a) Visual monitoring of LACFCD owned open channels and other drainage structures for trash and debris at least annually;

(b) Removal of trash and debris from open channels a minimum of once per year before the wet season;

(c) Elimination of the discharge of contaminants produced by storm drain maintenance and clean outs; and

(d) Proper disposal of debris and trash removed during open channel maintenance.

(6) Infiltration from Sanitary Sewer to MS4/Preventive Maintenance

(a) The LACFCD shall implement controls and measures to prevent and eliminate infiltration of seepage from sanitary sewers to its MS4 thorough routine preventive maintenance of its MS4.

(b) The LACFCD shall implement controls to limit infiltration of seepage from sanitary sewers to its MS4 where necessary. Such controls must include:

(i) Adequate plan checking for construction and new development;

(ii) Incident response training for its employees that identify sanitary sewer spills;

(iii) Code enforcement inspections;

(iv) MS4 maintenance and inspections;

(v) Interagency coordination with sewer agencies; and

(vi) Proper education of its staff and contractors conducting field operations on its MS4.

(7) LACFCD-Owned Treatment Control BMPs

(a) The LACFCD shall implement an inspection and maintenance program for all LACFCD-owned treatment control BMPs, including post-construction treatment control BMPs.

(b) The LACFCD shall ensure proper operation of all its treatment control BMPs and maintain them as necessary for proper operation, including all post-construction treatment control BMPs.

(c) Any residual water produced by a treatment control BMP and not being internal to the BMP performance when being maintained shall be:

(i) Hauled away and legally disposed of; or

(ii) Applied to the land without runoff; or

(iii) Discharged to the sanitary sewer system (with permits or authorization); or

(iv) Treated or filtered to remove bacteria, sediments, nutrients, and meet the limitations set in Table 19 (Discharge Limitations for Dewatering Treatment BMPs), prior to discharge to the MS4.

viii. Parking Facilities Management

LACFCD-owned parking lots exposed to storm water shall be kept clear of debris and excessive oil buildup and cleaned no less than 2 times per month and/or inspected no less than 2 times per month to determine if cleaning is necessary. In no case shall a LACFCD-owned parking lot be cleaned less than once a month.

ix. Emergency Procedures

The LACFCD may conduct repairs and rehabilitation of essential public service systems and infrastructure in emergency situations with a self-waiver of the provisions of this Order as follows:

(1) The LACFCD shall abide by all other regulatory requirements, including notification to other agencies as appropriate.

(2) Where the self-waiver has been invoked, the LACFCD shall notify the Regional Water Board Executive Officer of the occurrence of the emergency no later than 30 business days after the situation of emergency has passed.

(3) Minor repairs of essential public service systems and infrastructure in emergency situations (that can be completed in less than one week) are not subject to the notification provisions. Appropriate BMPs to reduce the threat to water quality shall be implemented.

x. Employee and Contractor Training

(1) The LACFCD shall, no later than one year after Order adoption and annually thereafter before June 30, train all of their employees and contractors in targeted positions (whose interactions, jobs, and activities affect storm water quality) on the requirements of the overall storm water management program to:

(a) Promote a clear understanding of the potential for activities to pollute storm water.

(b) Identify opportunities to require, implement, and maintain appropriate BMPs in their line of work.

(2) The LACFCD shall, no later than one year after Order adoption and annually thereafter before June 30, train all of their employees and contractors who use or have the potential to use pesticides or fertilizers (whether or not they normally apply these as part of their work). Outside contractors can self-certify, providing they certify they have received all applicable training required in the Order and have documentation to that effect. Training programs shall address:

(a) The potential for pesticide-related surface water toxicity.

(b) Proper use, handling, and disposal of pesticides.

(c) Least toxic methods of pest prevention and control, including IPM.

(d) Reduction of pesticide use.

(3) The LACFCD shall require appropriate training of contractor employees in targeted positions as described above.

d. Illicit Connections and Illicit Discharge Elimination Program

i. General

(1) The LACFCD shall continue to implement an Illicit Connection and Illicit Discharge (IC/ID) Program to detect, investigate, and eliminate IC/IDs to its MS4. The IC/ID Program must be implemented in accordance with the requirements and performance measures specified in the following subsections.

(2) As stated in Part VI.A.2 of this Order, each Permittee must have adequate legal authority to prohibit IC/IDs to the MS4 and enable enforcement capabilities to eliminate the source of IC/IDs.

(3) The LACFCD's IC/ID Program shall consist of at least the following major program components:

(a) An up-to-date map of LACFCD's MS4

(b) Procedures for conducting source investigations for IC/IDs

(c) Procedures for eliminating the source of IC/IDs

(d) Procedures for public reporting of illicit discharges

(e) Spill response plan

(f) IC/IDs education and training for LACFCD staff

ii. MS4 Mapping

(1) The LACFCD shall maintain an up-to-date and accurate electronic map of its MS4. If possible, the map should be maintained within a GIS. The map must show the following, at a minimum:

(a) Within one year of Permit adoption, the location of outfalls owned and maintained by the LACFCD. Each outfall shall be given an alphanumeric identifier, which must be noted on the map. Each mapped outfall shall be located using a geographic positioning system (GPS). Photographs of the major outfalls shall be taken to provide baseline information to track operation and maintenance needs over time.

(b) The location and length of open channels and underground storm drain pipes with a diameter of 36 inches or greater that are owned and operated by the LACFCD.

(c) The location and name of all waterbodies receiving discharges from those MS4 major outfalls identified in (a).

(d) All LACFCD's dry weather diversions installed within the MS4 to direct flows from the MS4 to the sanitary sewer system, including the owner and operator of each diversion.

(e) By the end of the Permit term, map all known permitted and documented connections to its MS4 system.

(2) The MS4 map shall be updated as necessary.

iii. Illicit Discharge Source Investigation and Elimination

(1) The LACFCD shall develop written procedures for conducting investigations to prioritize and identify the source of all illicit discharges to its MS4, including procedures to eliminate the discharge once the source is located.

(2) At a minimum, the LACFCD shall initiate[23] an investigation(s) to identify and locate the source within one business day of becoming aware of the illicit discharge.

(3) When conducting investigations, the LACFCD shall comply with the following:

(a) Illicit discharges suspected of being sanitary sewage and/or significantly contaminated shall be investigated first.

(b) The LACFCD shall track all investigations to document, at a minimum, the date(s) the illicit discharge was observed; the results

[23] Permittees may comply with the Permit by taking initial steps (such as logging, prioritizing, and tasking) to "initiate" the investigation within one business day. However, the Regional Water Board would expect that the initial investigation, including a site visit, occur within two business days of becoming aware of the illicit discharge.

of the investigation; any follow-up of the investigation; and the date the investigation was closed.

(c) The LACFCD shall prioritize and investigate the source of all observed illicit discharges to its MS4.

(d) If the source of the illicit discharge is found to be a discharge authorized under an NPDES permit, the LACFCD shall document the source and report to the Regional Water Board within 30 days of determination. No further action is required.

(e) If the source of the illicit discharge has been determined to originate from within the jurisdiction of other Permittee(s) with land use authority over the suspected responsible party/parties, the LACFCD shall immediately alert the appropriate Permittee(s) of the problem for further action by the Permittee(s).

(4) When taking corrective action to eliminate illicit discharges, the LACFCD shall comply with the following:

(a) If the source of the illicit discharge has been determined or suspected by the LACFCD to originate within an upstream jurisdiction(s), the LACFCD shall immediately notify the upstream jurisdiction(s), and notify the Regional Water Board within 30 days of such determination and provide all the information collected and efforts taken.

(b) Once the Permittee with land use authority over the suspected responsible party/parties has been alerted, the LACFCD may continue to work in cooperation with the Permittee(s) to notify the responsible party/parties of the problem, and require the responsible party/parties to immediately initiate necessary corrective actions to eliminate the illicit discharge. Upon being notified that the discharge has been eliminated, the LACFCD may, in conjunction with the Permittee(s) conduct a follow-up investigation to verify that the discharge has been eliminated and cleaned up to the satisfaction of the LACFCD. The LACFCD shall document its follow-up investigation. The LACFCD may seek recovery and remediation costs from responsible parties or require compensation for the cost of all inspection and investigation activities. Resulting enforcement actions shall follow the program's Progressive Enforcement Policy.

(c) If the source of the illicit discharge cannot be traced to a suspected responsible party, the LACFCD, in conjunction with other affected Permittees, shall continue implementing the illicit discharge/spill response plan.

(5) In the event the LACFCD and/or other Permittees are unable to eliminate an ongoing illicit discharge following full execution of its legal authority and in accordance with its Progressive Enforcement Policy, including the inability to find the responsible party/parties, or other circumstances prevent the full elimination of an ongoing illicit discharge, the LACFCD and/or other Permittees shall notify the Regional Water Board within 30 days of such determination and provide available information to the Regional Water Board.

iv. Identification and Response to Illicit Connections

(1) Investigation

The LACFCD, upon discovery or upon receiving a report of a suspected illicit connection, shall initiate an investigation within 21 days, to determine the following: (1) source of the connection, (2) nature and volume of discharge through the connection, and (3) responsible party for the connection.

(2) Elimination

The LACFCD, upon confirmation of an illicit connection to its MS4, shall ensure that the connection is:

(a) Permitted or documented, provided the connection will only discharge storm water and non-storm water allowable under this Order or other individual or general NPDES Permits/WDRs, or

(b) Eliminated within 180 days of completion of the investigation, using its formal enforcement authority, if necessary, to eliminate the illicit connection.

(3) Documentation

Formal records must be maintained for all illicit connection investigations and the formal enforcement taken to eliminate illicit connections.

v. Public Reporting of Non-Stormwater Discharges and Spills

(1) The LACFCD shall, in collaboration with the County, continue to maintain the 888-CLEAN-LA hotline and corresponding internet site at www.888cleanla.org to promote, publicize, and facilitate public reporting of illicit discharges or water quality impacts associated with discharges into or from MS4s.

(2) The LACFCD shall include information regarding public reporting of illicit discharges or improper disposal on the signage adjacent to open channels as required in Part VI.D.9.h.vi.(4).

(3) The LACFCD shall develop and maintain written procedures that document how complaint calls and internet submissions are received, documented, and tracked to ensure that all complaints are adequately addressed. The procedures shall be evaluated annually to determine whether changes or updates are needed to ensure that the procedures accurately document the methods employed by the LACFCD. Any identified changes shall be made to the procedures subsequent to the annual evaluation.

(4) The LACFCD shall maintain documentation of the complaint calls and internet submissions and record the location of the reported spill or IC/ ID and the actions undertaken, including referrals to other agencies, in response to all IC/ID complaints.

vi. Illicit Discharge and Spill Response Plan

(1) The LACFCD shall implement an ID and spill response plan for all spills that may discharge into its system. The ID and spill response plan shall clearly identify agencies responsible for ID and spill response and cleanup, contact information, and shall contain at a minimum the following requirements:

(a) Coordination with spill response teams throughout all appropriate departments, programs and agencies so that maximum water quality protection is provided.

(b) Initiation of investigation of all public and employee ID and spill complaints within one business day of receiving the complaint to assess validity.

(c) Response to ID and spills within 4 hours of becoming aware of the ID or spill, except where such IDs or spills occur on private property, in which case the response should be within 2 hours of gaining legal access to the property.

(d) IDs or spills that may endanger health or the environment shall be reported to appropriate public health agencies and the Office of Emergency Services (OES).

vii. Illicit Connection and Illicit Discharge Education and Training

(1) The LACFCD must continue to implement a training program regarding the identification of IC/IDs for all LACFCD field staff, who, as part of their normal job responsibilities (e.g., storm drain inspection and maintenance), may come into contact with or otherwise observe an illicit discharge or illicit connection to its MS4. Contact information, including the procedure for reporting an illicit discharge, must be included in the LACFCD's fleet vehicles that are used by field staff. Training program documents must be available for review by the Regional Water Board.

(2) The LACFCD's training program should address, at a minimum, the following:

(a) IC/ID identification, including definitions and examples,

(b) investigation,

(c) elimination,

(d) cleanup,

(e) reporting, and

(f) documentation.

(3) The LACFCD must create a list of applicable positions which require IC/ID training and ensure that training is provided at least twice during the term of this Order. The LACFCD must maintain documentation of the training activities.

(4) New LACFCD staff members must be provided with IC/ID training within 180 days of starting employment.

(5) The LACFCD shall require its contractors to train their employees in targeted positions as described above.

5. Public Information and Participation Program

a. General

i. Each Permittee shall implement a Public Information and Participation Program (PIPP) that includes the requirements listed in this Part VI.D.5. Each Permittee shall be responsible for developing and implementing the PIPP and implementing specific PIPP requirements. The objectives of the PIPP are as follows:

(1) To measurably increase the knowledge of the target audiences about the MS4, the adverse impacts of storm water pollution on receiving waters and potential solutions to mitigate the impacts.

(2) To measurably change the waste disposal and storm water pollution generation behavior of target audiences by developing and encouraging the implementation of appropriate alternatives.

(3) To involve and engage a diversity of socio-economic groups and ethnic communities in Los Angeles County to participate in mitigating the impacts of storm water pollution.

b. PIPP Implementation

i. Each Permittee shall implement the PIPP requirements listed in this Part VI.D.4 using one or more of the following approaches:

(1) By participating in a County-wide PIPP,

(2) By participating in one or more Watershed Group sponsored PIPPs, and/or

(3) Or individually within its jurisdiction.

ii. If a Permittee participates in a County-wide or Watershed Group PIPP, the Permittee shall provide the contact information for their appropriate staff responsible for storm water public education activities to the designated PIPP coordinator and contact information changes no later than 30 days after a change occurs.

c. Public Participation

i. Each Permittee, whether participating in a County-wide or Watershed Group sponsored PIPP, or acting individually, shall provide a means for public reporting of clogged catch basin inlets and illicit discharges/dumping, faded or missing catch basin labels, and general storm water and non-storm water pollution prevention information.

(1) Permittees may elect to use the 888-CLEAN-LA hotline as the general public reporting contact or each Permittee or Watershed Group may establish its own hotline, if preferred.

(2) Each Permittee shall include the reporting information, updated when necessary, in public information, and the government pages of the telephone book, as they are developed or published.

(3) Each Permittee shall identify staff or departments who will serve as the contact person(s) and shall make this information available on its website.

(4) Each Permittee is responsible for providing current, updated hotline contact information to the general public within its jurisdiction.

ii. Organize events targeted to residents and population subgroups to educate and involve the community in storm water and non-storm water pollution prevention and clean-up (e.g., education seminars, clean-ups, and community catch basin stenciling).

d. Residential Outreach Program

i. Working in conjunction with a County-wide or Watershed Group sponsored PIPP or individually, each Permittee shall implement the following activities:

(1) Conduct storm water pollution prevention public service announcements and advertising campaigns

(2) Public education materials shall include but are not limited to information on the proper handling (i.e., disposal, storage and/or use) of:

(a) Vehicle waste fluids

(b) Household waste materials (i.e., trash and household hazardous waste, including personal care products and pharmaceuticals)

(c) Construction waste materials

(d) Pesticides and fertilizers (including integrated pest management practices [IPM] to promote reduced use of pesticides)

(e) Green waste (including lawn clippings and leaves)

(f) Animal wastes

(3) Distribute activity specific storm water pollution prevention public education materials at, but not limited to, the following points of purchase:

(a) Automotive parts stores

(b) Home improvement centers / lumber yards / hardware stores/paint stores

(c) Landscaping / gardening centers

(d) Pet shops / feed stores

(4) Maintain storm water websites or provide links to storm water websites via the Permittee's website, which shall include educational material and opportunities for the public to participate in storm water pollution prevention and clean-up activities listed in Part VI.D.4.

(5) Provide independent, parochial, and public schools within in each Permittee's jurisdiction with materials to educate school children (K-12) on storm water pollution. Material may include videos, live presentations, and other information. Permittees are encouraged to work with, or leverage, materials produced by other statewide agencies and associations such as the State Water Board's "Erase the Waste" educational program and the California Environmental Education Interagency Network (CEEIN) to implement this requirement.

(6) When implementing activities in subsections (1)-(5), Permittees shall use effective strategies to educate and involve ethnic communities in storm water pollution prevention through culturally effective methods.

6. Industrial/Commercial Facilities Program

a. General

i. Each Permittee shall implement an Industrial / Commercial Facilities Program that meets the requirements of this Part VI.D.6. The Industrial / Commercial

Facilities Program shall be designed to prevent illicit discharges into the MS4 and receiving waters, reduce industrial / commercial discharges of storm water to the maximum extent practicable, and prevent industrial / commercial discharges from the MS4 from causing or contributing to a violation of receiving water limitations. At a minimum, the Industrial / Commercial Facilities Program shall be implemented in accordance with the requirements listed in this Part VI.D.6, or as approved in a Watershed Management Program per Part VI.C. Minimum program components shall include the following components:

(1) Track

(2) Educate

(3) Inspect

(4) Ensure compliance with municipal ordinances at industrial and commercial facilities that are critical sources of pollutants in storm water

b. Track Critical Industrial / Commercial Sources

i. Each Permittee shall maintain an updated watershed-based inventory or database containing the latitude / longitude coordinates of all industrial and commercial facilities within its jurisdiction that are critical sources of storm water pollution. The inventory or database shall be maintained in electronic format and incorporation of facility information into a Geographical Information System (GIS) is recommended. Critical Sources to be tracked are summarized below:

(1) Commercial Facilities

(a) Restaurants

(b) Automotive service facilities (including those located at automotive dealerships)

(c) Retail Gasoline Outlets

(d) Nurseries and Nursery Centers (Merchant Wholesalers, Nondurable Goods, and Retail Trade)

(2) USEPA “Phase I” Facilities [as specified in 40 CFR §122.26(b)(14)(i)-(xi)]

(3) Other federally-mandated facilities [as specified in 40 CFR §122.26(d)(2)(iv)(C)]

(a) Municipal landfills

(b) Hazardous waste treatment, disposal, and recovery facilities

(c) Industrial facilities subject to section 313 “Toxic Release Inventory” reporting requirements of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) [42 U.S.C. § 11023]

(4) All other commercial or industrial facilities that the Permittee determines may contribute a substantial pollutant load to the MS4.

ii. Each Permittee shall include the following minimum fields of information for each critical source industrial and commercial facility identified in its watershed-based inventory or database:

(1) Name of facility

(2) Name of owner/ operator and contact information

(3) Address of facility (physical and mailing)

(4) North American Industry Classification System (NAICS) code

(5) Standard Industrial Classification (SIC) code

(6) A narrative description of the activities performed and/or principal products produced

(7) Status of exposure of materials to storm water

(8) Name of receiving water

(9) Identification of whether the facility is tributary to a CWA § 303(d) listed water body segment or water body segment subject to a TMDL, where the facility generates pollutants for which the water body segment is impaired.

(10) Ability to denote if the facility is known to maintain coverage under the State Water Board's General NPDES Permit for the Discharge of Stormwater Associated with Industrial Activities (Industrial General Permit) or other individual or general NPDES permits or any applicable waiver issued by the Regional or State Water Board pertaining to storm water discharges.

(11) Ability to denote if the facility has filed a No Exposure Certification with the State Water Board.

iii. Each Permittee shall update its inventory of critical sources at least annually. The update shall be accomplished through collection of new information obtained through field activities or through other readily available inter- and intra-agency informational databases (e.g., business licenses, pretreatment permits, sanitary sewer connection permits, and similar information).

c. Educate Industrial / Commercial Sources

i. At least once during the five-year period of this Order, each Permittee shall notify the owner/operator of each of its inventoried commercial and industrial sites identified in Part VI.D.6.b of the BMP requirements applicable to the site/source.

ii. Business Assistance Program

(1) Each Permittee shall implement a Business Assistance Program to provide technical information to businesses to facilitate their efforts to reduce the discharge of pollutants in storm water. Assistance shall be targeted to select business sectors or small businesses upon a determination that their activities may be contributing substantial pollutant

loads to the MS4 or receiving water. Assistance may include technical guidance and provision of educational materials. The Program may include:

(a) On-site technical assistance, telephone, or e-mail consultation regarding the responsibilities of business to reduce the discharge of pollutants, procedural requirements, and available guidance documents.

(b) Distribution of storm water pollution prevention educational materials to operators of auto repair shops; car wash facilities; restaurants and mobile sources including automobile/equipment repair, washing, or detailing; power washing services; mobile carpet, drape, or upholstery cleaning services; swimming pool, water softener, and spa services; portable sanitary services; and commercial applicators and distributors of pesticides, herbicides and fertilizers, if present.

d. Inspect Critical Commercial Sources

i. Frequency of Mandatory Commercial Facility Inspections

Each Permittee shall inspect all commercial facilities identified in Part VI.D.6.b twice during the 5-year term of the Order, provided that the first mandatory compliance inspection occurs no later than 2 years after the effective date of this Order. A minimum interval of 6 months between the first and the second mandatory compliance inspection is required. In addition, each Permittee shall implement the activities outlined in the following subparts.

ii. Scope of Mandatory Commercial Facility Inspections

Each Permittee shall inspect all commercial facilities to confirm that storm water and non-storm water BMPs are being effectively implemented in compliance with municipal ordinances. At each facility, inspectors shall verify that the operator is implementing effective source control BMPs for each corresponding activity. Each Permittee shall require implementation of additional BMPs where storm water from the MS4 discharges to a significant ecological area (SEA), a water body subject to TMDL provisions in Part VI.E, or a CWA § 303(d) listed impaired water body. Likewise, for those BMPs that are not adequately protective of water quality standards, a Permittee may require additional site-specific controls.

e. Inspect Critical Industrial Sources

Each Permittee shall conduct industrial facility compliance inspections as specified below.

i. Frequency of Mandatory Industrial Facility Compliance Inspections

(1) Minimum Inspection Frequency

Each Permittee shall perform an initial mandatory compliance inspection at all industrial facilities identified in Part VI.D.6.b no later than 2 years after the effective date of this Order. After the initial inspection, all

facilities that have not filed a No Exposure Certification with the State Water Board are subject to a second mandatory compliance inspection. A minimum interval of 6 months between the first and the second mandatory compliance inspection is required. A facility need not be inspected more than twice during the term of the Order unless subject to an enforcement action as specified in Part VI.D.6.h below.

(2) Exclusion of Facilities Previously Inspected by the Regional Water Board

Each Permittee shall review the State Water Board's Storm Water Multiple Application and Report Tracking System (SMARTS) database[24] at defined intervals to determine if an industrial facility has recently been inspected by the Regional Water Board. The first interval shall occur approximately 2 years after the effective date of the Order. The Permittee does not need to inspect the facility if it is determined that the Regional Water Board conducted an inspection of the facility within the prior 24 month period. The second interval shall occur approximately 4 years after the effective date of the Order. Likewise, the Permittee does not need to inspect the facility if it is determined that the Regional Water Board conducted an inspection of the facility within the prior 24 month period.

(3) No Exposure Verification

As a component of the first mandatory inspection, each Permittee shall identify those facilities that have filed a No Exposure Certification with the State Water Board. Approximately 3 to 4 years after the effective date of the Order, each Permittee shall evaluate its inventory of industrial facilities and perform a second mandatory compliance inspection at a minimum of 25% of the facilities identified to have filed a No Exposure Certification. The purpose of this inspection is to verify the continuity of the no exposure status.

(4) Exclusion Based on Watershed Management Program

A Permittee is exempt from the mandatory inspection frequencies listed above if it is implementing industrial inspections in accordance with an approved Watershed Management Program per Part VI.C.

ii. Scope of Mandatory Industrial Facility Inspections

Each Permittee shall confirm that each industrial facility:

(1) Has a current Waste Discharge Identification (WDID) number for coverage under the Industrial General Permit, and that a Storm Water Pollution Prevention Plan (SWPPP) is available on-site; *or*

(2) Has applied for, and has received a current No Exposure Certification for facilities subject to this requirement;

(3) Is effectively implementing BMPs in compliance with municipal ordinances. Facilities must implement the source control BMPs identified

[24] SMARTS is accessible at https://smarts.waterboards.ca.gov/smarts/faces/SwSmartsLogin.jsp

in Table 10, unless the pollutant generating activity does not occur. The Permittees shall require implementation of additional BMPs where storm water from the MS4 discharges to a water body subject to TMDL Provisions in Part VI.E, or a CWA § 303(d) listed impaired water body. Likewise, if the specified BMPs are not adequately protective of water quality standards, a Permittee may require additional site-specific controls. For critical sources that discharge to MS4s that discharge to SEAs, each Permittee shall require operators to implement additional pollutant-specific controls to reduce pollutants in storm water runoff that are causing or contributing to exceedances of water quality standards.

(4) Applicable industrial facilities identified as not having either a current WDID or No Exposure Certification shall be notified that they must obtain coverage under the Industrial General Permit and shall be referred to the Regional Water Board per the Progressive Enforcement Policy procedures identified in Part VI.D.2.

f. Source Control BMPs for Commercial and Industrial Facilities

Effective source control BMPs for the activities listed in Table 10 shall be implemented at commercial and industrial facilities, unless the pollutant generating activity does not occur:

Table 10. Source Control BMPs at Commercial and Industrial Facilities

Pollutant-Generating Activity	BMP Narrative Description
Unauthorized Non-Storm water Discharges	Effective elimination of non-storm water discharges
Accidental Spills/ Leaks	Implementation of effective spills/ leaks prevention and response procedures
Vehicle/ Equipment Fueling	Implementation of effective fueling source control devices and practices
Vehicle/ Equipment Cleaning	Implementation of effective equipment/ vehicle cleaning practices and appropriate wash water management practices
Vehicle/ Equipment Repair	Implementation of effective vehicle/ equipment repair practices and source control devices
Outdoor Liquid Storage	Implementation of effective outdoor liquid storage source controls and practices
Outdoor Equipment Operations	Implementation of effective outdoor equipment source control devices and practices
Outdoor Storage of Raw Materials	Implementation of effective source control practices and structural devices
Storage and Handling of Solid Waste	Implementation of effective solid waste storage/ handling practices and appropriate control measures
Building and Grounds Maintenance	Implementation of effective facility maintenance practices

Pollutant-Generating Activity	BMP Narrative Description
Parking/ Storage Area Maintenance	Implementation of effective parking/ storage area designs and housekeeping/ maintenance practices
Storm water Conveyance System Maintenance Practices	Implementation of proper conveyance system operation and maintenance protocols
Pollutant-Generating Activity	**BMP Narrative Description from Regional Water Board Resolution No. 98-08**
Sidewalk Washing	**1.** Remove trash, debris, and free standing oil/grease spills/leaks (use absorbent material, if necessary) from the area before washing; and **2.** Use high pressure, low volume spray washing using only potable water with no cleaning agents at an average usage of 0.006 gallons per square feet of sidewalk area.
Street Washing	Collect and divert wash water to the sanitary sewer – publically owned treatment works (POTW). Note: POTW approval may be needed.

g. Significant Ecological Areas (SEAs)

See VI.D.6.e.ii.3.

h. Progressive Enforcement

Each Permittee shall implement its Progressive Enforcement Policy to ensure that Industrial / Commercial facilities are brought into compliance with all storm water requirements within a reasonable time period. See Part VI.D.2 for requirements for the development and implementation of a Progressive Enforcement Policy.

7. Planning and Land Development Program

a. Purpose

i. Each Permittee shall implement a Planning and Land Development Program pursuant to Part VI.D.7.b for all New Development and Redevelopment projects subject to this Order to:

(1) Lessen the water quality impacts of development by using smart growth practices such as compact development, directing development towards existing communities via infill or redevelopment, and safeguarding of environmentally sensitive areas.

(2) Minimize the adverse impacts from storm water runoff on the biological integrity of Natural Drainage Systems and the beneficial uses of water

bodies in accordance with requirements under CEQA (Cal. Pub. Resources Code § 21000 et seq.).

(3) Minimize the percentage of impervious surfaces on land developments by minimizing soil compaction during construction, designing projects to minimize the impervious area footprint, and employing Low Impact Development (LID) design principles to mimic predevelopment hydrology through infiltration, evapotranspiration and rainfall harvest and use.

(4) Maintain existing riparian buffers and enhance riparian buffers when possible.

(5) Minimize pollutant loadings from impervious surfaces such as roof tops, parking lots, and roadways through the use of properly designed, technically appropriate BMPs (including Source Control BMPs such as good housekeeping practices), LID Strategies, and Treatment Control BMPs.

(6) Properly select, design and maintain LID and Hydromodification Control BMPs to address pollutants that are likely to be generated, reduce changes to pre-development hydrology, assure long-term function, and avoid the breeding of vectors[25].

(7) Prioritize the selection of BMPs to remove storm water pollutants, reduce storm water runoff volume, and beneficially use storm water to support an integrated approach to protecting water quality and managing water resources in the following order of preference:

(a) On-site infiltration, bioretention and/or rainfall harvest and use.

(b) On-site biofiltration, off-site ground water replenishment, and/or off-site retrofit.

b. Applicability

i. New Development Projects

(1) Development projects subject to Permittee conditioning and approval for the design and implementation of post-construction controls to mitigate storm water pollution, prior to completion of the project(s), are:

(a) All development projects equal to 1 acre or greater of disturbed area and adding more than 10,000 square feet of impervious surface area

(b) Industrial parks 10,000 square feet or more of surface area

(c) Commercial malls 10,000 square feet or more surface area

(d) Retail gasoline outlets 5,000 square feet or more of surface area

(e) Restaurants (SIC 5812) 5,000 square feet or more of surface area

[25] Treatment BMPs when designed to drain within 96 hours of the end of rainfall minimize the potential for the breeding of vectors. See California Department of Public Health *Best Management Practices for Mosquito Control in California* (2012) at http://www.westnile.ca.gov/resources.php

(f) Parking lots 5,000 square feet or more of impervious surface area, or with 25 or more parking spaces

(g) Street and road construction of 10,000 square feet or more of impervious surface area shall follow USEPA guidance regarding Managing Wet Weather with Green Infrastructure: Green Streets[26] (December 2008 EPA-833-F-08-009) to the maximum extent practicable. Street and road construction applies to standalone streets, roads, highways, and freeway projects, and also applies to streets within larger projects.

(h) Automotive service facilities (SIC 5013, 5014, 5511, 5541, 7532-7534 and 7536-7539) 5,000 square feet or more of surface area

(i) Redevelopment projects in subject categories that meet Redevelopment thresholds identified in Part VI.D.6.b.ii (Redevelopment Projects) below

(j) Projects located in or directly adjacent to, or discharging directly to a Significant Ecological Area (SEA), where the development will:

(i) Discharge storm water runoff that is likely to impact a sensitive biological species or habitat; and

(ii) Create 2,500 square feet or more of impervious surface area

(k) Single-family hillside homes. To the extent that a Permittee may lawfully impose conditions, mitigation measures or other requirements on the development or construction of a single-family home in a hillside area as defined in the applicable Permittee's Code and Ordinances, each Permittee shall require that during the construction of a single-family hillside home, the following measures are implemented:

(i) Conserve natural areas

(ii) Protect slopes and channels

(iii) Provide storm drain system stenciling and signage

(iv) Divert roof runoff to vegetated areas before discharge unless the diversion would result in slope instability

(v) Direct surface flow to vegetated areas before discharge unless the diversion would result in slope instability.

ii. Redevelopment Projects

(1) Redevelopment projects subject to Permittee conditioning and approval for the design and implementation of post-construction controls to mitigate storm water pollution, prior to completion of the project(s), are:

(a) Land-disturbing activity that results in the creation or addition or replacement of 5,000 square feet or more of impervious surface area

[26] http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm

on an already developed site on development categories identified in Part VI.D.6.c. (New Development/Redevelopment Performance Criteria).

(b) Where Redevelopment results in an alteration to more than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction storm water quality control requirements, the entire project must be mitigated.

(c) Where Redevelopment results in an alteration of less than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to post-construction storm water quality control requirements, only the alteration must be mitigated, and not the entire development.

(i) Redevelopment does not include routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of facility or emergency redevelopment activity required to protect public health and safety. Impervious surface replacement, such as the reconstruction of parking lots and roadways which does not disturb additional area and maintains the original grade and alignment, is considered a routine maintenance activity. Redevelopment does not include the repaving of existing roads to maintain original line and grade.

(ii) Existing single-family dwelling and accessory structures are exempt from the Redevelopment requirements unless such projects create, add, or replace 10,000 square feet of impervious surface area.

(d) In this section, Existing Development or Redevelopment projects shall mean all discretionary permit projects or project phases that have not been deemed complete for processing, or discretionary permit projects without vesting tentative maps that have not requested and received an extension of previously granted approvals within 90 days of adoption of the Order. Projects that have been deemed complete within 90 days of adoption of the Order are not subject to the requirements Section 7.c. For Permittee's projects the effective date shall be the date the governing body or their designee approves initiation of the project design.

(e) Specifically, the Newhall Ranch Project Phases I and II (a.k.a. the Landmark and Mission Village projects) are deemed to be an existing development that will at a minimum, be designed to comply with the Specific LID Performance Standards attached to the Waste Discharge Requirements (Order No. R4-2012-0139). All subsequent phases of the Newhall Ranch Project constructed during the term of this Order shall be subject to the requirements of this Order.

c. New Development/ Redevelopment Project Performance Criteria

i. Integrated Water Quality/Flow Reduction/Resources Management Criteria

(1) Each Permittee shall require all New Development and Redevelopment projects (referred to hereinafter as "new projects") identified in Part VI.D.7.b to control pollutants, pollutant loads, and runoff volume emanating from the project site by: (1) minimizing the impervious surface area and (2) controlling runoff from impervious surfaces through infiltration, bioretention and/or rainfall harvest and use.

(2) Except as provided in Part VI.D.7.c.ii. (Technical Infeasibility or Opportunity for Regional Ground Water Replenishment), Part VI.D.7.d.i (Local Ordinance Equivalence), or Part VI.D.7.c.v (Hydromodification), below, each Permittee shall require the project to retain on-site the Stormwater Quality Design Volume (SWQDv) defined as the runoff from:

(a) The 0.75-inch, 24-hour rain event or

(b) The 85th percentile, 24-hour rain event, as determined from the Los Angeles County 85th percentile precipitation isohyetal map, *whichever is greater*.

(3) Bioretention and biofiltration systems shall meet the design specifications provided in Attachment H to this Order unless otherwise approved by the Regional Water Board Executive Officer.

(4) When evaluating the potential for on-site retention, each Permittee shall consider the maximum potential for evapotranspiration from green roofs and rainfall harvest and use.

ii. Alternative Compliance for Technical Infeasibility or Opportunity for Regional Ground Water Replenishment

(1) In instances of technical infeasibility or where a project has been determined to provide an opportunity to replenish regional ground water supplies at an offsite location, each Permittee may allow projects to comply with this Order through the alternative compliance measures as described in Part VI.D.7.c.iii.

(2) To demonstrate technical infeasibility, the project applicant must demonstrate that the project cannot reliably retain 100 percent of the SWQDv on-site, even with the maximum application of green roofs and rainwater harvest and use, and that compliance with the applicable post-construction requirements would be technically infeasible by submitting a site-specific hydrologic and/or design analysis conducted and endorsed by a registered professional engineer, geologist, architect, and/or landscape architect. Technical infeasibility may result from conditions including the following:

(a) The infiltration rate of saturated in-situ soils is less than 0.3 inch per hour and it is not technically feasible to amend the in-situ soils to attain an infiltration rate necessary to achieve reliable performance of infiltration or bioretention BMPs in retaining the SWQDv on-site.

(b) Locations where seasonal high ground water is within 5 to 10 feet of the surface,

(c) Locations within 100 feet of a ground water well used for drinking water,

(d) Brownfield development sites where infiltration poses a risk of causing pollutant mobilization,

(e) Other locations where pollutant mobilization is a documented concern[27],

(f) Locations with potential geotechnical hazards, or

(g) Smart growth and infill or redevelopment locations where the density and/ or nature of the project would create significant difficulty for compliance with the on-site volume retention requirement.

(3) To utilize alternative compliance measures to replenish ground water at an offsite location, the project applicant shall demonstrate *(i)* why it is not advantageous to replenish ground water at the project site, *(ii)* that ground water can be used for beneficial purposes at the offsite location, and *(iii)* that the alternative measures shall also provide equal or greater water quality benefits to the receiving surface water than the Water Quality/Flow Reduction/Resource Management Criteria in Part VI.7.D.c.i.

iii. Alternative Compliance Measures

When a Permittee determines a project applicant has demonstrated that it is technically infeasible to retain 100 percent of the SWQDv on-site, or is proposing an alternative offsite project to replenish regional ground water supplies, the Permittee shall require one of the following mitigation options:

(1) On-site Biofiltration

(a) If using biofiltration due to demonstrated technical infeasibility, then the new project must biofiltrate 1.5 times the portion of the SWQDv that is not reliably retained on-site, as calculated by Equation 1 below.

Equation 1:

$$Bv = 1.5 * [SWQDv - Rv]$$

Where:

Bv = biofiltration volume

[27] Pollutant mobilization is considered a documented concern at or near properties that are contaminated or store hazardous substances underground.

SWQDv = the storm water runoff from a 0.75 inch, 24-hour storm or the 85th percentile storm, *whichever is greater*.

Rv = volume reliably retained on-site

(b) Conditions for On-site Biofiltration

(i) Biofiltration systems shall meet the design specifications provided in Attachment H to this Order unless otherwise approved by the Regional Water Board Executive Officer.

(ii) Biofiltration systems discharging to a receiving water that is included on the Clean Water Act section 303(d) list of impaired water quality-limited water bodies due to nitrogen compounds or related effects shall be designed and maintained to achieve enhanced nitrogen removal capability. See Attachment H for design criteria for underdrain placement to achieve enhanced nitrogen removal.

(2) Offsite Infiltration

(a) Use infiltration or bioretention BMPs to intercept a volume of storm water runoff equal to the SWQDv, less the volume of storm water runoff reliably retained on-site, at an approved offsite project, and

(b) Provide pollutant reduction (treatment) of the storm water runoff discharged from the project site in accordance with the Water Quality Mitigation Criteria provided in Part VI.D.7.c.iv.

(c) The required offsite mitigation volume shall be calculated by Equation 2 below and equal to:

Equation 2:

$$Mv = 1.0 * [SWQDv - Rv]$$

Where:

Mv = mitigation volume

SWQDv = runoff from the 0.75 inch, 24-hour storm event or the 85th percentile storm, *whichever is greater*

Rv = the volume of storm water runoff reliably retained on-site.

(3) Ground Water Replenishment Projects

Permittees may propose, in their Watershed Management Program or EWMP, regional projects to replenish regional ground water supplies at offsite locations, provided the groundwater supply has a designated beneficial use in the Basin Plan.

(a) Regional groundwater replenishment projects must use infiltration, ground water replenishment, or bioretention BMPs to intercept a volume of storm water runoff equal to the SWQDv for new development and redevelopment projects, subject to Permittee conditioning and approval for the design and implementation of post-construction controls, within the approved project area, and

(b) Provide pollutant reduction (treatment) of the storm water runoff discharged from development projects, within the project area, subject to Permittee conditioning and approval for the design and implementation of post-construction controls to mitigate storm water pollution in accordance with the Water Quality Mitigation Criteria provided in Part VI.D.7.c.iv.

(c) Permittees implementing a regional ground water replenishment project in lieu of onsite controls shall ensure the volume of runoff captured by the project shall be equal to:

Equation 2:

$$Mv = 1.0 * [SWQDv - Rv]$$

Where:

Mv = mitigation volume

SWQDv = runoff from the 0.75 inch, 24-hour storm event or the 85th percentile storm, whichever is greater

Rv = the volume of storm water runoff reliably retained on-site.

(d) Regional groundwater replenishment projects shall be located in the same sub-watershed (defined as draining to the same HUC-12 hydrologic area in the Basin Plan) as the new development or redevelopment projects which did not implement on site retention BMPs . Each Permittee may consider locations outside of the HUC-12 but within the HUC-10 subwatershed area if there are no opportunities within the HUC-12 subwatershed or if greater pollutant reductions and/or ground water replenishment can be achieved at a location within the expanded HUC-10 subwatershed. The use of a mitigation, ground water replenishment, or retrofit project outside of the HUC-12 subwatershed is subject to the approval of the Executive Officer of the Regional Water Board.

(4) Offsite Project - Retrofit Existing Development

Use infiltration, bioretention, rainfall harvest and use and/or biofiltration BMPs to retrofit an existing development, with similar land uses as the new development or land uses associated with comparable or higher storm water runoff event mean concentrations (EMCs) than the new development.

Comparison of EMCs for different land uses shall be based on published data from studies performed in southern California. The retrofit plan shall be designed and constructed to:

(a) Intercept a volume of storm water runoff equal to the mitigation volume (Mv) as described above in Equation 2, except biofiltration BMPs shall be designed to meet the biofiltration volume as described in Equation 1 and

(b) Provide pollutant reduction (treatment) of the storm water runoff from the project site as described in the Water Quality Mitigation Criteria provided in Part VI.D.7.c.iv.

(5) Conditions for Offsite Projects

(a) Project applicants seeking to utilize these alternative compliance provisions may propose other offsite projects, which the Permittees may approve if they meet the requirements of this subpart.

(b) Location of offsite projects. Offsite projects shall be located in the same sub-watershed (defined as draining to the same HUC-12 hydrologic area in the Basin Plan) as the new development or redevelopment project. Each Permittee may consider locations outside of the HUC-12 but within the HUC-10 subwatershed area if there are no opportunities within the HUC-12 subwatershed or if greater pollutant reductions and/or ground water replenishment can be achieved at a location within the expanded HUC-10 subwatershed. The use of a mitigation, ground water replenishment, or retrofit project outside of the HUC-12 subwatershed is subject to the approval of the Executive Officer of the Regional Water Board.

(c) Project applicant must demonstrate that equal benefits to ground water recharge cannot be met on the project site.

(d) Each Permittee shall develop a prioritized list of offsite mitigation, ground water replenishment and/or retrofit projects, and when feasible, the mitigation must be directed to the highest priority project within the same HUC-12 or if approved by the Regional Water Board Executive Officer, the HUC-10 drainage area, as the new development project.

(e) Infiltration/bioretention shall be the preferred LID BMP for offsite mitigation or ground water replenishment projects. Offsite retrofit projects may include green streets, parking lot retrofits, green roofs, and rainfall harvest and use. Biofiltration BMPs may be considered for retrofit projects when infiltration, bioretention or rainfall harvest and use is technically infeasible.

(f) Each Permittee shall develop a schedule for the completion of offsite projects, including milestone dates to identify, fund, design, and construct the projects. Offsite projects shall be completed as soon as possible, and at the latest, within 4 years of the certificate of occupancy for the first project that contributed funds toward the

construction of the offsite project, unless a longer period is otherwise authorized by the Executive Officer of the Regional Water Board. For public offsite projects, each Permittee must provide in their annual reports a summary of total offsite project funds raised to date and a description (including location, general design concept, volume of water expected to be retained, and total estimated budget) of all pending public offsite projects. Funding sufficient to address the offsite volume must be transferred to the Permittee (for public offsite mitigation projects) or to an escrow account (for private offsite mitigation projects) within one year of the initiation of construction.

(g) Offsite projects must be approved by the Permittee and may be subject to approval by the Regional Water Board Executive Officer, if a third-party petitions the Executive Officer to review the project. Offsite projects will be publicly noticed on the Regional Water Board's website for 30 days prior to approval.

(h) The project applicant must perform the offsite projects as approved by either the Permittee or the Regional Water Board Executive Officer or provide sufficient funding for public or private offsite projects to achieve the equivalent mitigation storm water volume.

(6) Regional Storm Water Mitigation Program

A Permittee or Permittee group may apply to the Regional Water Board for approval of a regional or sub-regional storm water mitigation program to substitute in part or wholly for New and Redevelopment requirements for the area covered by the regional or sub-regional storm water mitigation program. Upon review and a determination by the Regional Water Board Executive Officer that the proposal is technically valid and appropriate, the Regional Water Board may consider for approval such a program if its implementation meets all of the following requirements:

(a) Retains the runoff from the 85th percentile, 24-hour rain event or the 0.75 inch, 24-hour rain event, whichever is greater;
(b) Results in improved storm water quality;
(c) Protects stream habitat;
(d) Promotes cooperative problem solving by diverse interests;
(e) Is fiscally sustainable and has secure funding; and
(f) Is completed in five years including the construction and start-up of treatment facilities.
(g) Nothing in this provision shall be construed as to delay the implementation of requirements for new and redevelopment, as approved in this Order.

(7) Water Quality Mitigation Criteria

(a) Each Permittee shall require all New Development and Redevelopment projects that have been approved for offsite mitigation or ground water replenishment projects as defined in Part VI.D.7.c.ii-iii to also provide treatment of storm water runoff from the project site. Each Permittee shall require these projects to design and implement post-construction storm water BMPs and control measures to reduce pollutant loading as necessary to:

(i) Meet the pollutant specific benchmarks listed in Table 11 at the treatment systems outlet or prior to the discharge to the MS4, and

(ii) Ensure that the discharge does not cause or contribute to an exceedance of water quality standards at the Permittee's downstream MS4 outfall.

(b) Each Permittee may allow the project proponent to install flow-through modular treatment systems including sand filters, or other proprietary BMP treatment systems with a demonstrated efficiency at least equivalent to a sand filter. The sizing of the flow through treatment device shall be based on a rainfall intensity of:

(i) 0.2 inches per hour, or

(ii) The one year, one-hour rainfall intensity as determined from the most recent Los Angeles County isohyetal map, *whichever is greater*.

Table 11. Benchmarks Applicable to New Development Treatment BMPs[28]

Conventional Pollutants

Pollutant	Suspended Solids mg/L	Total P mg/L	Total N mg/L		TKN mg/L	
Effluent Concentration	14	0.13	1.28		1.09	

Metals

Pollutant	Total Cd µg/L	Total Cu µg/L	Total Cr µg/L	Total Pb µg/L	Total Zn µg/L
Effluent Concentration	0.3	6	2.8	2.5	23

[28] The treatment control BMP performance benchmarks were developed from the median effluent water quality values of the six highest performing BMPs, per pollutant, in the storm water BMP database (http://www.bmpdatabase.org/, last visited September 25, 2012).

(c) In addition to the requirements for controlling pollutant discharges as described in Part VI.D.7.c.iii. and the treatment benchmarks described above, each Permittee shall ensure that the new development or redevelopment will not cause or contribute to an exceedance of applicable water quality-based effluent limitations established in Part VI.E pursuant to Total Maximum Daily Loads (TMDLs).

iv. Hydromodification (Flow/ Volume/ Duration) Control Criteria

Each Permittee shall require all New Development and Redevelopment projects located within natural drainage systems as described in Part VI.D.7.c.iv.(1)(a)(iii) to implement hydrologic control measures, to prevent accelerated downstream erosion and to protect stream habitat in natural drainage systems. The purpose of the hydrologic controls is to minimize changes in post-development hydrologic storm water runoff discharge rates, velocities, and duration. This shall be achieved by maintaining the project's pre-project storm water runoff flow rates and durations.

(1) Description

(a) Hydromodification control in natural drainage systems shall be achieved by maintaining the Erosion Potential (Ep) in streams at a value of 1, unless an alternative value can be shown to be protective of the natural drainage systems from erosion, incision, and sedimentation that can occur as a result of flow increases from impervious surfaces and prevent damage to stream habitat in natural drainage system tributaries (see Attachment J - Determination of Erosion Potential).

(ii) Hydromodification control may include one, or a combination of on-site, regional or sub-regional hydromodification control BMPs, LID strategies, or stream and riparian buffer restoration measures. Any in-stream restoration measure shall not adversely affect the beneficial uses of the natural drainage systems.

(iii) Natural drainage systems that are subject to the hydromodification assessments and controls as described in this Part of the Order, include all drainages that have not been improved (e.g., channelized or armored with concrete, shotcrete, or rip-rap) or drainage systems that are tributary to a natural drainage system, except as provided in Part VI.D.7c.iv.(1)(b)--Exemptions to Hydromodification Controls [see below]. The clearing or dredging of a natural drainage system does not constitute an "improvement."

(iv) Until the State Water Board or the Regional Water Board adopts a final Hydromodification Policy or criteria, Permittees shall implement the Hydromodification Control Criteria described in Part VI.D.7.c.iv.(1)(c) to control the potential adverse impacts of changes in hydrology that may result from new development and

redevelopment projects located within natural drainage systems as described in Part VI.D.7.c.iv.(1)(a)(iii).

(b) Exemptions to Hydromodification Controls. Permittees may exempt the following New Development and Redevelopment projects from implementation of hydromodification controls where assessments of downstream channel conditions and proposed discharge hydrology indicate that adverse hydromodification effects to beneficial uses of Natural Drainage Systems are unlikely:

(i) Projects that are replacement, maintenance or repair of a Permittee's existing flood control facility, storm drain, or transportation network.

(ii) Redevelopment Projects in the Urban Core that do not increase the effective impervious area or decrease the infiltration capacity of pervious areas compared to the pre-project conditions.

(iii) Projects that have any increased discharge directly or via a storm drain to a sump, lake, area under tidal influence, into a waterway that has a 100-year peak flow (Q100) of 25,000 cfs or more, or other receiving water that is not susceptible to hydromodification impacts.

(iv) Projects that discharge directly or via a storm drain into concrete or otherwise engineered (not natural) channels (e.g., channelized or armored with rip rap, shotcrete, etc.), which, in turn, discharge into receiving water that is not susceptible to hydromodification impacts (as in Parts VI.D.7.c.iv.(1)(b)(i)-(iii) above).

(v) LID BMPs implemented on single family homes are sufficient to comply with Hydromodification criteria.

(c) Hydromodification Control Criteria. The Hydromodification Control Criteria to protect natural drainage systems are as follows:

(i) Except as provided for in Part VI.D.7.c.iv.(1)(b), projects disturbing an area greater than 1 acre but less than 50 acres within natural drainage systems will be presumed to meet pre-development hydrology if one of the following demonstrations is made:

1. The project is designed to retain on-site, through infiltration, evapotranspiration, and/or harvest and use, the storm water volume from the runoff of the 95th percentile, 24-hour storm, or

2. The runoff flow rate, volume, velocity, and duration for the post-development condition do not exceed the pre-development condition for the 2-year, 24-hour rainfall event. This condition may be substantiated by simple screening models, including those described in *Hydromodification Effects on Flow Peaks*

and Durations in Southern California Urbanizing Watersheds (Hawley et al., 2011) or other models acceptable to the Executive Officer of the Regional Water Board, or

3. The Erosion Potential (Ep) in the receiving water channel will approximate 1, as determined by a Hydromodification Analysis Study and the equation presented in Attachment J. Alternatively, Permittees can opt to use other work equations to calculate Erosion Potential with Executive Officer approval.

(ii) Projects disturbing 50 acres or more within natural drainage systems will be presumed to meet pre-development hydrology based on the successful demonstration of one of the following conditions:

1. The site infiltrates on-site at least the runoff from a 2-year, 24-hour storm event, or
2. The runoff flow rate, volume, velocity, and duration for the post-development condition does not exceed the pre-development condition for the 2-year, 24-hour rainfall events. These conditions must be substantiated by hydrologic modeling acceptable to the Regional Water Board Executive Officer, or
3. The Erosion Potential (Ep) in the receiving water channel will approximate 1, as determined by a Hydromodification Analysis Study and the equation presented in Attachment J.

(c) Alternative Hydromodification Criteria

(i) Permittees may satisfy the requirement for Hydromodification Controls by implementing the hydromodification requirements in the County of Los Angeles Low Impact Development Manual (2009) for all projects disturbing an area greater than 1 acre within natural drainage systems.

(ii) Each Permittee may alternatively develop and implement watershed specific Hydromodification Control Plans (HCPs). Such plans shall be developed no later than one year after the effective date of this Order.

(iii) The HCP shall identify:

1. Stream classifications
2. Flow rate and duration control methods
3. Sub-watershed mitigation strategies
4. Stream and/or riparian buffer restoration measures, which will maintain the stream and tributary Erosion Potential at 1 unless

an alternative value can be shown to be protective of the natural drainage systems from erosion, incision, and sedimentation that can occur as a result of flow increases from impervious surfaces and prevent damage to stream habitat in natural drainage system tributaries.

(iv) The HCP shall contain the following elements:

1. Hydromodification Management Standards
2. Natural Drainage Areas and Hydromodification Management Control Areas
3. New Development and Redevelopment Projects subject to the HCP
4. Description of authorized Hydromodification Management Control BMPs
5. Hydromodification Management Control BMP Design Criteria
6. For flow duration control methods, the range of flows to control for, and goodness of fit criteria
7. Allowable low critical flow, Qc, which initiates sediment transport
8. Description of the approved Hydromodification Model
9. Any alternate Hydromodification Management Model and Design
10. Stream Restoration Measures Design Criteria
11. Monitoring and Effectiveness Assessment
12. Record Keeping
13. The HCP shall be deemed in effect upon Executive Officer approval.

v. Watershed Equivalence.

Regardless of the methods through which Permittees allow project applicants to implement alternative compliance measures, the subwatershed-wide (defined as draining to the same HUC-12 hydrologic area in the Basin Plan) result of all development must be at least the same level of water quality protection as would have been achieved if all projects utilizing these alternative compliance provisions had complied with Part VI.D.7.c.i (Integrated Water Quality/Flow Reduction/Resource Management Criteria).

vi. Annual Report

Each Permittee shall provide in their annual report to the Regional Water Board a list of mitigation project descriptions and estimated pollutant and flow reduction analyses (compiled from design specifications submitted by project

applicants and approved by the Permittee(s)). Within 4 years of Order adoption, Permittees must submit in their Annual Report, a comparison of the expected aggregate results of alternative compliance projects to the results that would otherwise have been achieved by retaining on site the SWQDv.

d. Implementation

i. Local Ordinance Equivalence

A Permittee that has adopted a local LID ordinance prior to the adoption of this Order, and which includes a retention requirement numerically equal to the 0.75-inch, 24-hour rain event or the 85th percentile, 24-hour rain event, whichever is greater, may submit documentation to the Regional Water Board that the alternative requirements in the local ordinance will provide equal or greater reduction in storm water discharge pollutant loading and volume as would have been obtained through strict conformance with Part VI.D.7.c.i. (Integrated Water Quality/Flow Reduction Resources Management Criteria) or Part VI.D.7.c.ii. (Alternative Compliance Measures for Technical Infeasibility or Opportunity for Regional Ground water Replenishment) of this Order and, if applicable, Part VI.D.7.c.iv. (Hydromodification (Flow/Volume Duration) Control Criteria).

(1) Documentation shall be submitted within 180 days after the effective date of this Order.

(2) The Regional Water Board shall provide public notice of the proposed equivalency determination and a minimum 30-day period for public comment. After review and consideration of public comments, the Regional Water Board Executive Officer will determine whether implementation of the local ordinance provides equivalent pollutant control to the applicable provisions of this Order. Local ordinances that do not strictly conform to the provisions of this Order must be approved by the Regional Water Board Executive Officer as being “equivalent” in effect to the applicable provisions of this Order in order to substitute for the requirements in Parts VI.D.7.c.i and, where applicable, VI.D.7.c.iv.

(3) Where the Regional Water Board Executive Officer determines that a Permittee’s local LID ordinance does not provide equivalent pollutant control, the Permittee shall either

(a) Require conformance with Parts VI.D.7.c.i and, where applicable, VI.D.7.c.iv, or

(b) Update its local ordinance to conform to the requirements herein within two years of the effective date of this Order.

ii. Project Coordination

(1) Each Permittee shall facilitate a process for effective approval of post-construction storm water control measures. The process shall include:

(a) Detailed LID site design and BMP review including BMP sizing calculations, BMP pollutant removal performance, and municipal approval; and

(b) An established structure for communication and delineated authority between and among municipal departments that have jurisdiction over project review, plan approval, and project construction through memoranda of understanding or an equivalent agreement.

iii. Maintenance Agreement and Transfer

(1) Prior to issuing approval for final occupancy, each Permittee shall require that all new development and redevelopment projects subject to post-construction BMP requirements, with the exception of simple LID BMPs implemented on single family residences, provide an operation and maintenance plan, monitoring plan, where required, and verification of ongoing maintenance provisions for LID practices, Treatment Control BMPs, and Hydromodification Control BMPs including but not limited to: final map conditions, legal agreements, covenants, conditions or restrictions, CEQA mitigation requirements, conditional use permits, and/ or other legally binding maintenance agreements. Permittees shall require maintenance records be kept on site for treatment BMPs implemented on single family residences.

(a) Verification at a minimum shall include the developer's signed statement accepting responsibility for maintenance until the responsibility is legally transferred; and either:

(i) A signed statement from the public entity assuming responsibility for BMP maintenance; or

(ii) Written conditions in the sales or lease agreement, which require the property owner or tenant to assume responsibility for BMP maintenance and conduct a maintenance inspection at least once a year; or

(iii) Written text in project covenants, conditions, and restrictions (CCRs) for residential properties assigning BMP maintenance responsibilities to the Home Owners Association; or

(iv) Any other legally enforceable agreement or mechanism that assigns responsibility for the maintenance of BMPs.

(b) Each Permittee shall require all development projects subject to post-construction BMP requirements to provide a plan for the operation and maintenance of all structural and treatment controls. The plan shall be submitted for examination of relevance to keeping the BMPs in proper working order. Where BMPs are transferred to Permittee for ownership and maintenance, the plan shall also include all relevant costs for upkeep of BMPs in the transfer. Operation and Maintenance plans for private BMPs shall be kept on-site for periodic review by Permittee inspectors.

iv. Tracking, Inspection, and Enforcement of Post-Construction BMPs

(1) Each Permittee shall implement a tracking system and an inspection and enforcement program for new development and redevelopment post-construction storm water no later than 60 days after Order adoption date.

(a) Implement a GIS or other electronic system for tracking projects that have been conditioned for post-construction BMPs. The electronic system, at a minimum, should contain the following information:

(i) Municipal Project ID

(ii) State WDID No.

(iii) Project Acreage

(iv) BMP Type and Description

(v) BMP Location (coordinates)

(vi) Date of Acceptance

(vii) Date of Maintenance Agreement

(viii) Maintenance Records

(ix) Inspection Date and Summary

(x) Corrective Action

(xi) Date Certificate of Occupancy Issued

(xii) Replacement or Repair Date

(b) Inspect all development sites upon completion of construction and prior to the issuance of occupancy certificates to ensure proper installation of LID measures, structural BMPs, treatment control BMPs and hydromodification control BMPs. The inspection may be combined with other inspections provided it is conducted by trained personnel.

(c) Verify proper maintenance and operation of post-construction BMPs previously approved for new development and redevelopment and operated by the Permittee. The post-construction BMP maintenance inspection program shall incorporate the following elements:

(i) The development of a Post-construction BMP Maintenance Inspection checklist

(ii) Inspection at least once every 2 years after project completion, of post-construction BMPs to assess operation conditions with particular attention to criteria and procedures for post-construction

treatment control and hydromodification control BMP repair, replacement, or re-vegetation.

(d) For post-construction BMPs operated and maintained by parties other than the Permittee, the Permittee shall require the other parties to document proper maintenance and operations.

(e) Undertake enforcement action per the established Progressive Enforcement Policy as appropriate based on the results of the inspection. See Part VI.D.2 for requirements for the development and implementation of a Progressive Enforcement Policy.

8. Development Construction Program

a. Each Permittee shall develop, implement, and enforce a construction program that:

i. Prevents illicit construction-related discharges of pollutants into the MS4 and receiving waters.

ii. Implements and maintains structural and non-structural BMPs to reduce pollutants in storm water runoff from construction sites.

iii. Reduces construction site discharges of pollutants to the MS4 to the MEP.

iv. Prevents construction site discharges to the MS4 from causing or contributing to a violation of water quality standards.

b. Each Permittee shall establish for its jurisdiction an enforceable erosion and sediment control ordinance for all construction sites that disturb soil.

c. Applicability

The provisions contained in Part VI.D.8.d below apply exclusively to construction sites less than 1 acre. Provisions contained in Part VI.D.8.e – j, apply exclusively to construction sites 1 acre or greater. The requirements contained in this part apply to all activities involving soil disturbance with the exception of agricultural activities. Activities covered by this permit include but are not limited to grading, vegetation clearing, soil compaction, paving, re-paving and linear underground/overhead projects (LUPs).

d. Requirements for Construction Sites Less than One Acre

i. For construction sites less than 1 acre, each Permittee shall:

(1) Through the use of the Permittee's erosion and sediment control ordinance or and/or building permit, require the implementation of an effective combination of erosion and sediment control BMPs from Table 12 to prevent erosion and sediment loss, and the discharge of construction wastes.

Table 12. Applicable Set of BMPs for All Construction Sites

Erosion Controls	Scheduling
	Preservation of Existing Vegetation
Sediment Controls	Silt Fence
	Sand Bag Barrier
	Stabilized Construction Site Entrance/Exit
Non-Storm Water Management	Water Conservation Practices
	Dewatering Operations
Waste Management	Material Delivery and Storage
	Stockpile Management
	Spill Prevention and Control
	Solid Waste Management
	Concrete Waste Management
	Sanitary/Septic Waste Management

(2) Possess the ability to identify all construction sites with soil disturbing activities that require a permit, regardless of size, and shall be able to provide a list of permitted sites upon request of the Regional Water Board. Permittees may use existing permit databases or other tracking systems to comply with these requirements.

(3) Inspect construction sites on as needed based on the evaluation of the factors that are a threat to water quality. In evaluating the threat to water quality, the following factors shall be considered: soil erosion potential; site slope; project size and type; sensitivity of receiving water bodies; proximity to receiving water bodies; non-storm water discharges; past record of non-compliance by the operators of the construction site; and any water quality issues relevant to the particular MS4.

(4) Implement the Permittee's Progressive Enforcement Policy to ensure that construction sites are brought into compliance with the erosion and sediment control ordinance within a reasonable time period. See Part VI.D.2 for requirements for the development and implementation of a Progressive Enforcement Policy.

e. Each Permittee shall require operators of public and private construction sites within its jurisdiction to select, install, implement, and maintain BMPs that comply with its erosion and sediment control ordinance.

f. The requirements contained in this part apply to all activities involving soil disturbance with the exception of agricultural activities. Activities covered by this permit include but are not limited to grading, vegetation clearing, soil compaction, paving, re-paving and linear underground/overhead projects (LUPs).

g. Construction Site Inventory / Electronic Tracking System

i. Each Permittee shall use an electronic system to inventory grading permits, encroachment permits, demolition permits, building permits, or construction permits (and any other municipal authorization to move soil and/ or construct or destruct that involves land disturbance) issued by the Permittee. To satisfy this requirement, the use of a database or GIS system is recommended.

ii. Each Permittee shall complete an inventory and continuously update as new sites are permitted and sites are completed. The inventory / tracking system shall contain, at a minimum:

(1) Relevant contact information for each project (e.g., name, address, phone, email, etc. for the owner and contractor.

(2) The basic site information including location, status, size of the project and area of disturbance.

(3) The proximity all water bodies, water bodies listed as impaired by sediment-related pollutants, and water bodies for which a sediment-related TMDL has been adopted and approved by USEPA.

(4) Significant threat to water quality status, based on consideration of factors listed in Appendix 1 to the Statewide General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit).

(5) Current construction phase where feasible.

(6) The required inspection frequency.

(7) The project start date and anticipated completion date.

(8) Whether the project has submitted a Notice of Intent and obtained coverage under the Construction General Permit.

(9) The date the Permittee approved the Erosion and Sediment Control Plan (ESCP).

(10) Post-Construction Structural BMPs subject to Operation and Maintenance Requirements.

h. Construction Plan Review and Approval Procedures

i. Each Permittee shall develop procedures to review and approve relevant construction plan documents.

ii. The review procedures shall be developed and implemented such that the following minimum requirements are met:

(1) Prior to issuing a grading or building permit, each Permittee shall require each operator of a construction activity within its jurisdiction to prepare and submit an ESCP prior to the disturbance of land for the Permittee's review and written approval. The construction site operator shall be prohibited from commencing construction activity prior to receipt of written approval by the Permittee. Each Permittee shall not approve any ESCP unless it contains appropriate site-specific construction site BMPs that

meet the minimum requirements of a Permittee's erosion and sediment control ordinance.

(2) ESCPs must include the elements of a Storm Water Pollution Prevention Plan (SWPPP). SWPPPs prepared in accordance with the requirements of the Construction General Permit can be accepted as ESCPs.

(3) At a minimum, the ESCP must address the following elements:

(a) Methods to minimize the footprint of the disturbed area and to prevent soil compaction outside of the disturbed area.

(b) Methods used to protect native vegetation and trees.

(c) Sediment/Erosion Control.

(d) Controls to prevent tracking on and off the site.

(e) Non-storm water controls (e.g., vehicle washing, dewatering, etc.).

(f) Materials Management (delivery and storage).

(g) Spill Prevention and Control.

(h) Waste Management (e.g., concrete washout/waste management; sanitary waste management).

(i) Identification of site Risk Level as identified per the requirements in Appendix 1 of the Construction General Permit.

(4) The ESCP must include the rationale for the selection and design of the proposed BMPs, including quantifying the expected soil loss from different BMPs.

(5) Each Permittee shall require that the ESCP is developed and certified by a Qualified SWPPP Developer (QSD).

(6) Each Permittee shall require that all structural BMPs be designed by a licensed California Engineer.

(7) Each Permittee shall require that for all sites, the landowner or the landowner's agent sign a statement on the ESCP as follows:

(a) "I certify that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure 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, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that submitting false and/ or inaccurate information, failing to update the ESCP to reflect current conditions, or failing to properly and/ or adequately implement the ESCP may result in revocation of grading and/ or other permits or other sanctions provided by law."

(8) Prior to issuing a grading or building permit, each Permittee must verify that the construction site operators have existing coverage under

applicable permits, including, but not limited to the State Water Board's Construction General Permit, and State Water Board 401 Water Quality Certification.

(9) Each Permittee shall develop and implement a checklist to be used to conduct and document review of each ESCP.

i. BMP Implementation Level

i. Each Permittee shall implement technical standards for the selection, installation and maintenance of construction BMPs for all construction sites within its jurisdiction.

ii. The BMP technical standards shall require:

(1) The use of BMPs that are tailored to the risks posed by the project. Sites are to be ranked from Low Risk (Risk 1) to High Risk (Risk 3). Project risks are to be calculated based on the potential for erosion from the site and the sensitivity of the receiving water body. Receiving water bodies that are listed on the Clean Water Act (CWA) Section 303(d) list for sediment or siltation are considered High Risk. Likewise, water bodies with designated beneficial uses of SPWN, COLD, and MIGR are also considered to be High Risk. The combined (sediment/receiving water) site risk shall be calculated using the methods provided in Appendix 1 of the Construction General Permit. At a minimum, the BMP technical standards shall include requirements for High Risk sites as defined in Table 15.

(2) The use of BMPs for all construction sites, sites equal or greater to 1 acre, and for paving projects per Tables 14 and 16 of this Order.

(3) Detailed installation designs and cut sheets for use within ESCPs.

(4) Maintenance expectations for each BMP, or category of BMPs, as appropriate.

iii. Permittees are encouraged to adopt respective BMPs from latest versions of the *California BMP Handbook, Construction* or *Caltrans Stormwater Quality Handbooks, Construction Site Best Management Practices (BMPs) Manual* and addenda. Alternatively, Permittees are authorized to develop or adopt equivalent BMP standards consistent for Southern California and for the range of activities presented below in Tables 13 through 16.

iv. The local BMP technical standards shall be readily available to the development community and shall be clearly referenced within each Permittee's storm water or development services website, ordinance, permit approval process and/or ESCP review forms. The local BMP technical standards shall also be readily available to the Regional Water Board upon request.

v. Local BMP technical standards shall be available for the following:

Table 13. Minimum Set of BMPs for All Construction Sites

Erosion Controls	Scheduling
	Preservation of Existing Vegetation
Sediment Controls	Silt Fence
	Sand Bag Barrier
	Stabilized Construction Site Entrance/Exit
Non-Storm water Management	Water Conservation Practices
	Dewatering Operations
Waste Management	Material Delivery and Storage
	Stockpile Management
	Spill Prevention and Control
	Solid Waste Management
	Concrete Waste Management
	Sanitary/Septic Waste Management

Table 14. Additional BMPs Applicable to Construction Sites Disturbing 1 Acre or More

Erosion Controls	Hydraulic Mulch
	Hydroseeding
	Soil Binders
	Straw Mulch
	Geotextiles and Mats
	Wood Mulching
Sediment Controls	Fiber Rolls
	Gravel Bag Berm
	Street Sweeping and/ or Vacuum
	Storm Drain Inlet Protection
	Scheduling
	Check Dam
Additional Controls	Wind Erosion Controls
	Stabilized Construction Entrance/ Exit
	Stabilized Construction Roadway
	Entrance/ Exit Tire Wash
Non-Storm water Management	Vehicle and Equipment Washing
	Vehicle and Equipment Fueling
	Vehicle and Equipment Maintenance
Waste Management	Material Delivery and Storage
	Spill Prevention and Control

Table 15. Additional Enhanced BMPs for High Risk Sites

Erosion Controls	Hydraulic Mulch
	Hydroseeding
	Soil Binders
	Straw Mulch

	Geotextiles and Mats
	Wood Mulching
	Slope Drains
Sediment Controls	Silt Fence
	Fiber Rolls
	Sediment Basin
	Check Dam
	Gravel Bag Berm
	Street Sweeping and/or Vacuum
	Sand Bag Barrier
	Storm Drain Inlet Protection
Additional Controls	Wind Erosion Controls
	Stabilized Construction Entrance/Exit
	Stabilized Construction Roadway
	Entrance/Exit Tire Wash
	Advanced Treatment Systems*
Non-Storm water Management	Water Conservation Practices
	Dewatering Operations (Ground water dewatering only under NPDES Permit No. CAG994004)
	Vehicle and Equipment Washing
	Vehicle and Equipment Fueling
	Vehicle and Equipment Maintenance
Waste Management	Material Delivery and Storage
	Stockpile Management
	Spill Prevention and Control
	Solid Waste Management

* Applies to public roadway projects.

Table 16. Minimum Required BMPs for Roadway Paving or Repair Operation (For Private or Public Projects)

1.	Restrict paving and repaving activity to exclude periods of rainfall or predicted rainfall unless required by emergency conditions.
2.	Install gravel bags and filter fabric or other equivalent inlet protection at all susceptible storm drain inlets and at manholes to prevent spills of paving products and tack coat.
3.	Prevent the discharge of release agents including soybean oil, other oils, or diesel to the storm water drainage system or receiving waters.
4.	Minimize non storm water runoff from water use for the roller and for evaporative cooling of the asphalt.
5.	Clean equipment over absorbent pads, drip pans, plastic sheeting or other material to capture all spillage and dispose of properly.
6.	Collect liquid waste in a container, with a secure lid, for transport to a maintenance facility to be reused, recycled or disposed of properly.
7.	Collect solid waste by vacuuming or sweeping and securing in an

	appropriate container for transport to a maintenance facility to be reused, recycled or disposed of properly.
8.	Cover the "cold-mix" asphalt (i.e., pre-mixed aggregate and asphalt binder) with protective sheeting during a rainstorm.
9.	Cover loads with tarp before haul-off to a storage site, and do not overload trucks.
10.	Minimize airborne dust by using water spray or other approved dust suppressant during grinding.
11.	Avoid stockpiling soil, sand, sediment, asphalt material and asphalt grindings materials or rubble in or near storm water drainage system or receiving waters.
12.	Protect stockpiles with a cover or sediment barriers during a rain.

j. Construction Site Inspection

i. Each Permittee shall use its legal authority to implement procedures for inspecting public and private construction sites.

ii. The inspection procedures shall be implemented as follows:

(1) Inspect the public and private construction sites as specified in Table 17 below:

Table 17. Inspection Frequencies for Sites One Acre or Greater

Site	Inspection Frequency Shall Occur
a. All sites 1 acre or larger that discharge to a tributary listed by the state as an impaired water for sediment or turbidity under the CWA § 303(d)	(1) when two or more consecutive days with greater than 50% chance of rainfall are predicted by NOAA[29], (2) within 48 hours of a ½-inch rain event and at (3) least once every two weeks
b. Other sites 1 acre or more determined to be a significant threat to water quality[30]	
c. All other construction sites with 1 acre or more of soil disturbance not meeting the criteria above	At least monthly

(2) Each Permittee shall inspect all phases of construction as follows:

(a) Prior to Land Disturbance

Prior to allowing an operator to commence land disturbance, each Permittee shall perform an inspection to ensure all necessary erosion

[29] www.srh.noaa.gov/forecast

[30] In evaluating the threat to water quality, the following factors shall be considered: soil erosion potential; site slope; project size and type; sensitivity of receiving water bodies; proximity to receiving water bodies; non-storm water discharges; past record of non-compliance by the operators of the construction site; and any water quality issues relevant to the particular MS4.

and sediment structural and non-structural BMP materials and procedures are available per the erosion and sediment control plan.

(b) During Active Construction, including Land Development[31] and Vertical Construction[32]

In accordance with the frequencies specified in Part VI.D.8.j and Table 17 of this Order, each Permittee shall perform an inspection to ensure all necessary erosion and sediment structural and non-structural BMP materials and procedures are available per the erosion and sediment control plan throughout the construction process.

(c) Final Landscaping / Site Stabilization[33]

At the conclusion of the project and as a condition of approving and/or issuing a Certificate of Occupancy, each Permittee shall inspect the constructed site to ensure that all graded areas have reached final stabilization and that all trash, debris, and construction materials, and temporary erosion and sediment BMPs are removed.

(3) Based on the required frequencies above, each construction project shall be inspected a minimum of three times.

(4) Inspection Standard Operating Procedures

Each Permittee shall develop, implement, and revise as necessary, standard operating procedures that identify the inspection procedures each Permittee will follow. Inspections of construction sites, and the standard operating procedures, shall include, but are not limited to:

(a) Verification of active coverage under the Construction General Permit for sites disturbing 1 acre or more, or that are part of a planned development that will disturb 1 acre or more and a process for referring non-filers to the Regional Water Board.

(b) Review of the applicable ESCP and inspection of the construction site to determine whether all BMPs have been selected, installed, implemented, and maintained according to the approved plan and subsequent approved revisions.

(c) Assessment of the appropriateness of the planned and installed BMPs and their effectiveness.

(d) Visual observation and record keeping of non-storm water discharges, potential illicit discharges and connections, and potential discharge of pollutants in storm water runoff.

(e) Development of a written or electronic inspection report generated from an inspection checklist used in the field.

[31] Activities include cuts and fills, rough and finished grading; alluvium removals; canyon cleanouts; rock undercuts; keyway excavations; stockpiling of select material for capping operations; and excavation and street paving, lot grading, curbs, gutters and sidewalks, public utilities, public water facilities including fire hydrants, public sanitary sewer systems, storm sewer system and/or other drainage improvement.
[32] The build out of structures from foundations to roofing, including rough landscaping.
[33] All soil disturbing activities at each individual parcel within the site have been completed.

(f) Tracking of the number of inspections for the inventoried construction sites throughout the reporting period to verify that the sites are inspected at the minimum frequencies required in Table 17 of this Order.

k. Enforcement

Each Permittee shall implement its Progressive Enforcement Policy to ensure that construction sites are brought into compliance with all storm water requirements within a reasonable time period. See Part VI.D.2 for requirements for the development and implementation of a Progressive Enforcement Policy.

l. Permittee Staff Training

i. Each Permittee shall ensure that all staff whose primary job duties are related to implementing the construction storm water program are adequately trained.

ii. Each Permittee may conduct in-house training or contract with consultants. Training shall be provided to the following staff positions of the MS4:

(1) Plan Reviewers and Permitting Staff

Ensure staff and consultants are trained as qualified individuals, knowledgeable in the technical review of local erosion and sediment control ordinance, local BMP technical standards, ESCP requirements, and the key objectives of the State Water Board QSD program. Permittees may provide internal training to staff or require staff to obtain QSD certification.

(2) Erosion Sediment Control/Storm Water Inspectors

Each Permittee shall ensure that its inspectors are knowledgeable in inspection procedures consistent with the State Water Board sponsored program QSD or a Qualified SWPPP Practitioner (QSP) or that a designated person on staff who has been trained in the key objectives of the QSD/QSP programs supervises inspection operations. Each Permittee may provide internal training to staff or require staff to obtain QSD/QSP certification. Each inspector must be knowledgeable of the local BMP technical standards and ESCP requirements.

(3) Third-Party Plan Reviewers, Permitting Staff, and Inspectors

If the Permittee utilizes outside parties to conduct inspections and/or review plans, each Permittee shall ensure these staff are trained per the requirements listed above. Outside contractors can self-certify, providing they certify they have received all applicable training required in the Permit and have documentation to that effect.

9. Public Agency Activities Program

a. Each Permittee shall implement a Public Agency Activities Program to minimize storm water pollution impacts from Permittee-owned or operated facilities and activities and to identify opportunities to reduce storm water pollution impacts

from areas of existing development. Requirements for Public Agency Facilities and Activities consist of the following components:

i. Public Construction Activities Management

ii. Public Facility Inventory

iii. Inventory of Existing Development for Retrofitting Opportunities

iv. Public Facility and Activity Management

v. Vehicle and Equipment Wash Areas

vi. Landscape, Park, and Recreational Facilities Management

vii. Storm Drain Operation and Maintenance

viii. Streets, Roads, and Parking Facilities Maintenance

ix. Emergency Procedures

x. Municipal Employee and Contractor Training

b. Public Construction Activities Management

i. Each Permittee shall implement and comply with the Planning and Land Development Program requirements in Part VI.D.7 of this Order at Permittee-owned or operated (i.e., public or Permittee sponsored) construction projects that are categorized under the project types identified in Part VI.D.7.b of this Order.

ii. Each Permittee shall implement and comply with the appropriate Development Construction Program requirements in Part VI.D.8 of this Order at Permittee-owned or operated construction projects as applicable.

iii. For Permittee-owned or operated projects (including those under a capital improvement project plan) that disturb less than one acre of soil, each Permittee shall require an effective combination of erosion and sediment control BMPs from Table 13 (see Construction Development Program, minimum BMPs).

iv. Each Permittee shall obtain separate coverage under the Construction General Permit for all Permittee-owned or operated construction sites that require coverage.

c. Public Facility Inventory

i. Each Permittee shall maintain an updated inventory of all Permittee-owned or operated (i.e., public) facilities within its jurisdiction that are potential sources of storm water pollution. The incorporation of facility information into a GIS is recommended. Sources to be tracked include but are not limited to the following:

(1) Animal control facilities

(2) Chemical storage facilities

(3) Composting facilities

(4) Equipment storage and maintenance facilities (including landscape maintenance-related operations)

(5) Fueling or fuel storage facilities (including municipal airports)

(6) Hazardous waste disposal facilities

(7) Hazardous waste handling and transfer facilities

(8) Incinerators

(9) Landfills

(10) Materials storage yards

(11) Pesticide storage facilities

(12) Fire stations

(13) Public restrooms

(14) Public parking lots

(15) Public golf courses

(16) Public swimming pools

(17) Public parks

(18) Public works yards

(19) Public marinas

(20) Recycling facilities

(21) Solid waste handling and transfer facilities

(22) Vehicle storage and maintenance yards

(23) Storm water management facilities (e.g., detention basins)

(24) All other Permittee-owned or operated facilities or activities that each Permittee determines may contribute a substantial pollutant load to the MS4.

ii. Each Permittee shall include the following minimum fields of information for each Permittee-owned or operated facility in its inventory.

(1) Name of facility

(2) Name of facility manager and contact information

(3) Address of facility (physical and mailing)

(4) A narrative description of activities performed and potential pollution sources.

(5) Coverage under the Industrial General Permit or other individual or general NPDES permits or any applicable waiver issued by the Regional or State Water Board pertaining to storm water discharges.

iii. Each Permittee shall update its inventory at least once during the 5-year term of the Order. The update shall be accomplished through collection of new information obtained through field activities or through other readily available inter and intra-agency informational databases (e.g., property management, land-use approvals, accounting and depreciation ledger account, and similar information).

d. Inventory of Existing Development for Retrofitting Opportunities

i. Each Permittee shall develop an inventory of retrofitting opportunities that meets the requirements of this Part VI.9.d. Retrofit opportunities shall be identified within the public right-of-way or in coordination with a TMDL implementation plan(s). The goals of the existing development retrofitting inventory are to address the impacts of existing development through regional or sub-regional retrofit projects that reduce the discharges of storm water pollutants into the MS4 and prevent discharges from the MS4 from causing or contributing to a violation of water quality standards as defined in Part V.A, Receiving Water Limitations.

ii. Each Permittee shall screen existing areas of development to identify candidate areas for retrofitting using watershed models or other screening level tools.

iii. Each Permittee shall evaluate and rank the areas of existing development identified in the screening to prioritize retrofitting candidates. Criteria for evaluation may include but are not limited to:

(1) Feasibility, including general private and public land availability;

(2) Cost effectiveness;

(3) Pollutant removal effectiveness;

(4) Tributary area potentially treated;

(5) Maintenance requirements;

(6) Landowner cooperation;

(7) Neighborhood acceptance;

(8) Aesthetic qualities;

(9) Efficacy at addressing concern; and

(10) Potential improvements to public health and safety.

iv. Each Permittee shall consider the results of the evaluation in the following programs:

(1) The Permittee's storm water management program: Highly feasible projects expected to benefit water quality should be given a high priority to implement source control and treatment control BMPs in a Permittee's SWMP.

(2) Off-site mitigation for New Development and Redevelopment: Each Permittee shall consider high priority retrofit projects as candidates for off-site mitigation projects per Part VI.D.7.c.iii.(4).(d).

(3) Where feasible, at the discretion of the Permittee, the existing development retrofitting program may be coordinated with flood control projects and other infrastructure improvement programs per Part VI.D.9.e.ii.(2) below.

v. Each Permittee shall cooperate with private landowners to encourage site specific retrofitting projects. Each Permittee shall consider the following practices in cooperating with private landowners to retrofit existing development:

(1) Demonstration retrofit projects;

(2) Retrofits on public land and easements that treat runoff from private developments;

(3) Education and outreach;

(4) Subsidies for retrofit projects;

(5) Requiring retrofit projects as enforcement, mitigation or ordinance compliance;

(6) Public and private partnerships;

(7) Fees for existing discharges to the MS4 and reduction of fees for retrofit implementation.

e. Public Agency Facility and Activity Management

i. Each Permittee shall obtain separate coverage under the Industrial General Permit for all Permittee-owned or operated facilities where industrial activities are conducted that require coverage under the Industrial General Permit.

ii. Each Permittee shall implement the following measures for Permittee- owned and operated flood management projects:

(1) Develop procedures to assess the impacts of flood management projects on the water quality of receiving water bodies; and

(2) Evaluate existing structural flood control facilities to determine if retrofitting the facility to provide additional pollutant removal from storm water is feasible.

iii. Each Permittee shall ensure the implementation and maintenance of activity specific BMPs listed in Table 18 (BMPs for Public Agency Facilities and Activities) or an equivalent set of BMPs when such activities occur at Permittee-owned or operated facilities and field activities (e.g., project sites) including but not limited to the facility types listed in Part VI.D.9.c above, and at any area that includes the activities described in Table 18, or that have the potential to discharge pollutants in storm water.

iv. Any contractors hired by the Permittee to conduct Public Agency Activities including, but not limited to, storm and/or sanitary sewer system inspection and repair, street sweeping, trash pick-up and disposal, and street and right-of-way construction and repair shall be contractually required to implement and maintain the activity specific BMPs listed in Table 18. Each Permittee shall conduct oversight of contractor activities to ensure these BMPs are implemented and maintained.

v. Permittee-owned or operated facilities that have obtained coverage under the Industrial General Permit shall implement and maintain BMPs consistent with the associated SWPPP and are therefore not required to implement and maintain the activity specific BMPs listed in Table 18.

vi. Effective source control BMPs for the activities listed in Table 18 shall be implemented at Permittee-owned or operated facilities, unless the pollutant generating activity does not occur. Each Permittee shall require implementation of additional BMPs where storm water from the MS4 discharges to a significant ecological area (SEA, see Attachment A for definition), a water body subject to TMDL provisions in Part VI.E., or a CWA § 303(d) listed water body (see Part VI.E below). Likewise, for those BMPs that are not adequately protective of water quality standards, a Permittee may require additional site-specific controls.

Table 18. BMPs for Public Agency Facilities and Activities

General and Activity Specific BMPs	
General BMPs	Scheduling and Planning
	Spill Prevention and Control
	Sanitary/Septic Waste Management
	Material Use
	Safer Alternative Products
	Vehicle/Equipment Cleaning, Fueling and Maintenance
	Illicit Connection Detection, Reporting and Removal
	Illegal Spill Discharge Control
	Maintenance Facility Housekeeping Practices
Flexible Pavement	Asphalt Cement Crack and Joint Grinding/ Sealing
	Asphalt Paving
	Structural Pavement Failure (Digouts) Pavement Grinding and Paving
	Emergency Pothole Repairs
	Sealing Operations
Rigid Pavement	Portland Cement Crack and Joint Sealing
	Mudjacking and Drilling
	Concrete Slab and Spall Repair
Slope/ Drains/ Vegetation	Shoulder Grading
	Nonlandscaped Chemical Vegetation Control
	Nonlandscaped Mechanical Vegetation Control/

General and Activity Specific BMPs	
	Mowing
	Nonlandscaped Tree and Shrub Pruning, Brush Chipping, Tree and Shrub Removal
	Fence Repair
	Drainage Ditch and Channel Maintenance
	Drain and Culvert Maintenance
	Curb and Sidewalk Repair
Litter/ Debris/ Graffiti	Sweeping Operations
	Litter and Debris Removal
	Emergency Response and Cleanup Practices
	Graffiti Removal
Landscaping	Chemical Vegetation Control
	Manual Vegetation Control
	Landscaped Mechanical Vegetation Control/ Mowing
	Landscaped Tree and Shrub Pruning, Brush Chipping, Tree and Shrub Removal
	Irrigation Line Repairs
	Irrigation (Watering), Potable and Nonpotable
Environmental	Storm Drain Stenciling
	Roadside Slope Inspection
	Roadside Stabilization
	Stormwater Treatment Devices
	Traction Sand Trap Devices
Bridges	Welding and Grinding
	Sandblasting, Wet Blast with Sand Injection and Hydroblasting
	Painting
	Bridge Repairs
Other Structures	Pump Station Cleaning
	Tube and Tunnel Maintenance and Repair
	Tow Truck Operations
	Toll Booth Lane Scrubbing Operations
Electrical	Sawcutting for Loop Installation
Traffic Guidance	Thermoplastic Striping and Marking
	Paint Striping and Marking
	Raised/ Recessed Pavement Marker Application and Removal
	Sign Repair and Maintenance
	Median Barrier and Guard Rail Repair
	Emergency Vehicle Energy Attenuation Repair
Storm Maintenance	Minor Slides and Slipouts Cleanup/ Repair
Management and Support	Building and Grounds Maintenance
	Storage of Hazardous Materials (Working Stock)
	Material Storage Control (Hazardous Waste)

General and Activity Specific BMPs	
	Outdoor Storage of Raw Materials
	Vehicle and Equipment Fueling
	Vehicle and Equipment Cleaning
	Vehicle and Equipment Maintenance and Repair
	Aboveground and Underground Tank Leak and Spill Control

f. Vehicle and Equipment Washing

i. Each Permittee shall implement and maintain the activity specific BMPs listed in Table 18 (BMPs for Public Agency Facilities and Activities) for all fixed vehicle and equipment washing; including fire fighting and emergency response vehicles.

ii. Each Permittee shall prevent discharges of wash waters from vehicle and equipment washing to the MS4 by implementing any of the following measures at existing facilities with vehicle or equipment wash areas:

(1) Self-contain, and haul off for disposal; or

(2) Equip with a clarifier or an alternative pre-treatment device and plumb to the sanitary sewer in accordance with applicable waste water provider regulations.

iii. Each Permittee shall ensure that any municipal facilities constructed, redeveloped, or replaced shall not discharge wastewater from vehicle and equipment wash areas to the MS4 by plumbing all areas to the sanitary sewer in accordance with applicable waste water provider regulations, or self-containing all waste water/ wash water and hauling to a point of legal disposal.

g. Landscape, Park, and Recreational Facilities Management

i. Each Permittee shall implement and maintain the activity specific BMPs listed in Table 18 for all public right-of-ways, flood control facilities and open channels, lakes and reservoirs, and landscape, park, and recreational facilities and activities.

ii. Each Permittee shall implement an IPM program that includes the following:

(1) Pesticides are used only if monitoring indicates they are needed, and pesticides are applied according to applicable permits and established guidelines.

(2) Treatments are made with the goal of removing only the target organism.

(3) Pest controls are selected and applied in a manner that minimizes risks to human health, beneficial non-target organisms, and the environment.

(4) The use of pesticides, including Organophosphates and Pyrethroids, does not threaten water quality.

(5) Partner with other agencies and organizations to encourage the use of IPM.

(6) Adopt and verifiably implement policies, procedures, and/ or ordinances requiring the minimization of pesticide use and encouraging the use of IPM techniques (including beneficial insects) for Public Agency Facilities and Activities.

(7) Policies, procedures, and ordinances shall include commitments and a schedule to reduce the use of pesticides that cause impairment of surface waters by implementing the following procedures:

(a) Prepare and annually update an inventory of pesticides used by all internal departments, divisions, and other operational units.

(b) Quantify pesticide use by staff and hired contractors.

(c) Demonstrate implementation of IPM alternatives where feasible to reduce pesticide use.

iii. Each Permittee shall implement the following requirements:

(1) Use a standardized protocol for the routine and non-routine application of pesticides (including pre-emergents), and fertilizers.

(2) Ensure there is no application of pesticides or fertilizers (1) when two or more consecutive days with greater than 50% chance of rainfall are predicted by NOAA[34], (2) within 48 hours of a ½-inch rain event, or (3) when water is flowing off the area where the application is to occur. This requirement does not apply to the application of aquatic pesticides described in Part VI.D.9.g.iii.(1) above or pesticides which require water for activation.

(3) Ensure that no banned or unregistered pesticides are stored or applied.

(4) Ensure that all staff applying pesticides are certified in the appropriate category by the California Department of Pesticide Regulation, or are under the direct supervision of a pesticide applicator certified in the appropriate category.

(5) Implement procedures to encourage the retention and planting of native vegetation to reduce water, pesticide and fertilizer needs; and

(6) Store pesticides and fertilizers indoors or under cover on paved surfaces, or use secondary containment.

(a) Reduce the use, storage, and handling of hazardous materials to reduce the potential for spills.

(b) Regularly inspect storage areas.

h. Storm Drain Operation and Maintenance

[34] www.srh.noaa.gov/forecast

i. Each Permittee shall implement and maintain the activity specific BMPs listed in Table 18 for storm drain operation and maintenance.

ii. Ensure that all material removed from the MS4 does not reenter the system. Solid material shall be dewatered in a contained area and liquid material shall be disposed in accordance with any of the following measures:

(1) Self-contain, and haul off for legal disposal; or

(2) Applied to the land without runoff; or

(3) Equip with a clarifier or an alternative pre-treatment device; and plumb to the sanitary sewer in accordance with applicable waste water provider regulations.

iii. Catch Basin Cleaning

(1) In areas that are not subject to a trash TMDL, each Permittee shall determine priority areas and shall update its map or list of Catch Basins with their GPS coordinates and priority:

Priority A: Catch basins that are designated as consistently generating the highest volumes of trash and/or debris.

Priority B: Catch basins that are designated as consistently generating moderate volumes of trash and/or debris.

Priority C: Catch basins that are designated as generating low volumes of trash and/or debris.

The map or list shall contain the rationale or data to support priority designations.

(2) In areas that are not subject to a trash TMDL, each Permittee shall inspect catch basins according to the following schedule:

Priority A: A minimum of 3 times during the wet season (October 1 through April 15) and once during the dry season every year.

Priority B: A minimum of once during the wet season and once during the dry season every year.

Priority C: A minimum of once per year.

Catch basins shall be cleaned as necessary on the basis of inspections. At a minimum, Permittees shall ensure that any catch basin that is determined to be at least 25% full of trash shall be cleaned out. Permittees shall maintain inspection and cleaning records for Regional Water Board review.

(3) In areas that are subject to a trash TMDL, the subject Permittees shall implement the applicable provisions in Part VI.E.

iv. Trash Management at Public Events

(1) Each Permittee shall require the following measures for any event in the public right of way or wherever it is foreseeable that substantial quantities

of trash and litter may be generated, including events located in areas that are subject to a trash TMDL:

(a) Proper management of trash and litter generated; and

(b) Arrangement for temporary screens to be placed on catch basins; or

(c) Provide clean out of catch basins, trash receptacles, and grounds in the event area within one business day subsequent to the event.

v. Trash Receptacles

(1) Each Permittee shall ensure trash receptacles, or equivalent trash capturing devices, are covered in areas newly identified as high trash generation areas within its jurisdiction.

(2) Each Permittee shall ensure that all trash receptacles are cleaned out and maintained as necessary to prevent trash overflow.

vi. Catch Basin Labels and Open Channel Signage

(1) Each Permittee shall label all storm drain inlets that they own with a legible “no dumping” message.

(2) Each Permittee shall inspect the legibility of the stencil or label nearest each inlet prior to the wet season every year.

(3) Each Permittee shall record all catch basins with illegible stencils and re-stencil or re-label within 180 days of inspection.

(4) Each Permittee shall post signs, referencing local code(s) that prohibit littering and illegal dumping, at designated public access points to open channels, creeks, urban lakes, and other relevant water bodies.

vii. Additional Trash Management Practices

(1) In areas that are not subject to a trash TMDL, each Permittee shall install trash excluders, or equivalent devices, on or in catch basins or outfalls to prevent the discharge of trash to the MS4 or receiving water no later than four years after the effective date of this Order in areas defined as Priority A (Part VI.D.9.h.iii.(1)) except at sites where the application of such BMP(s) alone will cause flooding. Lack of maintenance that causes flooding is not an acceptable exception to the requirement to install BMPs. Alternatively, each Permittee may implement alternative or enhanced BMPs beyond the provisions of this Order (such as but not limited to increased street sweeping, adding trash cans near trash generation sites, prompt enforcement of trash accumulation, increased trash collection on public property, increased litter prevention messages or trash nets within the MS4) that provide substantially equivalent removal of trash. Each Permittee shall demonstrate that BMPs, which substituted for trash excluders, provide equivalent trash removal performance as excluders. When outfall trash capture is provided, revision of the schedule for inspection and cleanout of catch basins in Part VI.D.9.h.iii.(2) shall be reported in the next year’s annual report.

viii. Storm Drain Maintenance

Each Permittee shall implement a program for Storm Drain Maintenance that includes the following:

(1) Visual monitoring of Permittee-owned open channels and other drainage structures for trash and debris at least annually.

(2) Removal of trash and debris from open channels a minimum of once per year before the wet season.

(3) Elimination of the discharge of contaminants during MS4 maintenance and clean outs.

(4) Proper disposal of debris and trash removed during storm drain maintenance.

ix. Infiltration from Sanitary Sewer to MS4/Preventive Maintenance

(1) Each Permittee shall implement controls and measures to prevent and eliminate infiltration of seepage from sanitary sewers to MS4s through thorough, routine preventive maintenance of the MS4.

(2) Each Permittee that operates both a municipal sanitary sewer system and a MS4 must implement controls and measures to prevent and eliminate infiltration of seepage from the sanitary sewers to the MS4s that must include overall sanitary sewer and MS4 surveys and thorough, routine preventive maintenance of both. Implementation of a Sewer System Management Plan in accordance with the Statewide General Waste Discharge Requirements for Sanitary Sewer Systems, may be used to fulfill this requirement.

(3) Each Permittee shall implement controls to limit infiltration of seepage from sanitary sewers to the MS4 where necessary. Such controls must include:

(a) Adequate plan checking for construction and new development;

(b) Incident response training for its municipal employees that identify sanitary sewer spills;

(c) Code enforcement inspections;

(d) MS4 maintenance and inspections;

(e) Interagency coordination with sewer agencies; and

(f) Proper education of its municipal staff and contractors conducting field operations on the MS4 or its municipal sanitary sewer (if applicable).

x. Permittee Owned Treatment Control BMPs

(1) Each Permittee shall implement an inspection and maintenance program for all Permittee owned treatment control BMPs, including post-construction treatment control BMPs.

(2) Each Permittee shall ensure proper operation of all treatment control BMPs and maintain them as necessary for proper operation, including all post-construction treatment control BMPs.

(3) Any residual water[35] produced by a treatment control BMP and not being internal to the BMP performance when being maintained shall be:

(a) Hauled away and legally disposed of; or

(b) Applied to the land without runoff; or

(c) Discharged to the sanitary sewer system (with permits or authorization); or

(d) Treated or filtered to remove bacteria, sediments, nutrients, and meet the limitations set in Table 19 (Discharge Limitations for Dewatering Treatment BMPs), prior to discharge to the MS4.

Table 19. Discharge Limitations for Dewatering Treatment BMPs[36]

Parameter	Units	Limitation
Total Suspended Solids	mg/L	100
Turbidity	NTU	50
Oil and Grease	mg/L	10

i. Streets, Roads, and Parking Facilities Maintenance

i. Each Permittee shall designate streets and/or street segments within its jurisdiction as one of the following:

Priority A: Streets and/or street segments that are designated as consistently generating the highest volumes of trash and/or debris.

Priority B: Streets and/or street segments that are designated as consistently generating moderate volumes of trash and/or debris.

Priority C: Streets and/or street segments that are designated as generating low volumes of trash and/or debris.

ii. Each Permittee shall perform street sweeping of curbed streets according to the following schedule:

Priority A: Streets and/or street segments that are designated as Priority A shall be swept at least two times per month.

Priority B: Streets and/or street segments that are designated as Priority B shall be swept at least once per month.

Priority C: Streets and/or street segments that are designated as Priority C shall be swept as necessary but in no case less than once per year.

[35] See Attachment A.
[36] Technology based effluent limitations.

iii. Road Reconstruction

Each Permittee shall require that for any project that includes roadbed or street paving, repaving, patching, digouts, or resurfacing roadbed surfaces, that the following BMPs be implemented for each project.

(1) Restrict paving and repaving activity to exclude periods of rainfall or predicted rainfall[37] unless required by emergency conditions.

(2) Install sand bags or gravel bags and filter fabric at all susceptible storm drain inlets and at manholes to prevent spills of paving products and tack coat;

(3) Prevent the discharge of release agents including soybean oil, other oils, or diesel into the MS4 or receiving waters.

(4) Prevent non-storm water runoff from water use for the roller and for evaporative cooling of the asphalt.

(5) Clean equipment over absorbent pads, drip pans, plastic sheeting or other material to capture all spillage and dispose of properly.

(6) Collect liquid waste in a container, with a secure lid, for transport to a maintenance facility to be reused, recycled or disposed of properly.

(7) Collect solid waste by vacuuming or sweeping and securing in an appropriate container for transport to a maintenance facility to be reused, recycled or disposed of properly.

(8) Cover the “cold-mix” asphalt (i.e., pre-mixed aggregate and asphalt binder) with protective sheeting during a rainstorm.

(9) Cover loads with tarp before haul-off to a storage site, and do not overload trucks.

(10) Minimize airborne dust by using water spray during grinding.

(11) Avoid stockpiling soil, sand, sediment, asphalt material and asphalt grindings materials or rubble in or near MS4 or receiving waters.

(12) Protect stockpiles with a cover or sediment barriers during a rain.

iv. Parking Facilities Maintenance

(1) Permittee-owned parking lots exposed to storm water shall be kept clear of debris and excessive oil buildup and cleaned no less than 2 times per month and/or inspected no less than 2 times per month to determine if cleaning is necessary. In no case shall a Permittee-owned parking lot be cleaned less than once a month.

j. Emergency Procedures

i. Each Permittee may conduct repairs of essential public service systems and infrastructure in emergency situations with a self-waiver of the provisions of this Order as follows:

[37] A probability of precipitation (POP) of 50% is required.

(1) The Permittee shall abide by all other regulatory requirements, including notification to other agencies as appropriate.

(2) Where the self-waiver has been invoked, the Permittee shall submit to the Regional Water Board Executive Officer a statement of the occurrence of the emergency, an explanation of the circumstances, and the measures that were implemented to reduce the threat to water quality, no later than 30 business days after the situation of emergency has passed.

(3) Minor repairs of essential public service systems and infrastructure in emergency situations (that can be completed in less than one week) are not subject to the notification provisions. Appropriate BMPs to reduce the threat to water quality shall be implemented.

k. Municipal Employee and Contractor Training

i. Each Permittee shall, no later than 1 year after Order adoption and annually thereafter before June 30, train all of their employees in targeted positions (whose interactions, jobs, and activities affect storm water quality) on the requirements of the overall storm water management program, or shall ensure contractors performing privatized/contracted municipal services are appropriately trained to:

(1) Promote a clear understanding of the potential for activities to pollute storm water.

(2) Identify opportunities to require, implement, and maintain appropriate BMPs in their line of work.

Outside contractors can self-certify, providing they certify they have received all applicable training required in the Permit and have documentation to that effect.

ii. Each Permittee shall, no later than 1 year after Order adoption and annually thereafter before June 30, train all of their employees and contractors who use or have the potential to use pesticides or fertilizers (whether or not they normally apply these as part of their work). Training programs shall address:

(1) The potential for pesticide-related surface water toxicity.

(2) Proper use, handling, and disposal of pesticides.

(3) Least toxic methods of pest prevention and control, including IPM.

(4) Reduction of pesticide use.

iii. Outside contractors can self-certify, providing they certify they have received all applicable training required in the Permit and have documentation to that effect.

10. Illicit Connections and Illicit Discharges Elimination Program

a. General

i. Each Permittee shall continue to implement an Illicit Connection and Illicit Discharge Elimination (IC/ID) Program to detect, investigate, and eliminate IC/IDs to the MS4. The IC/ID Program must be implemented in accordance with the requirements and performance measures specified in this Order.

ii. As stated in Part VI.A.2 of this Order, each Permittee must have adequate legal authority to prohibit IC/IDs to the MS4 and enable enforcement capabilities to eliminate the source of IC/IDs.

iii. Each Permittee's IC/ID Program shall consist of at least the following major program components:

(1) Procedures for conducting source investigations for IC/IDs

(2) Procedures for eliminating the source of IC/IDs

(3) Procedures for public reporting of illicit discharges

(4) Spill response plan

(5) IC/IDs education and training for Permittee staff

b. Illicit Discharge Source Investigation and Elimination

i. Each Permittee shall develop written procedures for conducting investigations to identify the source of all suspected illicit discharges, including procedures to eliminate the discharge once the source is located.

ii. At a minimum, each Permittee shall initiate an investigation(s) to identify and locate the source within 72 hours of becoming aware of the illicit discharge.

iii. When conducting investigations, each Permittee shall comply with the following:

(1) Illicit discharges suspected of being sanitary sewage and/or significantly contaminated shall be investigated first.

(2) Each Permittee shall track all investigations to document at a minimum the date(s) the illicit discharge was observed; the results of the investigation; any follow-up of the investigation; and the date the investigation was closed.

(3) Each Permittee shall investigate the source of all observed illicit discharges.

iv. When taking corrective action to eliminate illicit discharges, each Permittee shall comply with the following:

(1) If the source of the illicit discharge has been determined to originate within the Permittee's jurisdiction, the Permittee shall immediately notify the responsible party/parties of the problem, and require the responsible party to initiate all necessary corrective actions to eliminate the illicit discharge.

Upon being notified that the discharge has been eliminated, the Permittee shall conduct a follow-up investigation to verify that the discharge has been eliminated and cleaned-up to the satisfaction of the Permittee(s). Each Permittee shall document its follow-up investigation. Each Permittee may seek recovery and remediation costs from responsible parties or require compensation for the cost of all inspection, investigation, cleanup and oversight activities. Resulting enforcement actions shall follow the program's Progressive Enforcement Policy, per Part VI.D.2.

(2) If the source of the illicit discharge has been determined to originate within an upstream jurisdiction, the Permittee shall notify the upstream jurisdiction and the Regional Water Board within 30 days of such determination and provide all of the information collected regarding efforts to identify its source. Each Permittee may seek recovery and remediation costs from responsible parties or require compensation for the cost of all inspection, investigation, cleanup and oversight activities. Resulting enforcement actions shall follow the program's Progressive Enforcement Policy, per Part VI.D.2.

(3) If the source of the illicit discharge cannot be traced to a suspected responsible party, affected Permittees shall implement its spill response plan and then initiate a permanent solution as described in section 10.b.v below.

v. In the event the Permittee is unable to eliminate an ongoing illicit discharge following full execution of its legal authority and in accordance with its Progressive Enforcement Policy, or other circumstances prevent the full elimination of an ongoing illicit discharge, including the inability to find the responsible party/parties, the Permittee shall provide for diversion of the entire flow to the sanitary sewer or provide treatment. In either instance, the Permittee shall notify the Regional Water Board in writing within 30 days of such determination and shall provide a written plan for review and comment that describes the efforts that have been undertaken to eliminate the illicit discharge, a description of the actions to be undertaken, anticipated costs, and a schedule for completion.

c. Identification and Response to Illicit Connections

i. Investigation

Each Permittee, upon discovery or upon receiving a report of a suspected illicit connection, shall initiate an investigation within 21 days, to determine the following: (1) source of the connection, (2) nature and volume of discharge through the connection, and (3) responsible party for the connection.

ii. Elimination

Each Permittee, upon confirmation of an illicit MS4 connection, shall ensure that the connection is:

(1) Permitted or documented, provided the connection will only discharge storm water and non-storm water allowed under this Order or other individual or general NPDES Permits/WDRs, or
(2) Eliminated within 180 days of completion of the investigation, using its formal enforcement authority, if necessary, to eliminate the illicit connection.

iii. Documentation

Formal records must be maintained for all illicit connection investigations and the formal enforcement taken to eliminate illicit connections.

d. Public Reporting of Non-Storm Water Discharges and Spills

i. Each Permittee shall promote, publicize, and facilitate public reporting of illicit discharges or water quality impacts associated with discharges into or from MS4s through a central contact point, including phone numbers and an internet site for complaints and spill reporting. Each Permittee shall also provide the reporting hotline to Permittee staff to leverage the field staff that has direct contact with the MS4 in detecting and eliminating illicit discharges.

ii. Each Permittee shall implement the central point of contact and reporting hotline requirements listed in this part in one or more of the following methods:

(1) By participating in a County-wide sponsored hotline

(2) By participating in one or more Watershed Group sponsored hotlines

(3) Or individually within its own jurisdiction

(4) The LACFCD shall, in collaboration with the County, continue to maintain the 888-CLEAN-LA hotline and internet site to promote, publicize, and facilitate public reporting of illicit discharges or water quality impacts associated with discharges into or from MS4s.

iii. Each Permittee shall ensure that signage adjacent to open channels, as required in Part F.8.h.vi, include information regarding dumping prohibitions and public reporting of illicit discharges.

iv. Each Permittee shall develop and maintain written procedures that document how complaint calls are received, documented, and tracked to ensure that all complaints are adequately addressed. The procedures shall be evaluated to determine whether changes or updates are needed to ensure that the procedures accurately document the methods employed by the Permittee. Any identified changes shall be made to the procedures subsequent to the evaluation.

v. Each Permittee shall maintain documentation of the complaint calls and record the location of the reported spill or IC/ ID and the actions undertaken in response to all IC/ID complaints, including referrals to other agencies.

e. Spill Response Plan

i. Each Permittee shall implement a spill response plan for all sewage and other spills that may discharge into its MS4. The spill response plan shall clearly identify agencies responsible for spill response and cleanup, telephone numbers and e-mail address for contacts, and shall contain at a minimum the following requirements:

(1) Coordination with spill response teams throughout all appropriate departments, programs and agencies so that maximum water quality protection is provided.

(2) Initiate investigation of all public and employee spill complaints within one business day of receiving the complaint to assess validity.

(3) Response to spills for containment within 4 hours of becoming aware of the spill, except where such spills occur on private property, in which case the response should be within 2 hours of gaining legal access to the property.

(4) Spills that may endanger health or the environment shall be reported to appropriate public health agencies and the Office of Emergency Services (OES).

f. Illicit Connection and Illicit Discharge Education and Training

i. Each Permittee must continue to implement a training program regarding the identification of IC/IDs for all municipal field staff, who, as part of their normal job responsibilities (e.g., street sweeping, storm drain maintenance, collection system maintenance, road maintenance), may come into contact with or otherwise observe an illicit discharge or illicit connection to the MS4. Contact information, including the procedure for reporting an illicit discharge, must be readily available to field staff. Training program documents must be available for review by the permitting authority.

ii. Each Permittee shall ensure contractors performing privatized/contracted municipal services such as, but not limited to, storm and/or sanitary sewer system inspection and repair, street sweeping, trash pick-up and disposal, and street and right-of-way construction and repair are trained regarding IC/ID identification and reporting. Permittees may provide training or include contractual requirements for IC/ID identification and reporting training. Outside contractors can self-certify, providing they certify they have received all applicable training required in the Permit and have documentation to that effect.

iii. Each Permittee's training program should address, at a minimum, the following:

(1) IC/ID identification, including definitions and examples,

(2) investigation,

(3) elimination,

(4) cleanup,

(5) reporting, and

(6) documentation.

iv. Each Permittee must create a list of applicable positions and contractors which require IC/ID training and ensure that training is provided at least twice during the term of the Order. Each Permittee must maintain documentation of the training activities.

v. New Permittee staff members must be provided with IC/ID training within 180 days of starting employment.

E. Total Maximum Daily Load Provisions

1. The provisions of this Part VI.E. implement and are consistent with the assumptions and requirements of all waste load allocations (WLAs) established in TMDLs for which some or all of the Permittees in this Order are responsible.

a. Part VI.E of this Order includes provisions that are designed to assure that Permittees achieve WLAs and meet other requirements of TMDLs covering receiving waters impacted by the Permittees' MS4 discharges. TMDL provisions are grouped by WMA (WMA) in Attachments L through R.

b. The Permittees subject to each TMDL are identified in Attachment K.

c. The Permittees shall comply with the applicable water quality-based effluent limitations and/or receiving water limitations contained in Attachments L through R, consistent with the assumptions and requirements of the WLAs established in the TMDLs, including implementation plans and schedules, where provided for in the State adoption and approval of the TMDL (40 CFR §122.44(d)(1)(vii)(B); Cal. Wat. Code §13263(a)).

d. A Permittee may comply with water quality-based effluent limitations and receiving water limitations in Attachments L through R using any lawful means.

2. Compliance Determination

a. General

i. A Permittee shall demonstrate compliance at compliance monitoring points established in each TMDL or, if not specified in the TMDL, at locations identified in an approved TMDL monitoring plan or in accordance with an approved integrated monitoring program per Attachment E, Part VI.C.5 (Integrated Watershed Monitoring and Assessment).

ii. Compliance with water quality-based effluent limitations shall be determined as described in Parts VI.E.2.d and VI.E.2.e, or for trash water quality-based effluent limitations as described in Part VI.E.5.b, or as otherwise set forth in TMDL specific provisions in Attachments L through R.

iii. Pursuant to Part VI.C, a Permittee may, individually or as part of a watershed-based group, develop and submit for approval by the Regional Water Board Executive Officer a Watershed Management Program that addresses all water quality-based effluent limitations and receiving water limitations to which the Permittee is subject pursuant to established TMDLs.

b. Commingled Discharges

i. A number of the TMDLs establish WLAs that are assigned jointly to a group of Permittees whose storm water and/or non-storm water discharges are or may be commingled in the MS4 prior to discharge to the receiving water subject to the TMDL.

ii. In these cases, pursuant to 40 CFR section 122.26(a)(3)(vi), each Permittee is only responsible for discharges from the MS4 for which they are owners and/or operators.

iii. Where Permittees have commingled discharges to the receiving water, compliance at the outfall to the receiving water or in the receiving water shall be determined for the group of Permittees as a whole unless an individual Permittee demonstrates that its discharge did not cause or contribute to the exceedance, pursuant to subpart v. below.

iv. For purposes of compliance determination, each Permittee is responsible for demonstrating that its discharge did not cause or contribute to an exceedance of an applicable water quality-based effluent limitation(s) at the outfall or receiving water limitation(s) in the target receiving water.

v. A Permittee may demonstrate that its discharge did not cause or contribute to an exceedance of an applicable water quality-based effluent limitation or receiving water limitation in any of the following ways:

(1) Demonstrate that there is no discharge from the Permittee's MS4 into the applicable receiving water during the time period subject to the water quality-based effluent limitation and/or receiving water limitation; or

(2) Demonstrate that the discharge from the Permittee's MS4 is controlled to a level that does not exceed the applicable water quality-based effluent limitation; or

(3) For exceedances of bacteria receiving water limitations or water quality-based effluent limitations, demonstrate through a source investigation pursuant to protocols established under California Water Code section 13178 or for exceedances of other receiving water limitations or water quality-based effluent limitations, demonstrate using other accepted source identification protocols, that pollutant sources within the jurisdiction of the Permittee or the Permittee's MS4 have not caused or contributed to the exceedance of the Receiving Water Limitation(s).

c. Receiving Water Limitations Addressed by a TMDL

i. For receiving water limitations in Part V.A. associated with water body-pollutant combinations addressed in a TMDL, Permittees shall achieve compliance with the receiving water limitations in Part V.A. as outlined in this Part VI.E. and Attachments L through R of this Order.

ii. A Permittee's full compliance with the applicable TMDL requirement(s), including compliance schedules, of this Part VI.E. and Attachments L through R constitutes compliance with Part V.A. of this Order for the specific pollutant addressed in the TMDL.

iii. As long as a Permittee is in compliance with the applicable TMDL requirements in a time schedule order (TSO) issued by the Regional Water Board pursuant to California Water Code sections 13300 and 13385(j)(3), it is not the Regional Water Board's intention to take an enforcement action for violations of Part V.A. of this Order for the specific pollutant(s) addressed in the TSO.

d. Interim Water Quality-Based Effluent Limitations and Receiving Water Limitations

i. A Permittee shall be considered in compliance with an applicable interim water quality-based effluent limitation and interim receiving water limitation for a pollutant associated with a specific TMDL if any of the following is demonstrated:

(1) There are no violations of the interim water quality-based effluent limitation for the pollutant associated with a specific TMDL at the Permittee's applicable MS4 outfall(s),[38] including an outfall to the receiving water that collects discharges from multiple Permittees' jurisdictions;

(2) There are no exceedances of the applicable receiving water limitation for the pollutant associated with a specific TMDL 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 water quality-based effluent limitation and/or receiving water limitation for the pollutant associated with a specific TMDL; or

(4) The Permittee has submitted and is fully implementing an approved Watershed Management Program or EWMP pursuant to Part VI.C.

(a) To be considered fully implementing an approved Watershed Management Program or EWMP, a Permittee must be implementing

[38] An outfall may include a manhole or other point of access to the MS4 at the Permittee's jurisdictional boundary.

all actions consistent with the approved program and applicable compliance schedules, including structural BMPs.

(b) Structural storm water BMPs or systems of BMPs should be designed and maintained to treat storm water runoff from the 85th percentile, 24-hour storm, where feasible and necessary to achieve applicable WQBELs and receiving water limitations, and maintenance records must be up-to-date and available for inspection by the Regional Water Board.

(c) A Permittee that does not implement the Watershed Management Program in accordance with the milestones and compliance schedules shall demonstrate compliance with its interim water quality-based effluent limitations and/or receiving water limitations pursuant to Part VI.E.2.d.i.(1)-(3), above.

(d) Upon notification of a Permittee's intent to develop a WMP or EWMP and prior to approval of its WMP or EWMP, a Permittee's full compliance with all of the following requirements shall constitute a Permittee's compliance with provisions pertaining to interim WQBELs with compliance deadlines occurring prior to approval of a WMP or EWMP. This subdivision (d) shall not apply to interim trash WQBELs.

(1) Provides timely notice of its intent to develop a WMP or EWMP,

(2) Meets all interim and final deadlines for development of a WMP or EWMP,

(3) For the area to be covered by the WMP or EWMP, targets implementation of watershed control measures in its existing storm water management program, including watershed control measures to eliminate non-storm water discharges of pollutants through the MS4 to receiving waters, to address known contributions of pollutants from MS4 discharges that cause or contribute to the impairment(s) addressed by the TMDL(s), and

(4) Receives final approval of its WMP or EWMP within 28 or 40 months, respectively.

e. Final Water Quality-based Effluent Limitations and/or Receiving Water Limitations

i. A Permittee shall be deemed in compliance with an applicable final water quality-based effluent limitation and final receiving water limitation for the pollutant(s) associated with a specific TMDL if any of the following is demonstrated:

(1) There are no violations of the final water quality-based effluent limitation for the specific pollutant at the Permittee's applicable MS4 outfall(s)[39];

(2) There are no exceedances of applicable receiving water limitation 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 water quality-based effluent limitation and/or receiving water limitation 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 storm water 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. This provision (4) shall not apply to final trash WQBELs.

3. USEPA Established TMDLs

TMDLs established by the USEPA, to which Permittees are subject, do not contain an implementation plan adopted pursuant to California Water Code section 13242. However, USEPA has included implementation recommendations as part of these TMDLs. In lieu of inclusion of numeric water quality based effluent limitations at this time, this Order requires Permittees subject to WLAs in USEPA established TMDLs to propose and implement best management practices (BMPs) that will be effective in achieving compliance with USEPA established numeric WLAs. The Regional Water Board may, at its discretion, revisit this decision within the term of this Order or in a future permit, as more information is developed to support the inclusion of numeric water quality based effluent limitations.

a. Each Permittee shall propose BMPs to achieve the WLAs contained in the applicable USEPA established TMDL(s), and a schedule for implementing the BMPs that is as short as possible, in a Watershed Management Program or EWMP.

b. Each Permittee may either individually submit a Watershed Management Program, or may jointly submit a WMP or EWMP with other Permittees subject to the WLAs contained in the USEPA established TMDL.

c. At a minimum, each Permittee shall include the following information in its Watershed Management Program or EWMP, relevant to each applicable USEPA established TMDL:

i. Available data demonstrating the current quality of the Permittee's MS4 discharge(s) in terms of concentration and/or load of the target pollutant(s) to the receiving waters subject to the TMDL;

[39] Ibid.

ii. A detailed description of BMPs that have been implemented, and/or are currently being implemented by the Permittee to achieve the WLA(s), if any;

iii. A detailed time schedule of specific actions the Permittee will take in order to achieve compliance with the applicable WLA(s);

iv. A demonstration that the time schedule requested is as short as possible, taking into account the time since USEPA establishment of the TMDL, and technological, operation, and economic factors that affect the design, development, and implementation of the control measures that are necessary to comply with the WLA(s);

(1) For the Malibu Creek Nutrient TMDL established by USEPA in 2003, in no case shall the time schedule to achieve the final numeric WLAs exceed five years from the effective date of this Order; and

v. If the requested time schedule exceeds one year, the proposed schedule shall include interim requirements and numeric milestones and the date(s) for their achievement.

d. Each Permittee subject to a WLA in a TMDL established by USEPA shall submit a draft of a Watershed Management Program or EWMP to the Regional Water Board Executive Officer for approval per the schedule Part VI.C.4.

e. If a Permittee does not submit a Watershed Management Program, or the plan is determined to be inadequate by the Regional Water Board Executive Officer and the Permittee does not make the necessary revisions within 90 days of written notification that plan is inadequate, the Permittee shall be required to demonstrate compliance with the numeric WLAs immediately based on monitoring data collected under the MRP (Attachment E) for this Order.

4. State Adopted TMDLs where Final Compliance Deadlines have Passed

a. Permittees shall comply immediately with water quality-based effluent limitations and/or receiving water limitations to implement WLAs in state-adopted TMDLs for which final compliance deadlines have passed pursuant to the TMDL implementation schedule.

b. Where a Permittee believes that additional time to comply with the final water quality-based effluent limitations and/or receiving water limitations is necessary, a Permittee may within 45 days of Order adoption request a time schedule order pursuant to California Water Code section 13300 for the Regional Water Board's consideration.

c. Permittees may either individually request a TSO, or may jointly request a TSO with all Permittees subject to the water quality-based effluent limitations and/or receiving water limitations, to implement the WLAs in the state-adopted TMDL.

d. At a minimum, a request for a time schedule order shall include the following:

i. Data demonstrating the current quality of the MS4 discharge(s) in terms of concentration and/or load of the target pollutant(s) to the receiving waters subject to the TMDL;

ii. A detailed description and chronology of structural controls and source control efforts, since the effective date of the TMDL, to reduce the pollutant load in the MS4 discharges to the receiving waters subject to the TMDL;

iii. Justification of the need for additional time to achieve the water quality-based effluent limitations and/or receiving water limitations;

iv. A detailed time schedule of specific actions the Permittee will take in order to achieve the water quality-based effluent limitations and/or receiving water limitations;

v. A demonstration that the time schedule requested is as short as possible, taking into account the technological, operation, and economic factors that affect the design, development, and implementation of the control measures that are necessary to comply with the effluent limitation(s); and

vi. If the requested time schedule exceeds one year, the proposed schedule shall include interim requirements and the date(s) for their achievement. The interim requirements shall include both of the following:

(1) Effluent limitation(s) for the pollutant(s) of concern; and

(2) Actions and milestones leading to compliance with the effluent limitation(s).

5. Water Quality-Based Effluent Limitations for Trash

Permittees assigned a Waste Load Allocation in a trash TMDL shall comply as set forth below.

a. Effluent Limitations: Permittees shall comply with the interim and final water quality-based effluent limitations for trash set forth in Attachments L through R for the following Trash TMDLs:

i. Lake Elizabeth Trash TMDL (Attachment L)

ii. Santa Monica Bay Nearshore and Offshore Debris TMDL (Attachment M)

iii. Malibu Creek Watershed Trash TMDL (Attachment M)

iv. Ballona Creek Trash TMDL (Attachment M)

v. Machado Lake Trash TMDL (Attachment N)

vi. Los Angeles River Trash TMDL (Attachment O)

vii. Peck Road Park Lake Trash TMDL (Attachment O)

viii. Echo Park Lake Trash TMDL (Attachment O)

ix. Legg Lake Trash TMDL (Attachment O)

b. Compliance

i. Pursuant to California Water Code section 13360(a), Permittees may comply with the trash effluent limitations using any lawful means. Such compliance options are broadly classified as *full capture*, *partial capture, institutional controls,* or *minimum frequency of assessment and collection,* as described below, and any combination of these may be employed to achieve compliance:

(1) Full Capture Systems:

(a) The Basin Plan authorizes the Regional Water Board Executive Officer to certify *full capture systems*, which are systems that meet the operating and performance requirements as described in this Order, and the procedures identified in "Procedures and Requirements for Certification of a Best Management Practice for Trash Control as a Full Capture System."[40]

(b) Permittees are authorized to comply with their effluent limitations through certified *full capture systems* provided the requirements of paragraph (c), immediately below, and any conditions in the certification, continue to be met.

(c) Permittees may comply with their effluent limitations through progressive installation of *full capture systems* throughout their jurisdictional areas until all areas draining to Lake Elizabeth, Santa Monica Bay, Malibu Creek, Ballona Creek, Machado Lake, the Los Angeles River system, Legg Lake, Peck Road Park Lake, and/or Echo Park Lake are addressed. For purposes of this Order, attainment of the effluent limitations shall be conclusively presumed for any drainage area to Lake Elizabeth, Santa Monica Bay, Malibu Creek (and its tributaries), Ballona Creek (and its tributaries), Machado Lake, the Los Angeles River (and its tributaries), Legg Lake, Peck Road Park Lake, and/or Echo Park Lake where certified *full capture systems* treat all drainage from the area, provided that the *full capture systems* are adequately sized and maintained, and that maintenance records are up-to-date and available for inspection by the Regional Water Board.

[40] The Regional Water Board currently recognizes eight *full capture systems*. These are: Vortex Separation Systems (VSS) and seven other Executive Officer certified *full capture systems*, including specific types or designs of trash nets; two gross solids removal devices (GSRDs); catch basin brush inserts and mesh screens; vertical and horizontal trash capture screen inserts; and a connector pipe screen device. See August 3, 2004 Los Angeles Regional Water Quality Control Board Memorandum titled "Procedures and Requirements for Certification of a Best Management Practice for Trash Control as a Full Capture System.

(i) A Permittee shall be deemed in compliance with its final effluent limitation if it demonstrates that all drainage areas under its jurisdiction and/or authority are serviced by appropriate certified *full capture systems* as described in paragraph (1)(c).

(ii) A Permittee shall be deemed in compliance with its interim effluent limitations, where applicable:

1. By demonstrating that *full capture systems* treat the percentage of drainage areas in the watershed that corresponds to the required trash abatement.

2. Alternatively, a Permittee may propose a schedule for installation of *full capture systems* in areas under its jurisdiction and/or authority within a given watershed, targeting first the areas of greatest trash generation, for the Executive Officer's approval. The Executive Officer shall not approve any such schedule that does not result in timely compliance with the final effluent limitations, consistent with the established TMDL implementation schedule and applicable State policies. A Permittee shall be deemed in compliance with its interim effluent limitations provided it is fully in compliance with any such approved schedule.

(2) Partial Capture Devices and Institutional Controls: Permittees may comply with their interim and final effluent limitations through the installation of *partial capture devices* and the application of *institutional controls*.[41]

(a) Trash discharges from areas serviced solely by *partial capture devices* may be estimated based on demonstrated performance of the device(s) in the implementing area.[42] That is, trash reduction is equivalent to the *partial capture devices'* trash removal efficiency multiplied by the percentage of drainage area serviced by the devices.

(b) Except as provided in subdivision (c), immediately below, trash discharges from areas addressed by *institutional controls* and/or *partial capture devices* (where site-specific performance data is not available) shall be calculated using a mass balance approach, based on the daily generation rate (DGR) for a representative area.[43] The DGR shall be determined from direct measurement of trash deposited in the drainage area during any thirty-day period between June 22nd and September 22nd exclusive of rain events[44], and shall be re-calculated every year thereafter unless a less frequent period for recalculation is approved by the Regional Water Board Executive Officer. The DGR

[41] While interim effluent limitations may be complied with using *partial capture devices*, compliance with final effluent limitations cannot be achieved with the exclusive use of *partial capture devices*.
[42] Performance shall be demonstrated under different conditions (e.g. low to high trash loading).
[43] The area(s) should be representative of the land uses and activities within the Permittees' authority and shall be approved by the Executive Officer prior to the 30-day collection period.
[44] Provided no special events are scheduled that may affect the representative nature of that collection period.

shall be calculated as the total amount of trash collected during this period divided by the length of the collection period.

DGR = (Amount of trash collected during a 30-day collection period[45] / (30 days)

The DGR for the applicable area under the Permittees' jurisdiction and/or authority shall be extrapolated from that of the representative drainage area(s). A mass balance equation shall be used to estimate the amount of trash discharged during a storm event.[46] The *Storm Event Trash Discharge* for a given rain event in the Permittee's drainage area shall be calculated by multiplying the number of days since the last street sweeping by the DGR and subtracting the amount of any trash recovered in the catch basins.[47] For each day of a storm event that generates precipitation greater than 0.25 inch, the Permittee shall calculate a *Storm Event Trash Discharge*.

Storm Event Trash Discharge = [(Days since last street sweeping*DGR)] – [Amount of trash recovered from catch basins][48]

The sum of the *Storm Event Trash Discharges* for the storm year shall be the Permittee's calculated annual trash discharge.

Total Storm Year Trash Discharge = ∑Storm Event Trash Discharges from Drainage Area

(c) The Executive Officer may approve alternative compliance monitoring approaches for calculating total storm year trash discharge, upon finding that the program will provide a scientifically-based estimate of the amount of trash discharged from the Permittee's MS4.

(3) Combined Compliance Approaches:

Permittees may comply with their interim and final effluent limitations through a combination of *full capture systems*, *partial capture devices*, and *institutional controls*. Where a Permittee relies on a combination of approaches, it shall demonstrate compliance with the interim and final effluent limitations as specified in (1)(c) in areas where *full capture systems* are installed and as specified in (2)(a) or (2)(b), as appropriate, in areas where *partial capture devices* and *institutional controls* are applied.

(4) Minimum Frequency of Assessment and Collection Approach:

If allowed in a trash TMDL and approved by the Executive Officer, a Permittee may alternatively comply with its final effluent limitations by

[45] Between June 22nd and September 22nd
[46] Amount of trash shall refer to the uncompressed volume (in gallons) or drip-dry weight (in pounds) of trash collected.
[47] Any negative values shall be considered to represent a zero discharge.
[48] When more than one storm event occurs prior to the next street sweeping the discharge shall be calculated from the date of the last assessment.

implementing a program for *minimum frequency of assessment and collection* (MFAC) in conjunction with BMPs. To the satisfaction of the Executive Officer, the MFAC/BMP program must meet the following criteria:

(a) The MFAC/BMP Program includes an initial minimum frequency of trash assessment and collection and suite of structural and/or nonstructural BMPs. The MFAC/BMP program shall include collection and disposal of all trash found in the receiving water and shoreline. Permittees shall implement an initial suite of BMPs based on current trash management practices in land areas that are found to be sources of trash to the water body. The initial minimum frequency of trash assessment and collection shall be set as specified in the following TMDLs:

  (i) Malibu Creek Watershed Trash TMDL

  (ii) Machado Lake Trash TMDL

  (iii) Legg Lake Trash TMDL

(b) The MFAC/BMP Program includes reasonable assurances that it will be implemented by the responsible Permittees.

(c) MFAC protocols may be based on SWAMP protocols for rapid trash assessment, or alternative protocols proposed by Permittees and approved by the Regional Water Board Executive Officer.

(d) Implementation of the MFAC/BMP program should include a Health and Safety Program to protect personnel. The MFAC/BMP program shall not require Permittees to access and collect trash from areas where personnel are prohibited.

(e) The Regional Water Board Executive Officer may approve or require a revised assessment and collection frequency and definition of the critical conditions under the MFAC:

  (i) To prevent trash from accumulating in deleterious amounts that cause nuisance or adversely affect beneficial uses between collections;

  (ii) To reflect the results of trash assessment and collection;

  (iii) If the amount of trash collected does not show a decreasing trend, where necessary, such that a shorter interval between collections is warranted; or

  (iv) If the amount of trash collected is decreasing such that a longer interval between collections is warranted.

(f) At the end of the implementation period, a revised MFAC/BMP program may be required if the Regional Water Board Executive Officer determines that the amount of trash accumulating between

collections is causing nuisance or otherwise adversely affecting beneficial uses.

(g) With regard to (4)(e)(i), (4)(e)(ii), or (4)(e)(iii), above, the Regional Water Board Executive Officer is authorized to allow responsible Permittees to implement additional structural or non-structural BMPs in lieu of modifying the monitoring frequency.

ii. If a Permittee is not in compliance with its applicable interim and/or final effluent limitation as identified in Attachments L through R, then it shall be in violation of this Order.

(1) A Permittee relying on *partial capture devices* and/or *institutional controls* that has violated its interim and/or final effluent limitation(s) shall be presumed to have violated the applicable limitation for each day of each storm event that generated precipitation greater than 0.25 inch during the applicable storm year, except those storm days on which it establishes that its cumulative Storm Event Trash Discharges has not exceeded the applicable effluent limitation.

(2) If a Permittee relying on *full capture systems* has failed to demonstrate that the *full capture systems* for any drainage area are adequately sized and maintained, and that maintenance records are up-to-date and available for inspection by the Regional Water Board, and that it is in compliance with any conditions of its certification, shall be presumed to have discharged trash in an amount that corresponds to the percentage of the baseline waste load allocation represented by the drainage area in question.

(a) A Permittee may overcome this presumption by demonstrating (using any of the methods authorized in Part VI.E.5.b) that the actual or calculated discharge for that drainage area is in compliance with the applicable interim or final effluent limitation.

iii. Each Permittee shall be held liable for violations of the effluent limitations assigned to their area. If a Permittee's compliance strategy includes *full* or *partial capture devices* and it chooses to install a full or partial capture device in the MS4 physical infrastructure of another public entity, it is responsible for obtaining all necessary permits to do so. If a Permittee believes it is unable to obtain the permits needed to install a full capture or partial capture device within another Permittee's MS4 physical infrastructure, either Permittee may request the Executive Officer to hold a conference with the Permittees. Nothing in this Order shall affect the right of that public entity or a Permittee to seek indemnity or other recourse from the other as they deem appropriate. Nothing in this subsection shall be construed as relieving a Permittee of any liability that the Permittee would otherwise have under this Order.

c. Monitoring and Reporting Requirements (pursuant to California Water Code section 13383)

i. Each Permittee shall submit a TMDL Compliance Report as part of its Annual Report detailing compliance with the applicable interim and/or final effluent limitations. Reporting shall include the information specified below. The report shall be submitted on the reporting form specified by the Regional Water Board Executive Officer. The report shall be signed under penalty of perjury by the Permittee's principal executive officer or ranking elected official or duly authorized representative of the officer, consistent with Part V.B of Attachment D (Standard Provisions), who is responsible for ensuring compliance with this Order. Each Permittee shall be charged with and shall demonstrate compliance with its applicable effluent limitations beginning with its December 15, 2013, TMDL Compliance Report.

(1) Reporting Compliance based on Full Capture Systems: Permittees shall provide information on the number and location of full capture installations, the sizing of each full capture installation, the drainage areas addressed by these installations, and compliance with the applicable interim or final effluent limitation, in its TMDL Compliance Report. The Los Angeles Water Board will periodically audit sizing, performance, and other data to validate that a system satisfies the criteria established for a *full capture system* and any conditions established by the Regional Water Board Executive Officer in the certification.

(2) Reporting Compliance based on Partial Capture Systems and/or Institutional Controls:

(a) Using Performance Data Specific to the Permittee's Area: In its TMDL Compliance Report, a Permittee shall provide: (i) site-specific performance data for the applicable device(s); (ii) information on the number and location of such installations, and the drainage areas addressed by these installations; and (iii) calculated compliance with the applicable effluent limitations.

(b) Using Direct Measurement of Trash Discharge: Permittees shall provide an accounting of DGR and trash removal via street sweeping, catch basin clean outs, etc., in a database to facilitate the calculation of discharge for each rain event. The database shall be maintained and provided to the Regional Water Board for inspection upon request. In its TMDL Compliance Report, a Permittee shall provide information on its annual DGR, calculated storm year discharge, and compliance with the applicable effluent limitation.

(3) Reporting Compliance based on Combined Compliance Approaches:

Permittees shall provide the information specified in Part VI.E.5.c.i(1) for areas where *full capture systems* are installed and that are specified in Part VI.E.5.c.i(2)(a) or (b), as appropriate, for areas where *partial capture devices* and *institutional controls* are applied. In its TMDL Compliance Report, a Permittee shall also provide information on compliance with the applicable effluent limitation based on the combined compliance approaches.

(4) Reporting Compliance based on an MFAC/BMP Approach:

The MFAC/BMP Program includes a Trash Monitoring and Reporting Plan, and a requirement that the responsible Permittees will self-report any non-compliance with its provisions. The results and report of the Trash Monitoring and Reporting Plan must be submitted to Regional Water Board with the Permittee's Annual Report.

ii. Violation of the reporting requirements of this Part shall be punishable pursuant to, inter alia, California Water Code section 13385, subdivisions (a)(3) and (h)(1), and/or section 13385.1.

Santa Monica Bay
Nearshore and Offshore Debris TMDL

Final Draft: October 25, 2010

California Regional Water Quality Control Board
Los Angeles Region
320 West Fourth Street, Suite 200
Los Angeles, California 90013

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Introduction

The California Regional Water Quality Control Board, Los Angeles Region (Regional Board) has developed this total maximum daily load (TMDL) to attain the water quality standards for debris in the nearshore and offshore areas of Santa Monica Bay (Santa Monica Bay Debris TMDL). The TMDL has been prepared pursuant to state and federal requirements to preserve and enhance water quality for impaired waterbodies within the Coastal Watersheds of Los Angeles and Ventura Counties.

The California Water Quality Control Plan, Los Angeles Region (Basin Plan) sets standards for surface waters and ground waters in the Coastal Watersheds of Los Angeles and Ventura Counties. These standards are comprised of designated beneficial uses for surface and ground water, numeric and narrative objectives necessary to support beneficial uses, and the state's antidegradation policy. Such standards are mandated for all waters of the state under the Porter-Cologne Water Quality Act, and for waters of the U.S. under the Federal Clean Water Act. In addition, the Basin Plan describes implementation programs to protect all waters in the region. The Basin Plan implements the Porter-Cologne Water Quality Act (also known as the "California Water Code") and serves as the State Water Quality Control Plan applicable to the Santa Monica Bay, as required pursuant to the federal Clean Water Act (CWA). The Porter-Cologne Water Quality Control Act specifically addresses preproduction plastic debris (plastic resin pellets and powdered coloring for plastics). Chapter 5.2, Section 13367, requires the State and Regional Boards to implement a program for the control of preproduction plastics from point and nonpoint sources.

Section 305(b) of the CWA mandates biennial assessment of the nation's water resources, and these water quality assessments are used to identify and list impaired waters. The resulting list is referred to as the 303(d) list. The CWA also requires states to establish a priority ranking for impaired waters and to develop and implement TMDLs. A TMDL specifies the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and allocates pollutant loadings to point and nonpoint sources.

The United States Environmental Protection Agency (USEPA) has oversight authority for the 303(d) program and must approve or disapprove the state's 303(d) lists and each specific TMDL. USEPA is ultimately responsible for issuing a TMDL, if the state fails to do so in a timely manner.

As part of California's 1998, 2002, and 2006 303(d) list submittals, the Regional Board identified the nearshore and offshore areas of Santa Monica Bay as being impaired by debris.

A consent decree between the USEPA, the Santa Monica BayKeeper and Heal the Bay Inc., represented by the Natural Resources Defense Council (NRDC), was signed on March 22, 1999. The Consent Decree requires that all TMDLs for the Los Angeles Region be addressed within 13 years. The consent decree also prescribes schedules for

certain TMDLs. The TMDL for the nearshore and offshore areas of Santa Monica Bay corresponds to Analytical Unit #66 of the Consent Decree.

This TMDL staff report and accompanying Basin Plan amendment establish the numeric targets for trash and plastic pellet discharges, baseline and final waste load allocations for point source trash and plastic pellets, and baseline and final load allocations for nonpoint source trash, a margin of safety, a program of implementation for point and nonpoint sources, an implementation schedule, and monitoring requirements.

The Debris TMDL for the nearshore and offshore areas of Santa Monica Bay will be adopted as an amendment to the Basin Plan and is therefore subject to Public Resources Code Section 21083.9 that requires California Environmental Quality Act (CEQA) Scoping and Analysis to be conducted for Regional Projects. CEQA Scoping involves identifying a range of project/program related actions, alternatives, mitigation measures, and significant effects to be analyzed in an EIR or its Substitute Environmental Documents (SEDs). On March 23, 2010 a CEQA Scoping meeting was held at the Hyperion Treatment Plant to present and discuss the foreseeable potential environmental impacts of compliance with the Debris TMDL for the nearshore and offshore areas of Santa Monica Bay. Notice of the CEQA Scoping meeting was circulated in the Los Angeles Times on February 19, 2010 and posted on the Regional Board's website. Electronic notification was also sent to interested parties including cities and/or counties with jurisdiction in or bordering the watershed of concern. Input from all stakeholders and interested parties was solicited for consideration in the development of the CEQA documents.

The Santa Monica Bay Debris TMDL is based on existing, readily available information concerning the conditions in Santa Monica Bay and the contributing watershed areas, as well as TMDLs previously developed by the State and USEPA.

I. Problem Statement

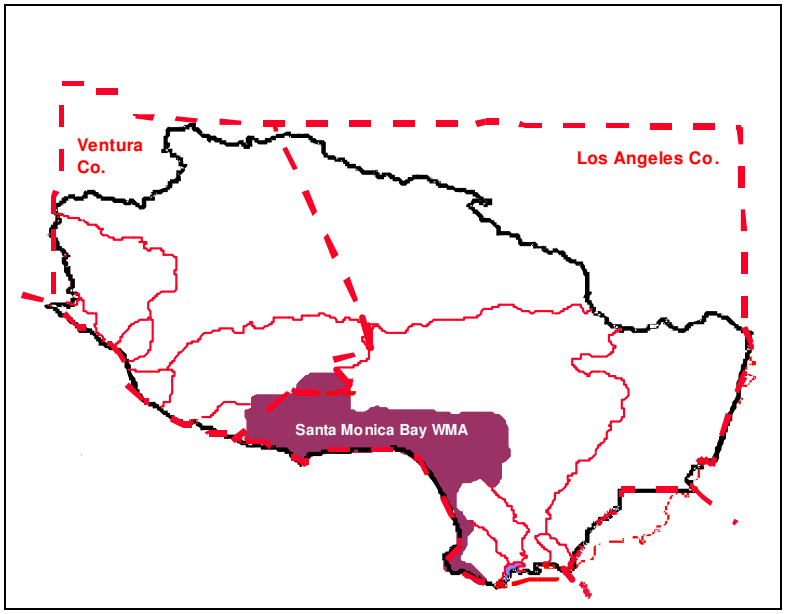
The problem statement consists of descriptions of the waterbody and watershed, the waterbody's designated beneficial uses, applicable water quality objectives, and impairments caused by debris to the nearshore and offshore areas of the Santa Monica Bay.

A. Description of the Santa Monica Bay Watershed

The Santa Monica Bay is an integral part of the larger geographic region commonly known as the Southern California Bight. It is bordered offshore by the Santa Monica Basin, to the north by the rocky headlands of Point Dume and to the south by the Palos Verdes Peninsula, and onshore by the Los Angeles Coastal Plain and the Santa Monica Mountains. The 414 square mile area of land that drains naturally to the Bay, known as the Santa Monica Bay watershed, is bordered on the north by the Santa Monica Mountains from the Ventura-Los Angeles County line to Griffith Park, extending south

and west across the Los Angeles coastal plain to include the area east of Ballona Creek and north of Baldwin Hills. South of Ballona Creek, a narrow coastal strip between Playa del Rey and the Palos Verdes Peninsula forms the southern boundary of the watershed. Figure 1 illustrates the county lines and the boundaries of the Santa Monica Bay Watershed.

Figure 1. Santa Monica Bay Watershed Management Area



The Santa Monica Bay itself is the submerged portion of the Los Angeles Coastal Plain. The continental shelf extends seaward to the shelf break about 265 feet underwater, then drops steeply to the Santa Monica Basin at about 2,630 feet.

The Debris TMDL addresses nearshore and offshore Santa Monica Bay. Nearshore Santa Monica Bay is defined by the Ocean Plan as, within a zone bounded by the shoreline and a distance of 1,000 feet from the shoreline or the 30-foot contour, whichever is further from the shoreline. Offshore is defined as the waters between the nearshore zone and the limit of state waters. Lastly, state waters, according to section 13200 of the California Water Code, extend three nautical miles into the Pacific Ocean from the line of mean lower low water marking the seaward limits of inland waters and three nautical miles from the line of mean lower low water on the mainland and each offshore island.

The Santa Monica Bay watershed has an estimated population of 1,950,265 based on the 2000 U.S. Census. Open space represents the primary land use in the watershed (55%), while high-density residential areas represent the largest developed area (25% of the total watershed). Low-density residential constitutes 5% of the land area. Commercial, industrial and mixed urban areas cover 10%. The remaining 5% of land area is covered by transportation (1.7%), educational institutions (1.6%), agriculture (0.8%),

recreational uses (0.8%), public facilities and military installations (0.2%), and water (0.4%).

In general, the northern part of the Santa Monica Bay (northwest of Santa Monica subwatershed) is not as highly developed and urbanized as the southern part of the Bay (southeast of Santa Monica Canyon subwatershed). Subwatersheds in the northern part of the Bay have on average 85% of their land area in open space. Subwatersheds in the central and southern portion of the Bay have on average 16% of their area in open space.

A.1 Santa Monica Bay Subwatersheds

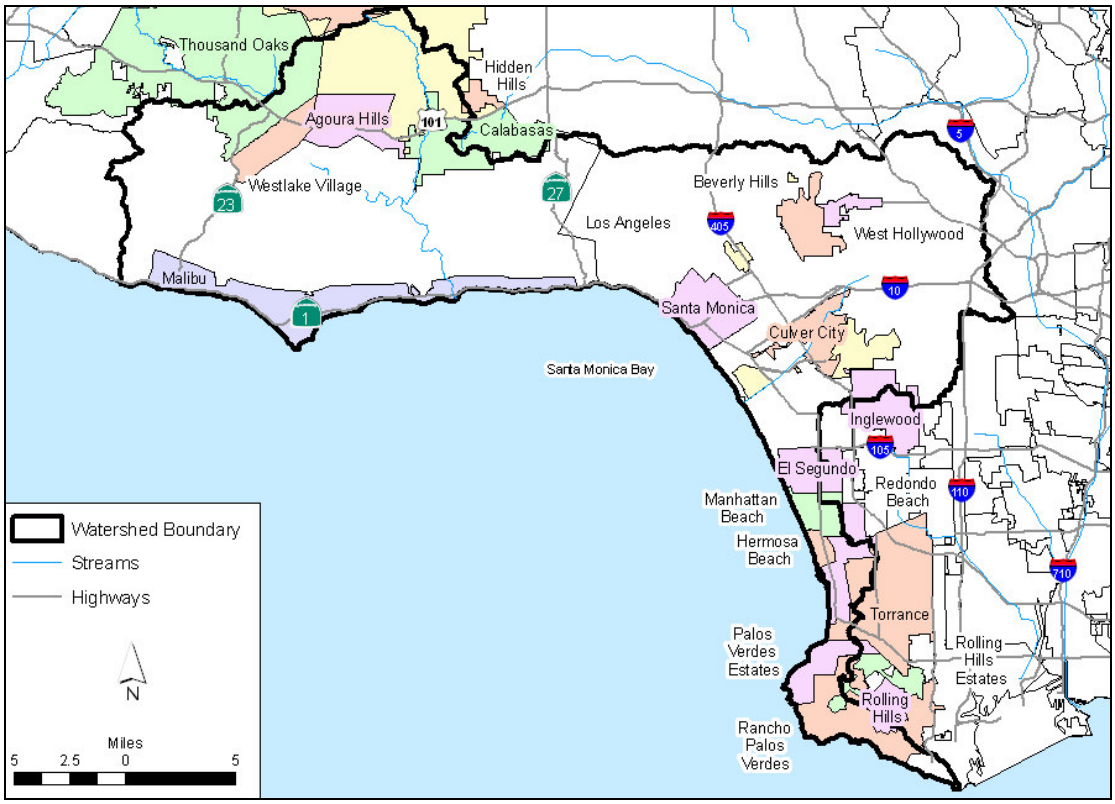
Table 1 lists the 28 separate sub-watersheds and associated cities within the larger Santa Monica Bay watershed (Figure 2). The three largest are Ballona Creek, Malibu Creek, and Topanga Canyon watershed. There are existing trash TMDLs for the Ballona Creek Watershed and the Malibu Creek Watershed. The Ballona Creek Trash TMDL became effective on August 11, 2005, and the Malibu Creek Trash TMDL became effective on March 17, 2009.

Table 1. Subwatersheds of the Santa Monica Bay

Subwatershed	City
Arroyo Sequit	Malibu, Los Angeles County Unincorporated
Ballona Creek	Culver City, Inglewood, Los Angeles, Beverly Hills, West Hollywood, Marina del Rey, Santa Monica, Los Angeles County Unincorporated
Carbon Canyon	Malibu, Los Angeles County Unincorporated
Castle Rock	Los Angeles, Los Angeles County Unincorporated
Corral Canyon	Malibu, Los Angeles County Unincorporated
Dockweiler	El Segundo, Los Angeles, Manhattan Beach, Los Angeles County Unincorporated
Encinal Canyon	Malibu, Los Angeles County Unincorporated
Escondido Canyon	Malibu, Los Angeles County Unincorporated
Hermosa	El Segundo, Hermosa Beach, Manhattan Beach, Redondo Beach
Las Flores Canyon	Malibu, Los Angeles County Unincorporated
Latigo Canyon	Malibu, Los Angeles County Unincorporated
Los Alisos Canyon	Malibu, Los Angeles County Unincorporated
Malibu Creek	Agoura Hills, Calabasas, Hidden Hills, Simi Valley, Thousand Oaks, Westlake Village, Malibu, Los Angeles County Unincorporated, Ventura County Unincorporated
Nicholas Canyon	Malibu, Los Angeles County Unincorporated
Palos Verdes	Los Angeles, Palos Verdes Estates, Rancho Palos Verdes, Redondo Beach, Rolling Hills, Rolling Hills Estates, Torrance, Los Angeles County Unincorporated
Pena Canyon	Malibu, Los Angeles County Unincorporated
Piedra Gorda Canyon	Malibu, Los Angeles County Unincorporated
Pulga Canyon	Los Angeles
Ramirez Canyon	Malibu, Los Angeles County Unincorporated

Redondo	Hermosa Beach, Manhattan Beach, Redondo Beach, Torrance, Los Angeles County Unincorporated
Santa Monica	Los Angeles, Santa Monica, Los Angeles County Unincorporated
Santa Monica Canyon	Los Angeles, Santa Monica
Santa Ynez	Los Angeles
Solstice Canyon	Malibu, Los Angeles County Unincorporated
Topanga Canyon	Calabasas, Los Angeles, Los Angeles County Unincorporated
Trancas Canyon	Malibu, Los Angeles County Unincorporated
Tuna Canyon	Malibu, Los Angeles County Unincorporated
Zuma Canyon	Malibu, Los Angeles County Unincorporated

Figure 2. Cities in the Santa Monica Bay Watershed



A.1.1 Ballona Creek Subwatershed

The largest subwatershed of Santa Monica Bay is the Ballona Creek Watershed, which covers approximately 130 square miles, and is located in the coastal plain of the Los Angeles Basin (Figure 3). Its boundaries are defined by the Santa Monica Mountains to the north, the Harbor Freeway (110) to the East, and Baldwin Hills to the south. Ballona Creek Watershed includes the Cities of Beverly Hills and West Hollywood, and portions of the cities of Culver City, Inglewood, Los Angeles, Santa Monica, and unincorporated areas of Los Angeles County. The Ballona Creek Watershed is highly

developed with high-density single family residential, multiple family residential, and mixed residential areas as the primary land uses in the watershed.

Ballona Creek is a concrete-lined, open channel for just under 10 miles which flows from Los Angeles (south of Hancock Park) through Culver City, eventually transitioning to the Ballona Creek Estuary, where concrete is replaced by grouted riprap side slopes and a natural bottom. Ballona Creek Estuary empties into the Pacific Ocean at Dockweiler Beach in Playa del Rey. Ballona Creek is fed by a complex underground network of storm drains, which reaches north to Beverly Hills and West Hollywood. Tributaries of the creek and estuary include Centinela Creek, Sepulveda Canyon Channel, Benedict Canyon Channel, and numerous storm drains. Ballona Creek is designed to discharge to Santa Monica Bay approximately 71,400 cubic feet per second from a 50-year frequency storm event (LADPW).

A.1.2 Malibu Creek Subwatershed

The next largest subwatershed of the Santa Monica Bay watershed is the Malibu Creek watershed. The Malibu Creek Watershed is 109 square miles, and is located roughly 35 miles west of Los Angeles. The Malibu Creek Watershed extends north from Santa Monica Bay and through the Santa Monica Mountains to the Simi Hills and Santa Susanna Mountains. The watershed is defined by US Highway 101 (Ventura Freeway) and California Highway 1 (Pacific Coast Highway). The Malibu Creek watershed encompasses unincorporated portions of Ventura and Los Angeles Counties, and seven cities including Malibu, Calabasas, Agoura Hills, Thousand Oaks, and Westlake Village and portions of Simi Valley and Hidden Hills. The dominant land use in this subwatershed is open space. Other land uses include: agriculture, recreation, and urbanized land uses including high and low density residential areas and commercial and industrial areas. Malibu Creek State Park is located in the Malibu Creek watershed.

Malibu Creek flows year-round, beginning at Malibou Lake and ending at Malibu Lagoon, where Malibu Creek empties into the Pacific Ocean in Santa Monica Bay. Malibu Creek is approximately 11 miles long, and is a receiving water body of urban and stormwater runoff from a network of storm drains and various types of open space throughout the watershed. Tributaries of Malibu Creek start in the Santa Monica Mountains and include the following: Lindero Canyon Creek, Lake Lindero, Medea Creek, Palo Comado Canyon Creek, Cheeseboro Canyon Creek, Las Virgenes Creek, Hidden Valley Creek, Lake Sherwood, Potrero Valley Creek, Westlake Lake, Triunfo Creek, Lake Enchanto, Malibou Lake, Malibu Creek, Las Virgenes Creek, Malibu Lagoon and Cold Creek. Malibu Creek outlets to the Santa Monica Bay through Malibu Lagoon at Surfrider Beach.

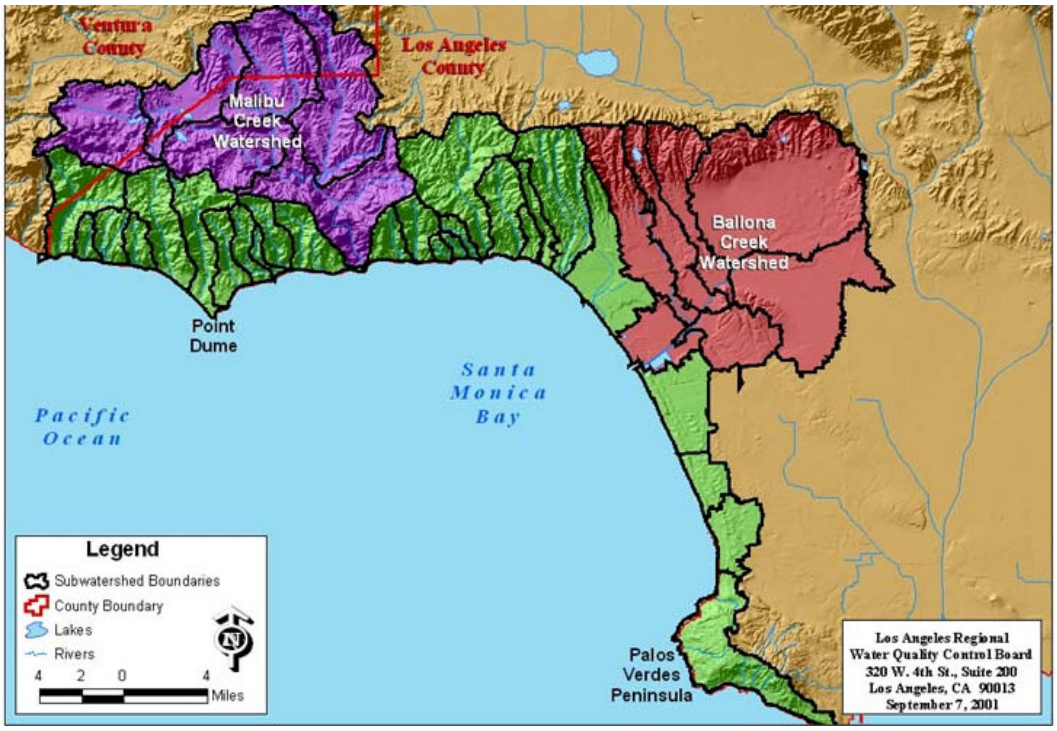
A.1.3 Topanga Canyon Subwatershed

The other major subwatershed in the Santa Monica Bay watershed is the Topanga Canyon watershed, which covers approximately 18 square miles. It is bounded on three sides by State Park or conservancy lands, and on the south by the Pacific Ocean and a small strip of Malibu, and Pacific Palisades to the east. Topanga Beach is on the coast at the outlet of Topanga Creek, just south of Malibu. Topanga Canyon contains lands of

both Topanga State Park, which is the largest park in the Santa Monica Mountains, and the Santa Monica Mountains Conservancy. Topanga State Park is part of the Santa Monica Mountains National Recreation Area. Although there are residential areas in the Topanga Canyon watershed, a large portion of the watershed is undeveloped.

Topanga Creek drains Topanga Canyon, and is one of the few remaining undammed waterways in the area. Topanga Canyon Boulevard is the main thoroughfare connecting the Ventura Freeway (US 101) with Pacific Coast Highway (SR 1). The southern portion of the boulevard largely parallels Topanga Creek.

Figure 3. Major Subwatersheds, Streams, and Lakes of the Santa Monica Bay Watershed



A.2 Santa Monica Bay Beaches

Santa Monica Bay is surrounded by fifty-five miles of shoreline and numerous public beaches. As there are differences in the characteristics and land uses of the beaches along the Santa Monica Bay, in this TMDL the beaches have been separated into north bay and south bay beaches. The north bay beaches are located north of the City of Santa Monica, while those referred to as south bay beaches are south of Santa Monica.

The north bay beaches are generally flanked by more open space and roads, as the northern Santa Monica Bay watershed is not as urbanized as the southern part of the watershed. North of Santa Monica, Pacific Coast Highway parallels the coastline and the beaches along the bay.

The beaches located in the south Santa Monica Bay area are commonly adjacent to residential areas. For example, there are high-density residences along The Strand directly adjacent to Redondo, Hermosa, and Manhattan Beach.

Dockweiler State Beach, located in mixed areas containing residences and open space, is the largest beach in both length and acreage in the south bay. It stretches 3.8 miles, and covers 255 acres (County of Los Angeles, Department of Beaches and Harbors).

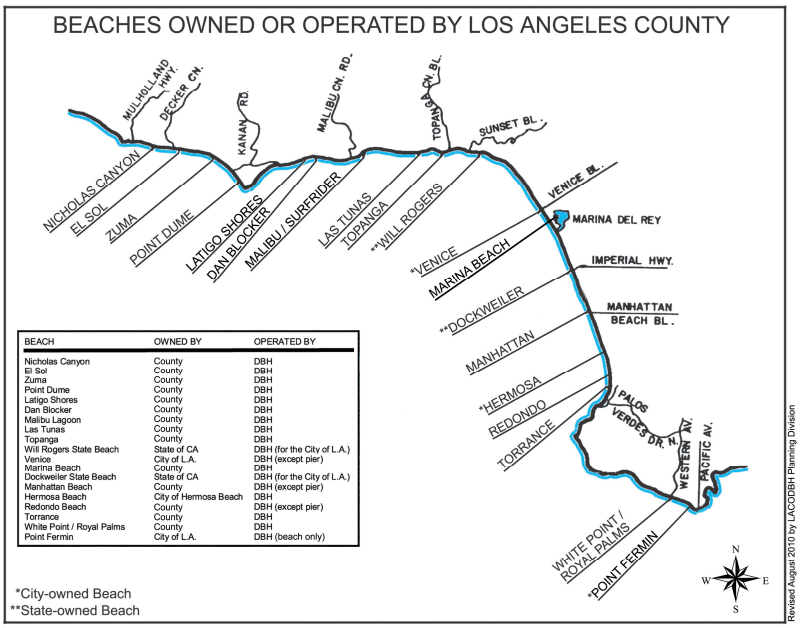
There are numerous storm drains and 40 dry weather diversions and three treatment facilities that end at the beaches of the Santa Monica Bay. Refer to the point sources section of the Source Analysis chapter for a map and list of locations.

Los Angeles County Department of Beaches and Harbors, California Department of Parks and Recreation, City of Los Angeles, City of Santa Monica, and City of Hermosa Beach own and/or operate a majority of the beaches along the Santa Monica Bay, as seen in Table 2 and Figure 4.

Table 2. Management of Santa Monica Bay Beaches

Beaches Operated by Los Angeles County Department of Beaches and Harbors
Latigo Shores County Beach
Dan Blocker Memorial Beach
Malibu Lagoon (Surfrider) Beach
Las Tunas Beach
Topanga Beach
Will Rogers State Beach (owned by the State of California)
Venice Beach (owned by the City of Los Angeles)
Marina Beach
Dockweiler State Beach (owned by the State of California)
Manhattan Beach
Hermosa Beach (owned by the City of Hermosa Beach)
Redondo Beach
Torrance Beach
Royal Palms Beach
White Point Beach
Point Fermin Beach
Beach Operated by City of Santa Monica
Santa Monica State Beach (owned by the State of California)

Figure 4. Beaches owned or operated by Los Angeles County



BEACH	OWNED BY	OPERATED BY
Nicholas Canyon	County	DBH
El Sol	County	DBH
Zuma	County	DBH
Point Dume	County	DBH
Latigo Shores	County	DBH
Dan Blocker	County	DBH
Malibu Lagoon	County	DBH
Las Tunas	County	DBH
Topanga	County	DBH
Will Rogers State Beach	State of CA	DBH (for the City of L.A.)
Venice	City of L.A.	DBH (except pier)
Marina Beach	County	DBH
Dockweiler State Beach	State of CA	DBH (for the City of L.A.)
Manhattan Beach	County	DBH (except pier)
Hermosa Beach	City of Hermosa Beach	DBH
Redondo Beach	County	DBH (except pier)
Torrance	County	DBH
White Point / Royal Palms	County	DBH
Point Fermin	City of L.A.	DBH (beach only)

A.3 Santa Monica Bay

Santa Monica Bay is comprised of different geological substrate types within nearshore and offshore areas: rocky intertidal, soft bottom, and hard bottom. Figure 5 shows a map of the landmarks described in the various substrate types, below. The shaded subwatersheds represent areas that are covered by the Santa Monica Bay Debris TMDL. Unshaded subwatersheds are either covered by the existing Malibu Creek and Ballona Creek Trash TMDLs, or not included in the Santa Monica Bay Debris TMDL.

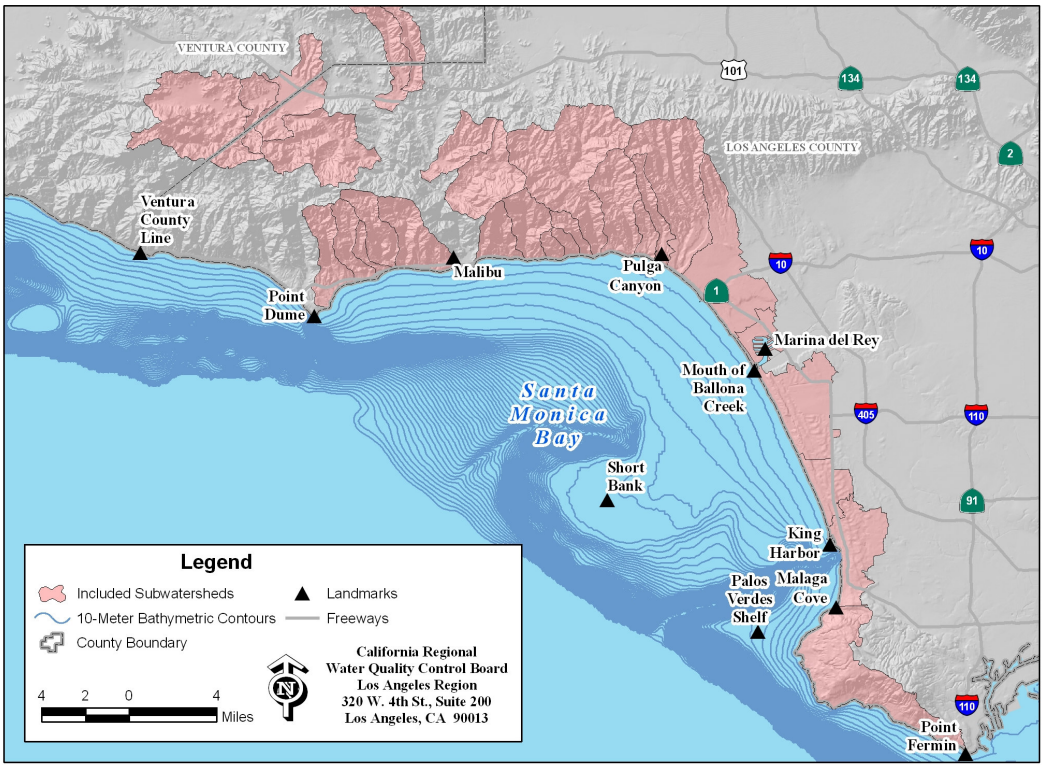
Rocky intertidal areas and areas of mixed rocky and sandy shoreline cover approximately 30% or 20 miles (32 km) of the Bay's coastline. Exposed bedrock forms the rocky intertidal from the Ventura County line to Pulga Canyon in Malibu and from Malaga Cove to Point Fermin on the Palos Verdes shelf (MBC Applied Environmental Sciences 1993). Artificial rocky intertidal—jetties, breakwater, rip rap—exist in Marina del Rey; the mouth of Ballona Creek; and King Harbor (MBC Applied Environmental Sciences 1988).

Unconsolidated, soft sediment, generally with the composition of sand, silt, and clay, makes up most of the Bay's seafloor. Silty sand is found over the central plateau and the Palos Verdes Shelf. The soft-bottom in Santa Monica Bay ranges in depth from the mean lower low water line (MLLW) to deeper than 500 meters in the outer portions of the bay and the submarine canyons (Robbins, 2006).

Hard bottom environments in Santa Monica Bay include the shallow kelp-covered areas adjacent to rocky headlands, submarine canyon walls, and the deep-water plateau called Short Bank. A large gravel bed surrounds the rocky outcrops of Short Bank.

Additionally, man-made features such as wastewater treatment plant outfall pipes, artificial reefs, and breakwaters are part of the hard bottom. (MBC Applied Environmental Sciences 1993).

Figure 5. Landmarks of the Santa Monica Bay



B. Climate

The Santa Monica Bay Watershed is located in the Southern California coastal belt and has a warm, Mediterranean climate. Summer is typically hot inland, and winter is mild. The average January air temperature is 53 degrees Fahrenheit, while the average July air temperature is 71 degrees Fahrenheit. The average annual air temperature is 61 degrees Fahrenheit with an average frost free season of 275 to 325 days.

Storm events and the resulting high stream flows are highly seasonal, grouped heavily in the months between November and April. Rainfall is rare in other months, and major storm flows historically have not been observed outside of the wet-weather season.

C. Beneficial Uses of Santa Monica Bay

The various uses of waters in the Los Angeles Region, referred as beneficial uses, are designated in the Basin Plan. These beneficial uses are the cornerstone of the State and Los Angeles Regional Water Quality Control Board's effort to protect water quality, as water quality objectives are set at levels that will protect the most sensitive beneficial use of a waterbody.

The Basin Plan for the Los Angeles Regional Board defines several beneficial uses in the Santa Monica Bay Watershed. Debris loading to the Santa Monica Bay causes impairments to beneficial uses associated with industrial service supply (IND), navigation (NAV), water contact recreation (REC-1), non-contact water recreation (REC-2), commercial and sport fishing (COMM), estuarine habitat (EST), marine habitat (MAR), preservation of biological habitats (BIOL), migration of aquatic organisms (MIGR), wildlife habitat (WILD), rare, threatened, or endangered species (RARE), spawning, reproduction, and or early development (SPWN), shellfish harvesting (SHELL), and wetland habitat (WET). These beneficial uses are summarized in Table 3.

The diverse ecosystems within the Santa Monica Bay Watershed provide a variety of habitats for more than five thousand species of plants, fish, birds, mammals, and other wildlife. The Bay's terrestrial habitats include riparian woodlands, coastal sage scrub, oak woodlands, coastal sand dunes, salt and brackish marshes, lagoons, and mudflats. Marine habitats include soft and hard bottom, sandy and rocky intertidal, pelagic, and kelp and seagrass beds (Santa Monica Bay Restoration Plan, 1994).

C.1 Santa Monica Bay

The Santa Monica Bay itself provides habitat for several different species. Below is a description of some of the specific aquatic life and recreational beneficial uses of the various marine habitats in the Bay.

C.1.1 Rocky Intertidal

The rocky intertidal areas are an important interface between the sea and the land, providing habitat for numerous and diverse species in the Bay. Various species of rockfish, such as the grass rockfish, kelp rockfish, and olive rockfish live and forage in rocky intertidal areas. In addition, the black abalone is a rocky intertidal species that has faced a rapid decline. Rocky intertidal areas can also have a recreational use, as people visit tidepools to explore and enjoy the life this habitat provides.

C.1.2 Soft Bottom Habitat

Fish use soft bottom habitat for all life stages. Soft bottom habitat supports a large number of organisms, including more than 100 species of demersal or bottom-dwelling fish, including White croaker, Queenfish, Surfperch, California halibut, and Barred sandbass. Eelgrass grows in the soft bottom habitat of Santa Monica Bay, and provides several fish species a food source and shelter (Allen 1999). Bocaccio, lingcod, California halibut, Pacific sanddab, and several species of rockfish also associate with the soft bottom habitat.

C.1.3 Hard Bottom Habitat

Although hard bottom habitat is scarce in the Bay, it supports a unique and productive ecosystem. Bocaccio, lingcod, and several species of rockfish live and forage in natural and artificial hard bottom habitats. In addition, kelp beds are associated with

hard bottom habitats. Hard bottom habitat also includes commercial and recreational uses, such as commercial and recreational fishing, and scuba diving.

C.1.4 Kelp Beds

Kelp beds extend low relief, hard bottom habitat from the seafloor to the surface, creating a vertically structured habitat. Fish may inhabit one of more of the following region of the kelp bed: holdfast, stipe, or canopy (MBC Applied Environmental Sciences). The giant kelp beds off of southern California are one of the most biodiverse communities known to exist in our world's oceans. In California, kelp beds provide protection and habitat for more than 800 species of fishes and invertebrates, many of which are uniquely adapted for life in kelp forests. One-fourth of California marine organisms depend on the kelp forests for some part of their life cycle. The survival of the threatened bocaccio, giant black sea bass, and entire industries are dependent on large, stable kelp beds (Santa Monica BayKeeper website, 2010).

Because most established kelp beds occur over hard bottom substrate, giant kelp beds in Santa Monica Bay are limited to two areas, the Palos Verdes Shelf and the area from Malibu west to Point Dume. Kelp beds grow on hard bottoms at depths ranging from 8 to 18 meters (Allen, 1985).

C.1.5 Pelagic

Pelagic, or open water, habitat is the most extensive of any of the coastal and marine habitats in the Bay. The pelagic habitat is from the sea surface to the ocean bottom, and is free of direct influence from the shore or ocean bottom.

The vast majority of life in the Bay depends either directly or indirectly on phytoplankton found in the pelagic realm. Phytoplankton forms the base of the food web – they support grazing zooplankton, fish, and marine bacteria. In the Southern California Bight, the pelagic realm is home to 40% of the total fish species. Small fish, such as northern anchovies, pacific sardines, and pacific mackerel school and reside in the pelagic realm, as well. In addition, several species of rockfish release larvae in pelagic waters. The open Bay also supports numerous species of seabirds, including the endangered California brown pelican and California least tern. Furthermore, several species of marine mammals are frequently observed in the open Bay.

C.2 Santa Monica Bay Beaches

Santa Monica Bay's sandy beaches are heavily used as a recreational resource by residents of Los Angeles and Ventura Counties, and visitors from around the world. Bay beaches attract, on average, 50-60 million visitors per year and generate significant revenue for the local economy. The intense recreational use of Santa Monica Bay's beaches has impacted both the habitat and the associated species. Sandy beaches are important foraging and nesting grounds for many shore bird species. The protection of this habitat is central to the population recovery of two endangered species, the California least tern and Western snowy plover. Although the snowy plover no longer nests along Santa Monica Bay beaches due to habitat loss/degradation as well as human disturbance,

the plover still winters on Bay beaches and is therefore still vulnerable (Santa Monica Bay Restoration Commission website, 2010).

Table 3. Beneficial Uses of Coastal Features, Santa Monica Bay.

Coastal Feature[a]	Beneficial Uses	IND	NAV	REC1	REC2	COMM	EST	MAR	WILD	BIOL	RARE	MIGR	SPWN	SHELL	WET[b]
Los Angeles County Coastal	Hydro Unit #														
Nearshore Zone*		E	E	E	E	E		E	E	Ean	Ee	Ef	Ef	Ear	
Offshore Zone		E	E	E	E	E		E	E		Ee	Ef	Ef	E	
Escondido Beach	404.34		E	E	E	E		E	E				P	E	
Dan Blocker Memorial (Corral) Beach	404.31		E	E	E	E		E	E				P	E	
Puerco Beach	404.31		E	E	E	E		E	E				P	E	
Amarillo Beach	404.21		E	E	E	E		E	E				P	E	
Malibu Beach	404.21		E	E	E	E		E	E			E	Eas	Ear	
Malibu Lagoon	404.21		E	E	E		E	E	E		Ee	Ef	Ef		E
Carbon Beach	404.16		E	E	E	E		E	E				P	E	
La Costa Beach	404.16		E	E	E	E		E	E				P	E	
Las Flores Beach	404.15		E	E	E	E		E	E				P	E	
Las Tunas Beach	404.12		E	E	E	E		E	E				P	E	
Topanga Beach	404.11		E	E	E	E		E	E				P	E	
Topanga Lagoon	405.11		E	E	E	E	E		E		Ee	Ef	Ef		E
Will Rogers State Beach	405.13		E	E	E	E		E	E				P	E	
Santa Monica Beach	405.13		E	E	E	E		E	E			E	Eas	E	
Venice Beach	405.13		E	E	E	E		E	E		E	E	Eas	E	
Marina Del Rey				E											
Harbor	405.13		E	E	E	E		E	E					E	
Public Beach Areas	405.13		E	E	E	E		E	E		E				
All other Areas	405.13		E	P	E	E		E	E		E			E	
Entrance Channel	405.13		E	E	E	E		E	E		E			E	
Ballona Creek Estuary	405.13		E	E	E	E	E	E	E		Ee	Ef	Ef	E	
Ballona Lagoon/Venice Canals	405.13		E	E	E	E	E	E	E		Ee	Ef	Ef	E	E
Ballona Wetlands	405.13			E	E		E		E		Ee	Ef	Ef		E
Del Rey Lagoon	405.13			E	E		E		E		Ee	Ef	Ef		E
Dockweiler Beach	405.12	E	E	E	E	E		E	E				P		
Manhattan Beach	405.12		E	E	E	E		E	E				P	E	
Hermosa Beach	405.12		E	E	E	E		E	E				Eas	E	
King Harbor	405.12	E	E	E	E	E		E	E		E				
Redondo Beach	405.12	E	E	E	E	E		E	E		E	E	Eas	E	
Torrance Beach	405.12		E	E	E	E		E	E			E	Eas	E	
Point Vicente Beach	405.11		E	E	E	E		E	E				P	E	

E: Existing beneficial use
P: Potential beneficial use
I: Intermittent beneficial use
a: Waterbodies are listed multiple times if they cross hydrologic area or subarea boundaries. Beneficial use designations apply to all tributaries to the indicated waterbody, if not listed separately.
b: Waterbodies designated as WET may have wetlands habitat associated with only a portion of the waterbody. Any regulatory action would require a detailed analysis of the area.
e: One or more rare species utilize all ocean, bays, estuaries, and coastal wetlands for foraging and/or nesting.
f: Aquatic organisms utilize all bays, estuaries, lagoons, and coastal wetlands, to a certain extent, for spawning and early development. This may include migration into areas which are heavily influenced by freshwater inputs.
an: Areas of Special Biological Significance (along coast from Latigo Point to Laguna Point) and Big Sycamore Canyon and Abalone Cove Ecological Reserves and Point Fermin Marine Life Refuge.
ar: Areas exhibiting large shellfish populations include Malibu, Point Dume, Point Fermin, White Point, and Zuma Beach.
as: Most frequently used grunion spawning beaches. Other beaches may be used as well.
* Nearshore is defined as the zone bounded by the shoreline and a line 1000 feet from the shoreline or the 30-foot contour, whichever is further from the shore line.

C.3 Santa Monica Bay Subwatersheds

The Ballona Creek Subwatershed, Malibu Creek Subwatershed, and Topanga Canyon Subwatershed are all ecologically significant watersheds located within the Santa Monica Bay Watershed.

C.3.1 Ballona Creek Subwatershed

Ballona Creek, the largest subwatershed in the Santa Monica Bay watershed, is ecologically and recreationally significant. The bike path along the creek provides opportunities for recreation in the area. This path extends almost seven miles from Ballona Creek at National Boulevard in Culver City, to the end of Ballona Creek Estuary in Marina del Rey. The bike path is connected to another path along Dockweiler Beach by the Pacific Bridge, which links Marina del Rey to Playa del Rey. Biking, walking, drawing and painting are common practices that take place along the bikepath.

In addition to biking, hiking and bird watching are common practices in the watershed. About 300 bird species have been recorded in the Ballona Creek Subwatershed, including water, marsh, shore, and sea birds. Some of these birds are threatened and endangered species. For example, the California least tern is an endangered species that forages at the freshwater marsh during the breeding season, and raises its young in the sand dunes at Venice Beach. The great blue heron nests in tall trees in upland areas of Ballona, and forages along Ballona Creek. The Belding's savannah sparrow, a State listed endangered species, forages and breeds primarily in high salt marsh habitat. The least bittern, a State Species of Special Concern, breeds at the Freshwater Marsh.

C.3.2 Malibu Creek Subwatershed

The second largest of Santa Monica Bay's subwatersheds, the Malibu Creek Watershed, is the most ecologically significant watershed in Los Angeles County and the Santa Monica Mountains National Recreation Area (SMMNRA). The Malibu Creek Watershed provides a wide variety of habitats for threatened and endangered species and has long been a popular locale for public access and public recreation. Some animal species, such as the steelhead trout, tidewater goby, and brown pelican are endangered. Many others, such as the snowy plover and peregrine falcon, are threatened. As a large percentage of the Malibu Creek Watershed includes large areas of open space and natural habitat, it also provides many recreational opportunities. Hiking, mountain biking, fishing, horseback riding trails, camping, swimming and birdwatching are all common activities. In addition, Malibu Beach is a popular spot for vacationers, beachgoers, and surfers. The Malibu Creek Watershed has also been the location of many movie studio sets.

C.3.3 Topanga Canyon Subwatershed

The third largest subwatershed of the Santa Monica Bay watershed, Topanga Canyon watershed, is a favorite spot for hikers, bikers, and motorcycle riders because of its location in the Santa Monica Mountains. Biodiversity in Topanga watershed is quite high, with many species present that are rare in other areas of the Santa Monica Mountains. Sensitive plant species found in Topanga include Braunton's milkvetch, Santa Monica Mountains Dudleya, and Santa Susana Tarplant. Several sensitive animal species have been found in Topanga, including the steelhead trout, California newt, Arboreal salamander, and the California Red-legged frog.

D. Water Quality Objectives

Narrative water quality objectives are specified by the 1994 Los Angeles Regional Board Basin Plan. Water quality standards consist of a combination of beneficial uses, water quality objectives, and the State's Antidegradation Policy. Regional Board staff finds that the following narrative objectives are most pertinent to the Santa Monica Bay Debris TMDL:

Floating Materials: *"Waters shall not contain floating materials, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect beneficial uses."*

Solid, Suspended, or Settleable Materials: *"Waters shall not contain suspended or settleable material in concentrations that cause nuisance or adversely affect beneficial uses."*

In addition, the 2005 Water Quality Control Plan for Ocean Waters of California (California Ocean Plan) establishes water quality objectives, as well. This narrative objective is applicable to both trash and plastic pellets:

"Floating particulates and grease and oil shall not be visible."

Moreover, in 2007 AB 258 was signed into law, which added Chapter 5.2 to Division 7 of the California Water Code, section 13367. Chapter 5.2 is called "Preproduction Plastic Debris Program," and requires the Regional Boards to implement a program to control the discharges of preproduction plastic pellets from point and nonpoint sources. The program requires plastic manufacturing, handling, and transportation facilities to implement best management practices to control discharges of preproduction plastics, including: appropriate containment systems; sealed containers durable enough so as not to rupture during transfer and storage; use of capture devices during loading, unloading, and transferring; and the availability of a vacuum or vacuum like system to clean up loose pellets.

State Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality Water" in California, known as the "Antidegradation Policy," protects high quality surface and ground waters from degradation. Any actions that can adversely affect water quality in all surface and ground waters must be consistent with the maximum benefit to the people of the state, must not unreasonably affect present and anticipated beneficial use of such water, and must not result in water quality less than that prescribed in water quality plans and policies. Furthermore, any actions that can adversely affect surface waters are also subject to the federal Antidegradation Policy (40 CFR 131.12). The proposed TMDL will not degrade water quality, and will in fact improve water quality as it is designed to achieve compliance with existing water quality standards.

E. Impairment of Beneficial Uses

The beneficial uses described above are impaired by the accumulation of suspended and settleable debris. Common items that have been observed by Regional Board staff include

plastic bags, aluminum cans, paper items, plastic and glass bottles, styrofoam, plastic pellets, cigarette butts, and construction debris. Heavier debris can also be transported during storms.

Marine debris[1] has impacted at least 267 species worldwide, primarily through ingestion and entanglement (Heal the Bay, 2007). Marine debris and beach litter kills marine wildlife, damages the Bay's aesthetic qualities, and is expensive for coastal communities to clean up. Items like fishing line and six-pack rings can entangle marine animals. Entanglement results when an animal becomes encircled or ensnared by debris. It can occur accidentally, or when the animal is attracted to the debris as part of its normal behavior or out of curiosity. Entanglement is harmful to wildlife for several reasons. Not only can it cause wounds that can lead to infections or loss of limbs; it can also cause strangulation or suffocation. In addition, entanglement can impair an animal's ability to swim, which can result in drowning, or in difficulty in moving, finding food, or escaping predators (U.S. EPA, 2001). Once entangled, animals have trouble eating, breathing or swimming, all of which can have fatal results.

For aquatic life, buoyant (floatable) elements tend to be more harmful than settleable elements, due to their ability to be transported throughout the water body and ultimately to the marine environment. Birds, fish and mammals often mistake plastic for food. With plastic filling their stomachs, animals have a false feeling of being full, and may die of starvation. Sea turtles mistake plastic bags for jellyfish, one of their favorite foods. Even gray whales have been found dead with plastic bags and sheeting in their stomachs. Smaller elements such as plastic resin pellets (a by-product of plastic manufacturing) and cigarette butts are often more harmful to aquatic life than larger elements, since they can be ingested by a large number of small organisms which can then suffer malnutrition or internal injuries. In addition to malnutrition, plastic pellets may contain chemicals that are toxic (e.g. persistent organic pollutants). These toxic substances may be additives that were intentionally mixed into the resin to achieve specific properties, or contaminants that were adsorbed by the pellets from the environment (U.S. EPA, 1992).

Ingestion of sharp objects can damage the mouth, digestive tract and/or stomach lining and cause infection or pain. Ingested items can also block air passages and prevent breathing, thereby causing death (U.S. EPA, 2001). Many of the species most vulnerable to the problems of floatable debris are endangered or threatened by extinction.

Trash and plastic pellets in waterways causes other significant water quality problems. Small and large floatables can inhibit the growth of aquatic vegetation, decreasing spawning areas and habitats for fish and other living organisms. With the exception of large items, settleables are not always obvious to the eye. This includes plastic pellets, glass, cigarette butts, rubber, construction debris, and more. Settleables can be a problem for bottom feeders and can contribute to sediment contamination.

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[1] According to the National Oceanic and Atmospheric Administration (NOAA) Marine Debris Program, debris is defined as "any persistent solid material that is manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned into the marine environment" (NOAA 2010). In this TMDL, trash does not include naturally occurring vegetation waste. Plastic pellets, also known as plastic resin pellets, are small, round pellets that are the raw form of plastic. These pellets are melted down to form plastic products.

Persistent elements such as plastics, synthetic rubber and synthetic cloth tend to be more harmful than degradable elements such as paper or organic waste. Glass and metal are less persistent, even though they are not biodegradable, because wave action and rusting can cause them to break into smaller pieces that are less sharp and harmful. Natural rubber and cloth can degrade but not as quickly as paper (U.S. EPA, 2002).

Debris in water bodies can threaten the health of people who use them for wading or swimming. Of particular concern are the bacteria and viruses associated with diapers, medical waste (e.g., used hypodermic needles and pipettes), and human or pet waste. Additionally, beachgoers can cut themselves on glass and metal left on the beach. Such injuries can then expose a person's bloodstream to microbes in the stream's water that may cause illness. Also, some debris, such as containers or tires, can pond water and support mosquito production and associated risks of diseases such as encephalitis and the West Nile virus.

Marine debris also endangers the safety and livelihood of fishermen and recreational boaters. Nets and monofilament fishing line can obstruct propellers and plastic sheeting and bags can block cooling intakes.

Most of the effects listed above are related to the health of marine life and people. However, marine debris is also a nuisance. Debris is not aesthetically pleasing to the eye, and can also affect tourism if people do not want to spend time at a beach filled with trash and plastic pellets.

In conclusion, debris in Santa Monica Bay can adversely affect humans, fish, and wildlife. Not all water quality effects of debris are equal in severity or duration. The water quality effects of debris depend on individual items and their buoyancy, degradability, size, potential health hazard, and potential hazards to fish and wildlife. The prevention and removal of trash and plastic pellets in the Santa Monica Bay and their possible source areas will ultimately lead to improved water quality and protection of aquatic life and habitat, expansion of opportunities for recreation, enhancement of public interest in Santa Monica Bay, and public participation in restoration activities, and propagation of the vision of the watershed as a whole and enhancement of the quality of life of those who use the Bay.

F. Debris Impairments of Santa Monica Bay

F.1 Site Inspections

According to the 1998, 2002, and 2006 303(d) lists, debris is impairing beneficial uses in the Santa Monica Bay. On October 16, 2008 and August 10, 2009, Regional Board staff conducted site visits along the beaches in the southern and northern parts of the Santa Monica Bay, respectively, to document the trash problem. The Rapid Trash Assessment method was used to measure and document trash at sites in Redondo Beach, Hermosa Beach, Manhattan Beach, Dockweiler Beach, Venice Beach, Santa Monica Beach, Will Rogers State Beach, Topanga County Beach, Dan Blocker County Beach, Paradise Cove, and Zuma County Beach.

During the site inspection, trash was found at all beaches along the Santa Monica Bay. Common items found on every beach included: plastic bags, candy wrappers, cigarette butts, styrofoam, beverage containers, straws, and paper.

Areas along the beaches north of Santa Monica Beach had much more trash beside Pacific Coast Highway (PCH) and other roads. Many pocket areas were observed with no gutter or other mechanism that would catch the trash from the roadway, through the parking lots, and to the beach. Most of the trash on the roadside consisted of plastic bags, plastic and paper wrappers, and cigarette butts. Along a 100-foot stretch of PCH in Zuma Beach, 52 plastic wrappers, over 100 cigarette butts, and over 60 pieces of paper trash were counted. There were no trash cans observed in this area.

The south bay beaches (south of Santa Monica Beach) are located in more urban areas, and did not have as much trash on the roadside. Since these areas are equipped with catch basins and attached to the municipal separate storm sewer system (MS4), trash does not tend to remain on the roadside. Although there was not much trash observed along the roads, there was trash observed on all south bay beaches.

In general, there was more trash at the beaches with more visitation, such as Santa Monica by the pier, and Venice Beach by the boardwalk. Among the trash found in a 100-foot transect of Santa Monica Beach, there were 43 cigarette butts, 19 pieces of styrofoam, 18 pieces of plastic, and one diaper. There was also a considerable amount of trash found floating in the surf zone near the outfall at Dockweiler Beach, and on the beach itself.

F.2 Other Studies

Data provided by Heal the Bay from the Coastal Cleanup Day in 2009 shows the significant amount of trash that is present on coastal beaches. Volunteers collected 2,750 pounds of trash from Dockweiler State Beach, while 848 pounds were collected at Santa Monica Beach, and approximately 650 pounds at Will Rogers State Beach. At the south bay beaches, approximately 550 pounds were collected at Redondo Beach, 300 pounds at Manhattan Beach, 193 pounds at Torrance Beach, and 160 pounds at Hermosa Beach.

According to Heal the Bay, a majority of marine debris is comprised of plastic material. An estimated 60 to 80 percent of all marine debris (and 90 percent of floating debris) is plastic (Heal the Bay, 2007).

Several studies have investigated the presence of plastics in the waters off of southern California. Plastic pellets, polystyrene, hard plastic fragments, thin films, and line have all been documented in the Santa Monica Bay. A study conducted by Algalita Marine Research Foundation found that plastics were present not only at surface levels, but also in mid-water depths, and at the bottom of the Santa Monica Bay (Gwen L. Lattin et al., 2001).

Two separate studies conducted by UCLA students in 2010 quantitatively and qualitatively examined marine debris distribution on the beaches along the Santa Monica Bay. One of the studies evaluated debris among four Los Angeles County Beaches: Malibu-Surfrider Beach, Venice Beach, Dockweiler State Beach, and Redondo Beach. The other study looked at debris at Topanga Beach and Topanga Canyon Creek. Both studies found that plastics were

present in abundance on all beaches. Many plastic pieces were degraded, suggesting that they had originated in upstream waterways for a significant amount of time before accumulating on beaches. In addition to plastic, styrofoam was prevalent in the mouth of Topanga Canyon Creek and on Topanga Beach. Furthermore, the original use of most debris items found on beaches was associated with food and beverages.

The Ocean Conservancy uses annual data collected during International Coastal Cleanup (ICC), and the National Marine Debris Monitoring Program (NMDMP) to evaluate the sources of marine debris. ICC data collected over several years has indicated that over 60% of debris collected from beaches on Coastal Cleanup Day in the United States is comprised of plastic materials. The primary items from land based sources on the Pacific Coast included food wrappers, beverage containers, cigarettes, and smoking-related materials. The primary items of ocean-related debris included fishing nets and gear. The Ocean Conservancy uses the ICC data to assess the sources of the debris. Data collected during the 2004 California Coastal Cleanup Day revealed the following sources (by number of pieces): shoreline and recreational activities - 48%; Smoking-related activities - 44.2%; Ocean waterway activities - 4.5% (Gordon, 2006).

While there are numerous studies documenting visible and identifiable plastic objects, another study conducted by Algalita Marine Research Foundation and Southern California Coastal Water Research Project (SCCWRP) focused on miniscule plastic fragments, and showed that these fragments of less than 5mm in size have a mass that is 30% of the mass of the associated zooplankton in the Northern Pacific Central Gyre.

A more localized study conducted in the summer of 1998 by SCCWRP examined the composition and distribution of beach debris on Orange County beaches. The study found over 105 million pre-production plastic pellets, weighing more than 4,700 pounds.

II. Numeric Target

The numeric target is derived from the narrative water quality objectives in the Basin Plan for the Los Angeles Region and the California Ocean Plan, including:

"Floating Material"

> *"Waters shall not contain floating materials, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect beneficial uses";*

"Solid, suspended, or settleable materials"

> *"Waters shall not contain suspended or settleable material in concentrations that cause nuisance or adversely affect beneficial uses."*

"Floating particulates"

> *"Floating particulates and grease and oil shall not be visible."*

A. Numeric Target for Trash

The numeric target for the Santa Monica Bay Debris TMDL is zero trash in Santa Monica Bay. For point sources, zero trash is defined as no trash discharged into waterbodies within the Santa Monica Bay Watershed and into Santa Monica Bay or on the shoreline of Santa Monica Bay. For nonpoint sources, zero trash is defined as no trash on the shoreline or beaches, or in harbors adjacent to Santa Monica Bay, immediately following each assessment and collection event consistent with an established Minimum Frequency of Assessment and Collection Program (MFAC Program). Regional Board staff has not found information to justify any value other than zero that would fully support the designated beneficial uses. Further, court rulings have found that a numeric target of zero trash is legally valid. The numeric target was used to calculate the Load Allocations for nonpoint sources and Waste Load Allocations for point sources, as described in the following sections of this Staff Report.

B. Numeric Target for Plastics

The numeric target for plastic pellets in the Santa Monica Bay Debris TMDL is zero plastic pellets in Santa Monica Bay. For point source dischargers of plastic pellets, zero plastic pellets is defined as no plastic pellets discharged from the premises of industrial facilities that import, manufacture, process, transport, store, recycle or otherwise handle plastic pellets. Similar to trash, this numeric target supports the designated beneficial uses, as stated above.

III. Source Analysis

Contaminants that enter the Bay may originate on land, in the air, or at sea outside of the Bay itself. Although the sources of pollutants are numerous and disparate, they are ultimately the product of all the people who live, work, and play in the region. Countless human activities directly influence the amount and types of pollutants that enter the Bay. Along the West Coast, land-based debris comprises over half of the debris observed in the marine environment followed by undetermined sources of debris, while ocean-based debris comprises only approximately one-tenth of the debris observed in the marine environment (Sheavly, 2007).

<u>Trash Sources</u>

The major source of trash in the Santa Monica Bay results from litter, which is intentionally or accidentally discarded by people and ends up in the Santa Monica Bay. Over 4,000 tons of trash is collected from Bay beaches annually and a 1994 survey found that one-quarter of the ocean bottom surveyed contained man-made materials (Santa Monica Bay Restoration Plan). The potential trash sources can be categorized as point sources and nonpoint sources depending on the transport mechanisms, which include:

1. Storm drains: trash that is deposited throughout the watershed is carried to the various beaches and Santa Monica Bay during and after rainstorms through storm drains. This is a point source.

2. Marine vessels/ships: trash can be deposited into the Santa Monica Bay directly from marine vessels and ships. This is a nonpoint source.

3. Wind/wave action: trash can be blown or washed into the Santa Monica Bay directly. This is a nonpoint source.

4. Direct disposal: direct dumping or littering into the Santa Monica Bay. This is a nonpoint source.

According to the characteristics of the land uses which include high and low density residential areas, open space and parks, both point and nonpoint sources contribute trash to the Santa Monica Bay.

Plastic Pellet Sources

Approximately 60 billion pounds of plastic pellets are manufactured annually in the United States, where they are frequently discharged to waterways during the transport, packaging, and processing of plastics (Heal the Bay, 2007). Like trash, the plastic pellets can reach Santa Monica Bay via storm drains, wind, or direct spills. Plastic pellets are transported through ships, trucks, and trains from plastic manufacturers to plastic industries. Once discharged, the pellets are easily blown by wind or carried by stormwater through the storm drain system and to the beaches and water of the Santa Monica Bay. Since the plastic pellets are very small (less than 5 millimeters), they will not be captured by most trash capture devices. Studies in New York, Boston, and Houston showed that combined sewer overflows and storm drains were sources of pellets in the aquatic environment (U.S. EPA, 1992).

A. Point Sources

There are several point sources that contribute to Santa Monica Bay and its watershed. Municipal storm drains and discharges from industrial facilities that manufacture, transport or otherwise handle plastic pellets will be the major focus of point sources in this Debris TMDL.

Land Based Point Sources of Trash

Trash conveyed by urban runoff and storm water through storm drains to the Santa Monica Bay is evidenced by trash accumulation at the base of storm drains discharging to the beaches and catch basins, which collect runoff from surrounding lands.

Urban and storm water runoff, carried to the Bay through the region's massive storm drain systems and streams, is a serious, year-round concern. Each year, an average of 30 billion gallons of storm water and urban runoff are discharged through more than 200 outlets. Even in dry weather, ten to 25 million gallons of water flow through storm drains into Santa Monica Bay every day. Table 4 and Figure 6 show the major storm drains that empty into Santa Monica Bay.

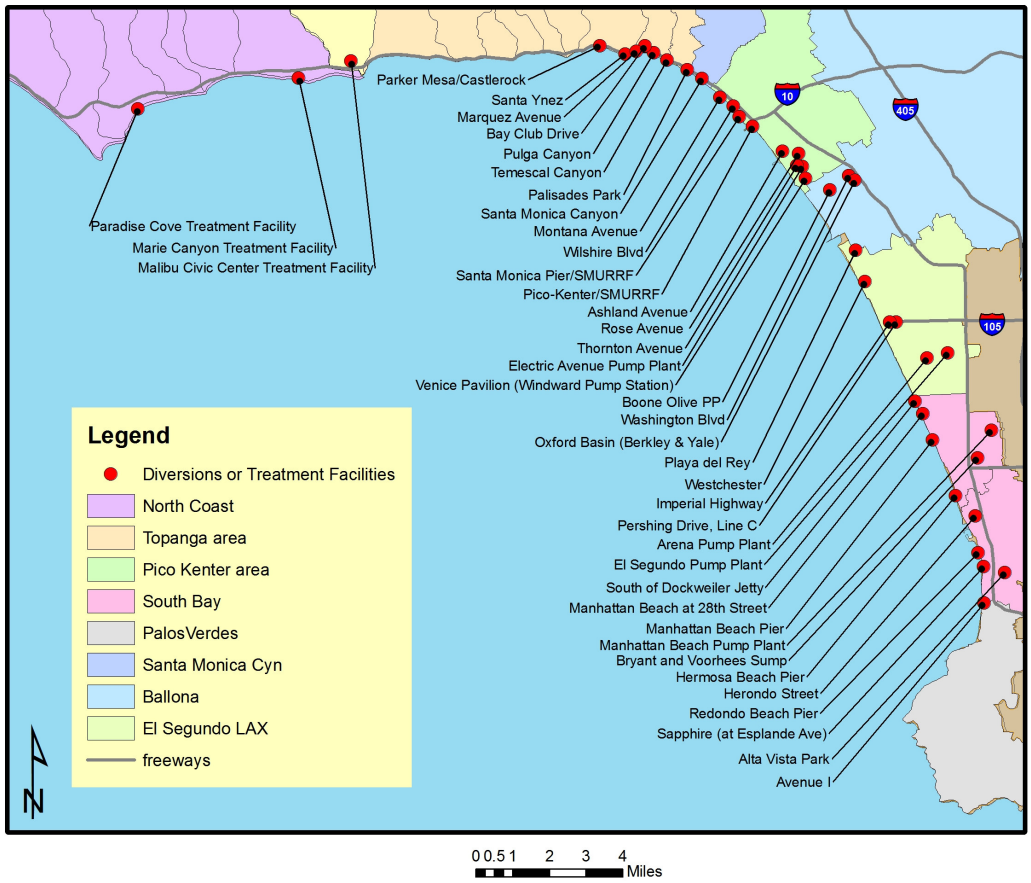
Runoff flows over rooftops, parking lots, roadways and freeways, sidewalks, commercial areas, construction sites, industrial facilities, and other impervious surfaces, picking up trash and transporting it through open channels and underground pipes directly to the Bay.

Because the region's 5,000-mile network of storm drains was built to convey flood waters to the ocean as quickly as possible, all wet-weather flows and most dry-weathers flow bypass wastewater treatment facilities and discharge directly to the Bay. However, some facilities treat runoff on-site, such as those at Malibu Lagoon, Marie Canyon, Paradise Cove and the Santa Monica Pier.

Table 4. Major creeks, open channel, and storm drains in Santa Monica Bay beach cities and Los Angeles County.

Low Flow Diversion	Subwatershed
Boone Olive PP	Ballona
Washington Blvd	Ballona
Oxford Basin (Berkley at Yale)	Ballona
Playa del Rey	El Segundo-LAX
Westchester	El Segundo-LAX
Pershing Drive, Line C	El Segundo-LAX
Arena Pump Plant	El Segundo-LAX
El Segundo Pump Plant	El Segundo-LAX
Imperial Highway	El Segundo-LAX
Malibu Civic Center Treatment Facility	Malibu
Paradise Cove Treatment Facility	North Coast
Marie Canyon Treatment facility	North Coast
Avenue I	Palos Verdes
Alta Vista Park	Palos Verdes
Rose Avenue (phase 2)	Pico Kenter
Ashland Avenue (phase 2)	Pico Kenter
Electric Avenue Pump Plant	Pico Kenter
Thornton Avenue	Pico Kenter
Venice Pavilion (Windward Ave Pump Station)	Pico Kenter
Montana Avenue	Pico Kenter
Wilshire Avenue	Pico Kenter
Santa Monica Pier	Pico Kenter
Pico-Kenter	Pico Kenter
Santa Monica Canyon	Santa Monica Cyn
Manhattan Beach Pump Plant	South Bay
Manhattan Beach at 28th Street (The Strand)	South Bay
Herondo Street	South Bay
South of Dockweiler Jetty	South Bay
Manhattan Beach Pier	South Bay
Hermosa Beach Pier	South Bay
Redondo Beach Pier	South Bay
Sapphire (at Esplanade Ave)	South Bay
Bryant and Voorhees Sump	South Bay
Parker Mesa/Castlerock	Topanga
Santa Ynez	Topanga
Pulga Canyon	Topanga
Palisades Park	Topanga
Bay Club Drive	Topanga
Temescal Canyon	Topanga
Marquez Avenue	Topanga

Figure 6. Low flow diversions and treatment facilities in the Santa Monica Bay Watershed Management Area



Extensive research has not been done on trash generation or the precise relationship between rainfall and its deposition in waterways. However, it has been found that the amount of gross pollutants entering the stormwater system is rainfall dependent but does not necessarily depend on the source (Walker and Wong, December 1999). The amount of trash which enters the stormwater system depends on the energy available to re-mobilize and transport deposited gross pollutants on street surfaces rather than on the amount of available gross pollutants deposited on street surfaces. Where gross pollutants exist, a clear relationship between the gross pollutant load in the stormwater system and the magnitude of the storm event has been established. The limiting mechanism affecting the transport of gross pollutants, in the majority of cases, appears to be re-mobilization and transport processes (i.e., stormwater rates and velocities).

Several studies conclude that urban runoff is the dominant source of trash. The large amount of trash conveyed by urban storm water to the Los Angeles River is evidenced by the trash that accumulates at the base of storm drains. The amount and type of trash that is washed into the storm drain system appears to be a function of the surrounding land use.

A number of studies (Walker and Wong, 1999, Allison, 1995), have shown that commercial land-use catchments generate more pollutants than residential land-use catchments, and as much as three times the amount generated from light industrial land-use catchments. It is generally accepted that commercial land uses tend to contribute larger loads of gross pollutants per area compared to residential and mixed land-use areas. This is in spite of the typical daily street sweeping in the commercial sub-catchment compared to the typical frequency of once every two weeks in residential and mixed land use areas.

Based on reports and research on other watersheds, the amount and type of trash washed into the storm drain system appears to be a function of the surrounding land use. The City of Long Beach has recorded trash quantity collected at the mouth of the Los Angeles River; the result suggested that the total trash amount is somewhat linearly correlated with the precipitation (see Table 5).

Table 5. Storm Debris Collection Summary for Long Beach: (Signal Hill, 2006).

Year	Trash (Tons)	Precipitation (inches)
95-96	4162	12.44
96-97	3993	12.4
97-98	9290	31.01
98-99	3091	9.09
99-00	3844	11.57
00-01	4437	17.94
01-02	1858	4.42
02-03	4630	16.42
03-04	2636	9.25
04-05	12225	37.25
05-06	1059	13.19

The City of Calabasas conducted a study for Continuous Deflective Separation (CDS) units installed in December of 1998 for runoff from Calabasas Park Hills to Las Virgenes Creek. It is assumed that this CDS unit prevented all trash from passing through. The calculated area drained by this CDS Unit is approximately 12.8 square miles. The urbanized area estimated by Regional Board staff is 0.10 square miles. The result of this clean-out, which represents approximately half of the 1998-1999 rainy season, was 2,000 gallons of sludgy water and a 64-gallon bag about two-third full of plastic food wrappers. It is assumed that part of the trash accumulated in the CDS unit over roughly half of the rainy season had decomposed in the unit due to the absence of paper products. Given the CDS unit was cleaned out after slightly more than nine months of use, it was assumed that this 0.10 square mile urbanized area produced a volume of 64 gallons of trash over one year.

To estimate trash generation rates, studies from other watersheds were analyzed by Regional Board staff. The County of Los Angeles conducted a trash baseline study in 2003-2004 in the Los Angeles River Watershed and the Ballona Creek Watershed. The study examined different land uses, such as: high-density single-family residential, low-density single-family residential, commercial, industrial, and open space/parks. The County of Los Angeles installed 250 catch basin inserts in the Los Angeles River Watershed, and 250 catch basin inserts in the Ballona Creek Watershed, with a minimum of 10 sites per land use having at least 5 catch basins per site. They also installed five Continuous Deflective Separator units. The results of the study indicated an average of 5,741.34 pounds per square mile per year

generated from the Los Angeles River Watershed, and 3,663.55 pounds per square mile per year from the Ballona Creek Watershed.

Land Based Point Sources of Plastic Pellets

Industries that manufacture, store, process, and otherwise handle plastic pellets as raw material are sources of pellets in the environment. Although the plastic pellets ultimately make their way to the beaches of Santa Monica Bay through storm drain systems, they originate on the premises of the plastic industries and discharges from these facilities are regulated through separate regulatory mechanisms. When industries release plastic pellets onto the ground and adjacent areas of the site, they are responsible for ensuring that the plastic pellets are not transported off-site via runoff and stormwater.

Marine Based Point Sources of Plastic Pellets

Researchers have suggested possible sources of plastic pellets in the marine environment, which include direct discharges and improper waste water disposal by the plastics industry, spillage from ships during loading, transport, and unloading, and improper use of pellets (i.e., for bearings to facilitate movement of cargo boxes and heavy objects). Other studies showed spillage at loading and shipping docks as a source of plastic pellets to the marine environment (U.S. EPA, 1992).

B. Nonpoint Sources

Nonpoint source pollution is commonly caused by a wide range of activities including urban development, agriculture, and recreation. The trash deposited in the Santa Monica Bay resulting from nonpoint sources is a function of transport mechanisms including wind, wave action, stormwater, and visitation, as they relate to open space, beaches, state parks, harbors and marinas, boating, and roadways.

There are limited studies, particularly to define the relationship between the strength of winds and movement of trash from a land surface to a waterbody. Lighter trash with a sufficient surface area to sail with the wind, such as plastic bags and pellets, beverage containers, paper or plastic convenient food containers are easily lifted and carried to the Santa Monica Bay. Also, as described in the point source section, stormwater carries trash from shore areas and beaches to waterbodies. Transportation of pollutants from one location to another is determined by the energy of wind, wave action, stormwater, and visitation.

Land Based Nonpoint Sources of Trash

In consideration of transport mechanisms, existing trash in the environment near the Santa Monica Bay is a fundamental cause of nonpoint sources trash loading. Based on observation, land use can be generally divided into categories of low density single-family residential, open space/parks, and beach areas. Residents may accidentally discard trash to the backyard, grass, or roads along the beach, which initiates the journey of trash to the Santa Monica Bay via wind or stormwater. Different uses of the open space may be responsible for different degrees of trash impairment. For example, areas with picnic tables closer to the bay

have a higher likelihood of having more trash on the ground near the water than in parking lots. Visitation rates also appear to be correlated with the amount of trash from nonpoint sources.

Large areas such as beaches and parks are especially prone to transport mechanisms such as wind and wave action. Pier fishermen and beach visitors generate trash that, if not properly disposed of, can be blown or washed directly into the Bay. In addition, trash can be blown or taken out of trash receptacles by birds if they are not covered.

Review of beach clean up data provided by Heal the Bay shows that the three most common trash types found on beaches surrounding the Santa Monica Bay are: plastic, styrofoam, and cigarette butts. Site visits support this data, and suggest that a large portion of the trash found on beaches is directly deposited by beach visitors. The areas that have high visitation tend to have more trash. Venice Beach by the board walk and Santa Monica Beach by the Santa Monica Pier are two examples.

Harbors and the marinas located within them are large areas that attract recreational and commercial boaters. Wind and stormwater can sweep any nearby trash into the harbor waters, if there is trash present in adjacent areas. Table 6 lists the marinas and yacht clubs in the Santa Monica Bay.

Table 6. Marinas and Yacht Clubs in Santa Monica Bay

Marinas, Anchorages, and Yacht Clubs Managed by County of Los Angeles Department of Beaches and Harbors
Anchorage 47
Bar Harbor Marina
Bay Club Marina
Boat Yard
Burton Chace Park Transient Boat Docks
California Yacht Club
Del Rey Yacht Club
Dolphin Marina
Esprit (formerly Deauville Marina)
Holiday Harbor Marina
Marina City Club
Marina del Rey Marina
Marina Harbor Anchorage
Mariner's Bay Anchorage
Neptune Marina
Pier 44 Marina
Public Boat Launch Ramp
Tahiti Marina
Villa del Mar Marina
Windward yacht Repair
Marina Venice Yacht Club
Pacific Mariner's Yacht Club
Santa Monica Windjammers Yacht Club
South Coast Corinthian Yacht Club
Marina del Rey Sportfishing
Marina Fuels and Service
Marinas Managed by City of Redondo Beach Harbor Department
King Harbor Marina
California Yacht Marina
Portofino Marina
Redondo Beach Marina
King Harbor Yacht Club

Marine Based Nonpoint Sources of Trash

Commercial and recreational fishing boats, sailboats, cruise ships, and import/export container ships are also nonpoint sources. In addition to trash being blown overboard, the passengers on these vessels may be depositing trash into the Bay. According to a study conducted as part of the Southern California Bight Pilot Project, entitled "Distribution of Anthropogenic and Natural Debris on the Mainland Shelf to the Southern California Bight," anthropogenic debris was most commonly found in the urbanized regions, on the outer shelf, and in areas near publicly owned treatment works (POTWs). Fishing gear was the most common type of anthropogenic debris in the urban and outer shelf zone, whereas glass bottles and plastic were most common in POTW areas. Glass bottles and cans are too large to pass through the screens covering POTW outfall pipes, so it was concluded that they were not discharged from this source. However, these outfall pipes are essentially artificial reefs, and are popular fishing spots for recreational anglers. As a result, the study suggested that marine vessels and fishing activities are a likely source of anthropogenic debris in the Santa Monica Bay (Moore, Shelly L. and Allen, M. James, 1994).

Land Based Nonpoint Sources of Plastic Pellets

Although plastic industries are the primary point source for plastic pellets, it is likely that any spills that happen during transport, transfer, or handling may release loose plastic pellets to the MS4 and eventually to the beach and the Santa Monica Bay. Any such spills will be addressed by the previously mentioned land based point source of plastic pellets or the MS4 Permittees.

IV. Linkage Analysis

This TMDL is based on numeric targets derived from narrative water quality objectives for floating materials and particulates and solid, suspended, or settleable materials. The narrative objectives prescribe that waters shall not contain these materials in concentrations that cause nuisance or adversely affect beneficial uses. Based on these targets, staff finds the capacity of the Santa Monica Bay to accumulate trash is zero. Similarly, the Santa Monica Bay should accumulate no plastic pellets.

V. Waste Load and Load Allocations

Waste Load and Load Allocations for Trash

Both point sources and nonpoint sources are identified as sources of trash in the Santa Monica Bay. For point sources, the strategy for attaining water quality standards focuses on assigning Waste Load Allocations (WLAs) to the Permittees of the Los Angeles County Municipal Separate Storm Sewer System (MS4) Permit, and the Ventura County MS4 Permit (hereinafter referred to as Responsible Jurisdictions). The WLAs will be implemented through permit requirements. For nonpoint sources, the strategy for attaining water quality standards focuses on assigning Load Allocations (LAs) to municipalities, and agencies having jurisdiction over the beaches, harbors, parks and open space, and the vicinities surrounding these beaches

and harbors. Final WLAs and LAs are zero trash. The LAs will be implemented through regulatory mechanisms that implement the State Board's 2004 Nonpoint Source Policy, which may include but are not limited to conditional waivers, waste discharge requirements, or prohibitions.

WLAs and LAs are based on a phased reduction from the Baseline Waste Load and Load Allocation, estimated as the current discharge, over an eight-year period for point source trash reduction compliance, and a five-year period for nonpoint source trash reduction compliance by using a program of minimum frequency of trash assessment and collection (MFAC) program discussed below. Responsible agencies and jurisdictions assigned a WLA may achieve WLAs through the use of full capture systems, partial capture systems, institutional controls, nonstructural BMPs, or any other lawful methods. Responsible agencies and jurisdictions assigned a LA may achieve LAs through implementation of a Regional Board Executive Officer approved MFAC program in conjunction with BMPs.

Waste Load Allocations for trash are assigned to the California Department of Transportation (Caltrans, permittee for Statewide National Pollutant Discharge Elimination System (NPDES) Storm Water Permit, No. 99-06-DWQ); Los Angeles County, and the Cities of Agoura Hills, Calabasas, Culver City, El Segundo, Hermosa Beach, Los Angeles, Malibu, Manhattan Beach, Palos Verdes Estates, Rancho Palos Verdes, Redondo Beach, Rolling Hills, Rolling Hills Estates, Santa Monica, Torrance, and Westlake Village (co-permittees within the Santa Monica Bay WMA under the Los Angeles County MS4 NPDES Permit); and County of Ventura, and City of Thousand Oaks (co-permittees within the Santa Monica Bay WMA under the Ventura County MS4 NPDES Permit No. CAS 004002).

Responsible agencies and jurisdictions covered by the Ballona Creek Watershed Trash TMDL including Caltrans, County of Los Angeles, and the Cities of Beverly Hills, Culver City, Inglewood, Los Angeles, Santa Monica, and West Hollywood, and responsible agencies and jurisdictions identified in the Malibu Creek Trash TMDL including Caltrans, Los Angeles County, Ventura County, Ventura County Watershed Protection District, and the Cities of Agoura Hills, Calabasas, Hidden Hills, Malibu, Thousand Oaks, and Westlake Village are also responsible for point source discharges of trash into the Santa Monica Bay via open channels and storm drains. The WLA applicable to MS4 Permittees that is established in the Santa Monica Bay Debris TMDL, and the associated requirements for these responsible agencies and jurisdictions shall be addressed through the Ballona Creek Trash TMDL (Regional Board Resolution No. R01-014 and any amendments thereto) and the Malibu Creek Trash TMDL (Regional Board Resolution No. R08-007 and any amendments thereto). Therefore, compliance with the existing Malibu Creek and Ballona Creek Trash TMDLs will constitute compliance with the trash related requirements of the Santa Monica Bay Debris TMDL.

The Regional Board's approach to regulating trash in the context of a TMDL is unique and unlike that used for other pollutants. Trash is generally visible and easily containable, and these attributes make it a pollutant that is readily controllable within its area of origin through proper and frequent collection and disposal by municipalities and the public. Also, the feasibility of containing this pollutant allows for determining compliance within a jurisdiction prior to discharge to the MS4. The LA Region trash TMDLs take this into account in identifying responsible jurisdictions and agencies and their points of compliance, and in assigning waste load allocations.

The TMDL is designed to assign all responsibility for trash generated within a land area to the responsible jurisdictional agency. The intent of the TMDL is to control the trash prior to its being discharged to the MS4 and from there to impaired waters. In this manner, responsible jurisdictions within the watershed are assigned waste load allocations and should be responsible for controlling all potential trash discharges from their area. The flood control districts are not assigned waste load allocations. However, the Regional Board recognizes the flood control districts' authority over the MS4 and the fact that some of the key compliance strategies for the trash TMDL rely on installations within the flood control districts' infrastructure. Because of this, flood control districts may be held responsible with a jurisdiction and/or agency for non-compliance where the flood control district has either:

(i) without good cause denied entitlements or other necessary authority to a responsible jurisdiction or agency for the timely installation and/or maintenance of full and/or partial capture trash control devices for purposes of TMDL compliance in parts of the MS4 physical infrastructure that are under its authority, or

(ii) not fulfilled its obligations regarding proper BMP installation, operation and maintenance for purposes of TMDL compliance within the MS4 physical infrastructure under its authority,

thereby causing or contributing to a responsible jurisdiction and/or agency to be out of compliance with its interim or final Waste Load Allocations.

Under these circumstances, the flood control district's responsibility shall be limited to non-compliance related to the drainage area(s) within the jurisdiction where the flood control district has authority over the relevant portions of the MS4 physical infrastructure.

The WLA may be assigned to additional responsible jurisdictions discharging urban runoff and stormwater in the future under Phase II of the National Stormwater Permitting Program, or other applicable regulatory programs.

On January 16, 2008, Los Angeles Regional Board staff conducted a site inspection in response to the City of Simi Valley's request brought during the CEQA Scoping meeting for the Malibu Creek Watershed Trash TMDL. The City of Simi Valley requested that Regional Board staff evaluate the responsibilities of the City as a responsible jurisdiction. Based on geographical information system (GIS) data, Simi Valley has approximately 118 acres of property within the upper Las Virgenes Creek Subwatershed. According to the 1991 land use data published by the Southern California Association of Governments (SCAG), all of the subject land area is undeveloped open space. Access to the area is limited to two fire roads, and is restricted because the entrance is within gated private properties. During the inspection, there was no trash found along the road and within the range of visibility. Given these findings, the Regional Board staff did not include Simi Valley on the list of Responsible Jurisdictions for the Malibu Creek Watershed Trash TMDL, since the responsibility of Simi Valley is minimal, if any. The area within the City of Simi Valley that is part of the watershed addressed by this TMDL continues to have the same consideration. Therefore, the City of Simi Valley is not included as a responsible jurisdiction in this Santa Monica Bay Debris TMDL. However, if there are any changes in land use in the portion of the City within this TMDL, the Los Angeles

Regional Board reserves the right to reconsider the City's responsibility under this TMDL, and to impose TMDL requirements on Simi Valley to ensure that water quality is protected.

Load Allocations are assigned to jurisdictions that own and/or manage beaches and harbors along Santa Monica Bay, which include California Department of Parks and Recreation, County of Los Angeles Department of Beaches and Harbors, Cities of Hermosa Beach, Los Angeles, Santa Monica, and Redondo Beach.

The National Park Service, California Department of Parks and Recreation, County of Los Angeles, County of Ventura, and State Lands Commission, which have jurisdiction over non-beach open space and/or parks are assigned LAs. The LA may be assigned to additional responsible jurisdictions and/or agencies in the future under appropriate regulatory programs.

Waste Load Allocations for Plastic Pellets

The WLA for plastic pellets is zero discharge from the premises of industrial facilities that import, manufacture, process, transport, store, recycle or otherwise handle plastic pellets. The WLA is consistent with Cal. Water Code § 13367 and 40 CFR 122.26(b)(12).

For point sources of plastic pellets, the strategy for attaining water quality standards focuses on assigning WLAs to industries engaged in the manufacture, transport or handling of plastic pellets. The WLAs will be implemented through permit requirements.

WLAs for plastic pellets are assigned to permittees of the Industrial Storm Water General Permit (Order No. 97-03-DWQ, and NPDES Permit No. CAS 000001) within the Santa Monica Bay WMA. The Standard Industry Classification (SIC) codes associated with industrial activities involving plastic pellets may include, but are not limited to, 282X, 305X, 308X, 39XX, 25XX, 3261, 3357, 373X, and 2893. Additionally, industrial facilities with the term "plastic" in the facility or operator name, regardless of the SIC code, may be subject to the WLA for plastic pellets. Other industrial permittees within the Santa Monica Bay WMA that fall within the above categories, but are regulated through other general permits and/or individual industrial storm water permits are also required to comply with the WLA for plastic pellets.

A. Waste Load Allocations

A.1 Baseline Waste Load Allocation for Trash for MS4 Responsible Jurisdictions

The Baseline Waste Load Allocation for any single permittee is the sum of the products of each land use area multiplied by the Waste Load Allocation for the land use area, as shown below:

$$WLA = \sum \textit{for each city} \left(\textit{area by land uses} \bullet \textit{allocations for this land use} \right)$$

Southern California Association of Governments (SCAG) classified twelve types of land uses for every city and unincorporated area in the watershed. The land use categories are: (1) high density residential, (2) low density residential, (3) commercial and services, (4) industrial, (5) public facilities, (6) educational institutions, (7) military installations, (8) transportation, (9) mixed urban, (10) open space and recreation, (11) agriculture, and (12) water.

Data collected during implementation of the Trash Monitoring and Reporting Plan can be used to establish specific site trash generation rates for various or all land uses. The land use categories relevant to the Santa Monica Bay are:

- High density residential,
- Low density residential,
- Commercial,
- Industrial,
- Military,
- Public Facilities,
- Transportation,
- Agriculture,
- Educational institutions, and
- Open space and recreation.

Transportation land use under Caltrans' jurisdiction will be covered under Caltrans' permit. Caltrans will be required to submit a monitoring plan for that land use, and will be assigned a Waste Load Allocation. Major boulevards that are currently under Caltrans' jurisdiction, but are affected by trash generated on municipal sites will be addressed by the cities concerned.

All different land uses may be assumed to have the same litter generation rate unless data is collected separately for specific land uses.

Responsible jurisdictions may provide acreage of above mentioned land uses within their jurisdiction in order to revise their contributions from their assigned Baseline Waste Load Allocations. The Baseline Waste Load Allocations for responsible jurisdictions are presented in Table 9. For responsible jurisdictions that are only partially located in the watershed, the square mileage indicated is for the portion in the watershed only. The values shown are uncompressed volume in gallons. A more detailed breakdown along land uses is provided in Appendix II.

A.1.1 Baseline WLAs for Trash for MS4 Responsible Jurisdictions North and West of the Malibu Creek Watershed

The Santa Monica Bay Debris TMDL includes some jurisdictions that have been identified as responsible jurisdictions under the existing Malibu Creek Trash TMDL. The Malibu Creek Trash TMDL only addresses limited reaches in the Malibu Creek Watershed. However, the remaining part of the Malibu Creek Watershed is to be incorporated into this TMDL. To be consistent, responsible jurisdictions in the Malibu Creek Watershed and areas at the west end of the Santa Monica Bay Watershed will be assigned the same Waste Load

Allocation that was established in the Malibu Creek Trash TMDL. The Waste Load Allocation is 640 gallons of trash per square mile per year.

As discussed in the Problem Statement chapter of this report, the northern portion of the Santa Monica Bay Watershed is characteristically different from the southern portion of the watershed. The Malibu Creek Subwatershed and the areas north and west of the Malibu Creek Subwatershed are typically not as developed, and have more open space than the areas to the south and east. As the City of Calabasas is located in the Malibu Creek Subwatershed, which is in the northern part of the Santa Monica Bay Watershed and is characteristically similar to other areas north and west of the Malibu Creek Subwatershed, Regional Board staff concludes that it is appropriate for the jurisdictions north and west of the Malibu Creek Subwatershed to have a Baseline Waste Load Allocation based on the trash generation rate derived from the City of Calabasas study.

A.1.2 Baseline WLAs for Trash for MS4 Responsible Jurisdictions South and East of the Malibu Creek Watershed

The area of the Santa Monica Bay Watershed to the south and east of the Malibu Creek Subwatershed is highly developed and urbanized. In 2003 and 2004, the County of Los Angeles documented the trash generation rates in the Ballona Creek Watershed to fulfill the requirements of the Ballona Creek Trash TMDL. The data collected from the Ballona Creek Watershed, which was from multiple land uses, is appropriate as the Baseline Waste Load Allocation. The Waste Load Allocation from this study is 807 gallons per square mile per year.

Municipal stormwater permittees may implement their TMRPs to obtain site specific trash generation rates during the first two years of the implementation period and, if approved by the Regional Board's Executive Officer, ultimately use these data to define the trash Baseline Waste Load Allocations. The TMRP will derive a representative trash generation rate from various land uses of responsible agencies and jurisdictions discharging stormwater to the Santa Monica Bay. This TMRP shall include, but is not limited to, assessment and quantification of trash collected from responsible jurisdiction land areas where urban runoff and stormwater discharges to the MS4, which leads to the beaches and the Santa Monica Bay. The monitoring plan shall provide details of the frequency, location, and reporting of trash monitoring. Responsible jurisdictions shall propose a metric (e.g., weight, volume, pieces of trash) to measure the amount of trash accumulated in the MS4 from the surrounding land areas. The derived trash generation rate may be used to refine the Waste Load Allocation when the TMDL is reconsidered.

A.2 Baseline Waste Load Allocations for Caltrans Stormwater Permit

During the 1998/1999 and 1999/2000 rain seasons, a Litter Management Pilot Study (LMPS) was conducted by Caltrans to evaluate the effectiveness of several litter management practices in reducing litter that is discharged from Caltrans storm water conveyance systems. The LMPS employed four field study sites; at each site, the amount of trash produced using

different BMPs was measured. The average total loads for each site normalized by the total area of control catchments is presented in Table 7, adapted from the LMPS report:

Table 7. Preliminary weight and volume for freeways by Litter Management Pilot Study (LMPS).

Weight lbs/sq mi/year	Volume cu ft/sq mi/year	Volume gal/sq mi/year
7,479.36	892.64	6,677.39

Subsequently, Caltrans launched a Gross Solid Removal Devices (GSRDs) Pilot Program to study trash removal efficiencies of various systems installed along freeways in 2000. Three preliminary designs for different GSRDs which are the Linear Radial, the Inclined Screen, and the Baffle Box were developed. These GSRDs fulfill the criteria of being certified as Full Capture Systems, to be drained within 72 hours, requiring cleanup once a year, and needing no maintenance throughout the storm season.

The Linear Radial utilizes a casing with louvers to serve as screens or mesh screen. Flows are routed through the louvers and into a vault. The Inclined Screen uses wedge-wire screen with the slotting perpendicular or parallel to the direction of flow. This device is configured with an influent trough to allow solids to settle. The Baffle Box applies a two-chamber concept: the first chamber utilizes an underflow weir to trap floatable solids, and the second chamber uses a bar rack to capture material. All of these designs were certified as Full Capture Systems by the Executive Officer of the Regional Board on October 7, 2004.

Table 8 below summarizes the annual trash loads normalized with the drainage areas at multiple sites for years 2000-2001 and 2001-2002.

Table 8. Average weight and volume for trash for freeways by Caltrans Phase I Gross Solids Removal Devices Pilot Study at Year 2000 through 2002.

Year	Weight lbs/sq mi/year*	Volume cu ft/sq mi/year	Volume gal/sq mi/year
2000-2001	157,240	4,184	31,298.41
2001-2002	146,280	4,760	35,607.18
Average	151,760	4,472	33,452.8

*The trash weight was measured after drip drying.

According to the GSRD phase I study, the baseline WLA for Caltrans is 4,472 $ft^3/mi^2/yr$, or 33,452.8 $gallons/mi^2/yr$. The GSRD study has more recent data, and is applicable to the Santa Monica Bay Watershed based on the land use, population density, and average daily traffic conditions.

A.3 Baseline Waste Load Allocation Assignments for Trash

Table 9 shows the Baseline WLAs for all point source dischargers, in gallons per year, assuming a trash generation rate of 640 $gallons/mi^2/yr$ in the Malibu Creek Subwatershed and areas north and west of the Malibu Creek Subwatershed, or 806.9 $gallons/mi^2/yr$ in areas south and east of the Malibu Creek Watershed. If the MS4 Permittees use their respective TMRPs to derive site specific trash generation rates, the Baseline WLAs will be calculated by multiplying the point source areas by the derived trash generation rates. The Baseline WLA for Caltrans

was based on a trash generation rate of 33,452.8 gallons/mi^2/yr, as determined by the GSRD study.

Table 9. Baseline Waste Load Allocations for trash, assuming corresponding trash generation rates.

Responsible Parties	Point Source Area (Mile^2)	Baseline WLA (gals/year)
County of Los Angeles	6.37	5,137.8
County of Ventura	1.11	710.1
Caltrans	1.08	36,129.0
Cities of:		
Agoura Hills	1.63	1,044.0
Calabasas	2.59	1656.4
Thousand Oaks	7.25	4,640.4
Westlake Village	4.89	3,130.9
Malibu	9.08	5,809.4
Culver City	0.06	51.9
Los Angeles	31.12	25,112.2
Santa Monica	7.03	5,671.5
El Segundo	3.39	2,732.2
Manhattan Beach	3.10	2,501.4
Hermosa Beach	1.38	1,117.3
Redondo Beach	3.96	3,196.9
Torrance	3.08	2,483.6
Palos Verdes Estates	4.15	3,345.8
Rancho Palos Verdes	8.99	7,254.3
Rolling Hills Estates	0.45	364.7
Rolling Hills	0.64	515.1

B. Load Allocations

Load Allocations (LAs) for nonpoint sources follow phased reduction from Baseline Load Allocations. According to the State's Nonpoint Source Policy, Load Allocations may be addressed by the Statewide General Permits, conditional waivers of WDRs, or individual WDRs among other implementation mechanisms.

Responsible jurisdictions shall monitor the trash quantity deposited in the vicinities of the Santa Monica Bay and its beaches to comply with Baseline Load Allocation. Data collected through the Trash Monitoring and Reporting Plan may define the quantity of trash migrating from land to the Bay.

B.1 Load Allocation for Nonpoint Source Areas Excluding Beaches

The areas adjacent to the Santa Monica Bay, or defined as nonpoint sources, are composed of multiple land uses. There are parking lots, recreational areas, picnic areas, and hiking areas in the open space/park areas under the jurisdictions of Los Angeles County, Ventura County, National Park Service, California Department of Parks and Recreation, and California State Lands Commission. By applying the similar concept that is applied for the Waste Load Allocation calculation, the Load Allocation for any designated nonpoint source area

is the sum of the products of each land use subarea multiplied by the Load Allocation for the land use subarea, as shown below:

$$LA = \sum \textit{for each Nonpoint source}\left(\textit{subarea by land uses} \bullet \textit{allocations for this land use}\right)$$

It may be appropriate to assume the same trash generation rate or allocation for different types of land uses.

By applying the study by the City of Calabasas, the trash generation rate from nonpoint sources areas for open space and parks areas is 640 gallons per square mile per year. Table 10 represents the baseline load allocations for nonpoint source areas of parks and open space in the Santa Monica Bay Watershed. Responsible Jurisdictions may propose and implement the Regional Board Executive Officer approved TMRPs to obtain site-specific trash generation rates for the first two years of the implementation period. The data collected including, but not limited to, the details of the frequency, location, and reporting of trash monitoring, as well as a metric (e.g., weight, volume, pieces of trash) to measure the amount of trash in the nonpoint source areas of the Santa Monica Bay may be used to refine the trash Baseline Load Allocations when the TMDL is reconsidered. Data collected shall include the trash accumulated on the open space and park areas, which could possibly be carried directly to Santa Monica Bay by sheetflow, wind or wave action, or human activities.

Table 10. Baseline Load Allocations for nonpoint source areas of parks and open space (excluding beaches), assuming a trash generation rate of 640 (gallons of uncompressed litter).

Responsible Parties	Nonpoint Source Area ($Mile^2$)	Baseline Load Allocation (gals/year)
County of Los Angeles	47.32	30,287.0
Ventura County	8.53	5,459.1
National Park Service	11.72	7,498.1
California Department of Parks and Recreation	19.05	12,190.9
State Lands Commission	1.37	879.8

B.2 Load Allocations for Beaches

The load allocation for beaches is zero trash. Current practices employed by the Los Angeles County Department of Beaches and Harbors (LACDBH) and the City of Santa Monica include daily cleanup on the beaches in their respective jurisdictions. Based on the quantity of trash collected by LACDBH, the daily cleanup has reduced approximately 8.4 million pounds of trash per year from the beaches managed by LACDBH. Additional cleanup schedules or BMPs may be necessary to achieve the load allocation. As such, responsible jurisdictions for beaches will instead be assigned a benchmark.

B.2.1 Benchmark for Beaches

The 55-miles of beaches along Santa Monica Bay, with parking lots, bike paths, and recreational parks, are major nonpoint source areas for trash. According to Los Angeles County Department of Beaches and Harbors staff, current practices include collecting trash and cleaning

beaches in their jurisdiction daily in the morning. These practices involve both heavy equipment and manual labor. In the past 20 years, Los Angeles County Department of Beaches and Harbors has collected more than 84,000 tons of debris with the most trash littered after July 4th weekend in 1992 (101 tons). Environmental groups host annual Coastal Cleanup Day activities, in which volunteers help to collect trash and debris along stretches of selected beaches in the Santa Monica Bay. Although LACDBH cleans the beach daily in the morning, visitors continue to litter on the beach throughout the day. As the Coastal Cleanup Day activities were usually conducted after LACDBH's daily cleanup for the rest of the day, the data may represent the trash that is deposited on the beach within a day. In determining the benchmark for beaches in the Santa Monica Bay, Regional Board staff considered the current practices of the Los Angeles County Department of Beaches and Harbors, and efforts put forth by volunteers and environmental organizations. As such, the Regional Board has used four years of Coastal Cleanup data from 2006-2009 to analyze the trash load to the beach by normalizing the pounds of trash collected per miles of beach that were cleaned per day, and extrapolating it to the pounds of trash per miles of beach per year (Table 11). The benchmark for beaches based on the Coastal Cleanup data is 113,150 lbs/mi/yr, or 24,941.91 gal/mi/yr.

Table 11. Average volume of trash collected from Coastal Cleanup Day from year 2006-2009.

Year	Trash Collected (pounds)	Length of Beach Cleaned (miles)	Pounds Collected/mile of Beach/day	Pounds Collected/ mile/year	Gallons Collected/ mile/year
2006	7,428	27	275.11		
2007	16,727	40.75	410.48		
2008	7,102	32.35	219.53		
2009	8,463	25	335.03		
Average			310.04	113,150	24,941.91

Table 12 summarizes the beaches and the tentative benchmarks for responsible jurisdictions, assuming a trash generation rate of 24,941.91 gal/mi/yr for beaches. The length of the beaches is determined based on Geographic Information Systems (GIS) data, and the Load Allocation is calculated by multiplying the length of the beach with 24,941.91 gal/mi/yr, or 113,150 lbs/mi/yr. In some cases, certain beaches are owned by one entity, and managed by another. Agencies and jurisdictions that own and/or manage the beach are jointly responsible to achieve LAs.

Table 12. Benchmarks for beaches, assuming a trash generation rate of 24,941.91 gal/mi/yr.

Responsible Parties	Nonpoint Source Area (Mile^2)	Baseline Load Allocation (gals/year)
Los Angeles County Department of Beaches and Harbors (joint responsibility is denoted below per individual beach, where applicable)		
Latigo Shores	0.04	997.7
Dan Blocker	1.05	26,147.3
Malibu	0.87	21,731.0
Las Tunas	1.40	34,935.0
Topanga	0.96	24,013.0
Will Rogers State Beach (Jointly responsible with California Department of Parks and Recreation)	2.62	65,227.8
Venice (Jointly responsible with the City of Los Angeles)	2.74	68,294.2
Marina Beach	0.28	6,978.6
Dockweiler State Beach (Jointly responsible with California Department of Parks and Recreation)	4.46	111,249.1
Manhattan Beach	2.04	50,922.8
Hermosa Beach (Jointly responsible with the City of Hermosa Beach)	1.90	47,321.2
Redondo Beach	1.57	39,066.4
Torrance	0.74	18,526.8
Royal Palms Beach	1.09	27,186.7
White Point Beach	0.60	14,965.1
Point Fermin Park Beach	0.25	6,235.5
City of Santa Monica (joint responsibility is denoted below)		
Santa Monica Beach (Jointly responsible with California Department of Parks and Recreation)	3.05	76,019.3

VI. Margin of Safety

A margin of safety (MOS) accounts for uncertainties in the TMDL analysis. The MOS can be expressed as an explicit mass load that is not allocated to responsible parties, or included implicitly in the WLAs and LAs that are allocated. Because this TMDL sets WLAs and LAs as zero trash and plastic pellets, staff finds the TMDL includes an implicit MOS and that an explicit MOS is not necessary for this TMDL.

VII. Critical Conditions

Critical conditions for the Santa Monica Bay Watershed are based on three conditions that correlate with loading conditions:

- Major Storm (as proposed by responsible jurisdictions and responsible parties in the Trash Monitoring and Reporting Plan and approved by the Executive Officer);
- Wind advisories issued by the National Weather Service or by the California Highway Patrol;
- High visitation – On weekends and holidays year-round, and on days with special events scheduled at the beach.

Critical conditions must be considered when developing plans for monitoring, assessment and collection for trash and plastic pellet discharges.

VIII. TMDL Implementation and Compliance

This section describes TMDL implementation programs for compliance with the TMDL. Compliance with the TMDL is based on the Numeric Target and the Waste Load and Load Allocations which are defined as zero trash in and on the shorelines of the Santa Monica Bay, and no plastic pellets discharged from plastic manufacturers and facilities.

TMDL compliance is assessed in accordance with Dischargers' implementation of programs for point and nonpoint source trash and plastic pellet abatement, and attainment of the progressive trash reductions in accordance with the schedules below (Tables 13 and 14).

A. Implementation and Compliance for Trash

Compliance with the Santa Monica Bay Debris TMDL is based on installation of structural best management practices such as full capture or partial capture systems, institutional controls, or any best management practices, to attain a progressive reduction in the amount of trash in the Santa Monica Bay.

For responsible jurisdictions and agencies that are also listed in the Malibu Creek or Ballona Creek Trash TMDLs, compliance with the existing Trash TMDLs will constitute compliance with the trash related requirements of the Santa Monica Bay Debris TMDL.

Nonpoint source trash dischargers may propose a program for a minimum frequency of assessment and collection in conjunction with best management practices (MFAC/BMP program). The MFAC/BMP program is required to attain a progressive reduction in the amount of trash collected from the water surface and shorelines through routine trash removal and

implementation of BMPs. Dischargers may implement structural and/or nonstructural BMPs as required to attain a progressive reduction in the amount of trash and in the Santa Monica Bay. The TMDL Implementation Plan provides separate schedules for responsible jurisdictions to achieve zero trash for point sources by implementing full capture systems or other structural and/or nonstructural BMPs, and for nonpoint sources by using MFAC/BMP programs. Key provisions of the Implementation Plan include:

- Trash monitoring to provide data to revise Baseline Waste Load and Load Allocations, assess the effectiveness of BMPs and trash abatement programs, and assess the levels of trash on the Santa Monica Bay shorelines and its source area;
- TMDL Reconsideration by the Regional Board to revise Baseline Waste Load and Load Allocations and the minimum frequency of the MFAC program, if warranted.

The TMDL includes monitoring based on a Trash Monitoring and Reporting Plan (TMRP) developed by responsible jurisdictions and approved by the Executive Officer of the Regional Board. The minimum requirement for trash monitoring includes the assessment and quantification of trash collected from source areas of the Santa Monica Bay. The monitoring plan shall provide details on the frequency, location, and reporting of trash monitoring. Responsible jurisdictions shall propose a metric (e.g., weight, volume, pieces of trash) to measure the amount of trash in storm drains, and on the surrounding land areas. Responsible jurisdictions may include other metrics to provide data for revision of the Baseline Waste Load and Load Allocations, determine effectiveness of BMPs, and assess compliance with the TMDL. Responsible Jurisdictions may coordinate their trash monitoring activities for the Santa Monica Bay Watershed. Monitoring requirements are described in greater detail in Section IX and X.

If responsible jurisdictions do not use their TMRP to derive a new trash generation rate and accept Baseline Waste Load and Load Allocations, the WLAs and LAs may be based on appropriate data, either from the City of Calabasas, or the County of Los Angeles, normalized to the subwatershed area. The City of Calabasas study quantified trash recovered from a continuous deflector system. The County of Los Angeles study quantified trash collected from catch basin inserts and Continuous Deflective Separator (CDS) units in the Ballona Creek Watershed. The data that is referenced is based on historical trash generation rates at an existing monitoring location most similar to the Santa Monica Bay Watershed, where an amount of trash discharged to the Santa Monica Bay is permitted initially under the TMDL schedule.

Site-specific conditions for the Santa Monica Bay Watershed may differ from conditions of the Calabasas Study or the Ballona Creek Watershed study. As a result, responsible jurisdictions may use the data from their TMRP in order to derive a site-specific trash generation rate and Baseline Waste Load and Load Allocations. The Baseline Waste Load and Load Allocations are used as the basis for the progressive reduction of trash in the storm drains and tributaries for both point and nonpoint sources and represent the maximum amount of trash that can be discharged in conjunction with partial capture systems, institutional controls, or any other BMPs for point sources and the programs for minimum frequency of assessment and collection for nonpoint sources.

<u>Implementation of Load and Waste Load Allocations for Trash</u>

TMDL implementation may require BMPs to meet the progressive trash schedule. BMPs may be implemented through stormwater permits or through a variety of mechanisms such as a general WDR, a conditional waiver from waste discharge requirements, an individual WDR, prohibitions, among others for nonpoint source dischargers. Point source dischargers will implement BMPs in accordance with Waste Load Allocations incorporated into MS4 permits. Point sources may implement full capture systems, partial capture systems or any other structural or non-structural BMPs (e.g. institutional controls) to achieve Waste Load Allocations.

A.1 Point Sources Trash

Discharge of trash from stormdrains and conveyances to the Santa Monica Bay will be regulated through the MS4 NPDES Permits for Los Angeles County and for Ventura County, and the Caltrans Statewide Stormwater Permit.

There are alternatives for responsible jurisdictions to achieve compliance with waste load allocations. As established in the Los Angeles River Trash TMDL, point source dischargers can implement full capture systems to comply with the TMDL. Point source dischargers may also implement other structural and/or non-structural BMPs, sometimes referred to as partial capture systems and institutional controls.

A.1.1 Full Capture Treatment Systems

The amount of trash discharged to the Santa Monica Bay by an area serviced by a full-capture system will be considered to be in compliance with the final Waste Load Allocation for the drainage area, provided that the Full Capture Systems are adequately sized, maintained and maintenance records are available for inspection by the Regional Board.

A full capture system is any single device or series of devices that traps all particles retained by a 5 mm mesh screen and has a design treatment capacity of not less than the peak flow rate Q resulting from a one-year, one-hour storm in the subdrainage area. The Rational equation is used to compute the peak flow rate: $Q = C \times I \times A$, where Q = design flow rate (cubic feet per second, cfs); C = runoff coefficient (dimensionless); I = design rainfall intensity (inches per hour). Compliance with the TMDL schedule for full capture systems will be based on the percentage of the Santa Monica Bay watershed area that is outfitted with full capture systems. Alternatively, compliance will be based on the percentage of total catch basins outfitted with full capture systems. The TMDL Implementation Plan provides a total of eight years to install full capture systems. Compliance with the final Waste Load Allocation will be assumed wherever Full Capture Systems are installed in the storm drains discharging to Santa Monica Bay. The installation of a Full Capture System by a discharger does not establish any presumption that the system is adequately sized or maintained, and the Regional Board will review sizing and other data in the future to validate that a system satisfies the criteria established in this TMDL for a Full Capture System.

A.1.2 Structural and/or Non-structural Best Management Practices (BMPs)

Compliance with the final waste load allocations may also be attained by implementing other structural and/or non-structural BMPs. Responsible jurisdictions shall propose structural and/or non-structural BMPs which will be identified in the Regional Board Executive Officer approved TMRP. These BMPs should be applied to prevent trash from entering the Santa Monica Bay (Figure 7). For example, street sweeping or partial capture systems installed in the catch basins or stormdrains or their combination, can be used to prevent trash from being discharged into the Santa Monica Bay at levels that exceed the Baseline Waste Load Allocation. Progressive reductions in trash will be achieved over eight years.

Measuring the effectiveness of partial-capture systems and institutional controls is more complicated. The discharge resulting from an area addressed by partial capture and/or institutional controls will be estimated using a mass balance approach, based on the daily generation rate (DGR) for the specific area. [Note: The DGR should not be confused with the trash generation rates obtained during baseline monitoring. The baseline monitoring program is designed to obtain "typical" trash generation rates for a given land use. Those values are then used to calculate a Permittee's baseline load allocation. The DGR is the average amount of trash deposited within a specified drainage area over a 24-hour period. The DGR will be used in a mass balance equation to estimate the amount of trash discharged during a rain event.]

Annual re-calculation of the DGR will serve as a measure of the effectiveness of source reduction measures including public education, enforcement of litter laws, etc. Source reduction measures will be accredited based on an annual recalculation of the DGR to allow for progressive improvement and/or to account for backsliding.

The DGR will be determined from direct measurement of trash deposited in the drainage area during any 30-day period from June 22nd to September 22nd of a given year[2], and recalculated every year thereafter. This three-month period was assumed to be a time characterized by high outdoor activity when trash is most likely to be deposited on the ground. The recommended method for measuring trash during this time period is to close the catch basins in a manner that prevents trash from being swept into the catch basins and then to collect trash on the ground via street sweeping, manual pickup, or other comparable means. The DGR will be calculated as the total amount of trash collected divided by 30 (the required duration of trash collection).

Accounting of DGR and trash removal via street sweeping, catch basin clean outs, etc. will be tracked in a central spreadsheet or database to facilitate the calculation of discharge for each rain event. The spreadsheet and/or database will be available to the Regional Board for inspection during normal working hours. The database/spreadsheet system will allow for the computation of calculated discharges and can be coordinated with enforcement. This database will be developed by cities or groups of cities.

The Executive Officer may approve alternative compliance monitoring programs other than those described above, upon finding that the program will provide a scientifically-based estimate of the amount of trash discharged from the storm drain system.

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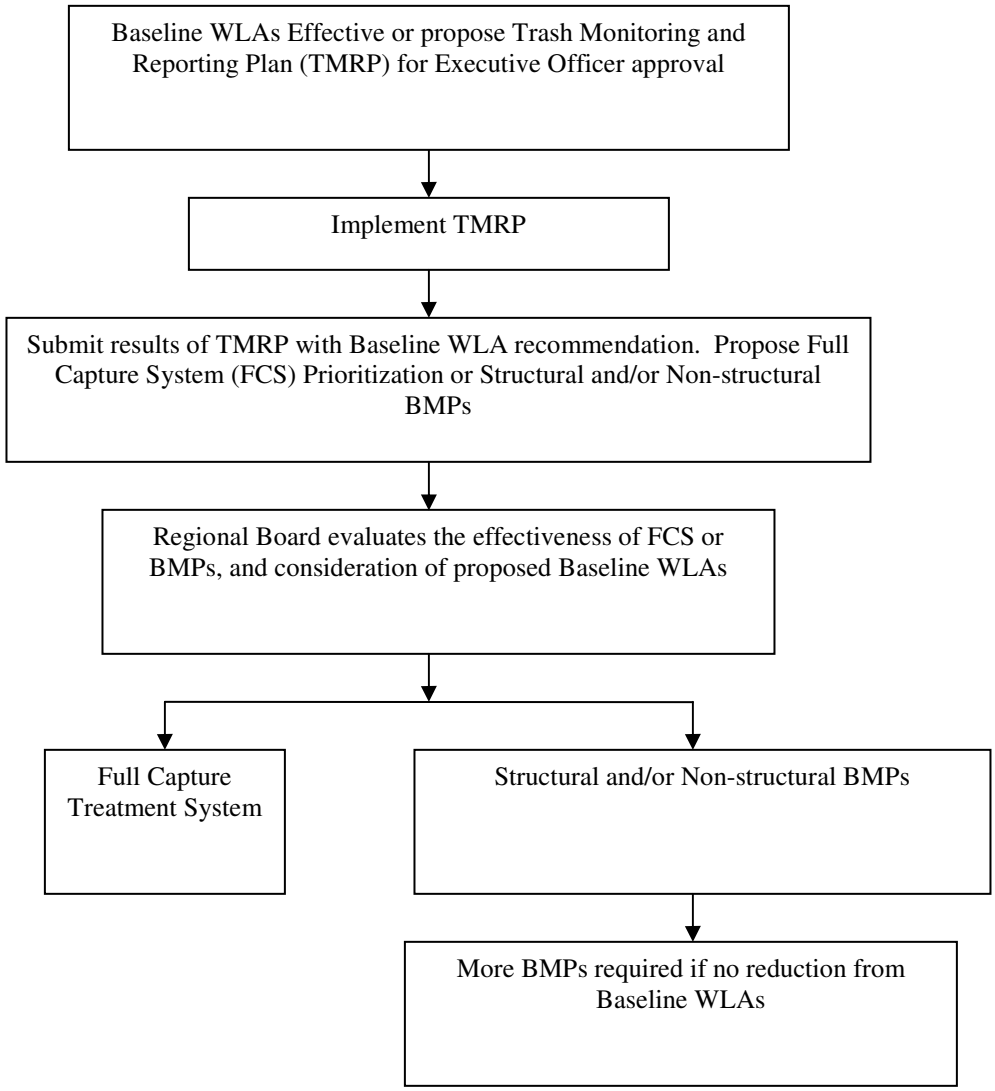
[2] Provided no special events are schedule that may affect the representative nature of this period.

Baseline Waste Load Allocations will apply at the effective date of the Santa Monica Bay Debris TMDL. Alternatively, responsible jurisdictions may propose a TMRP for Regional Board Executive Officer approval, which will collect site specific trash generation data to establish Baseline Waste Load Allocations. The first compliance point will be at the end of the fourth year with Waste Load Allocations equal to a 20% reduction of the amount of trash from the Baseline Waste Load Allocation. Compliance thereafter will be evaluated at the end of each successive storm season with Waste Load allocations equal to successive 20% reductions of the Baseline Waste Load Allocation (Table 14).

Responsible jurisdictions will be deemed in compliance with the final Waste Load Allocation upon results of the trash monitoring and reporting plan demonstrating that no trash greater than 5 mm in size is discharged to the Santa Monica Bay through point sources. If the amount of trash from point sources does not progressively decrease, then responsible jurisdictions must implement additional structural and/or non-structural BMPs to ensure reductions.

The Regional Board may revise the TMDL schedule and the Executive Officer approved TMRP based on the results of the trash monitoring and reporting program.

Figure 7. Flowchart for Point Source Implementation for Trash.



A.2 Nonpoint Source Trash

Two primary federal statutes establish framework in California for addressing nonpoint source (NPS) water pollution: Section 319 of the Clean Water Act (CWA) of 1987 and Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA). In accordance with these statutes, the state assesses water quality associated with nonpoint source pollution (NPS) and develops programs to address NPS. In 2004, The State Water Resource Control Board (SWRCB), in its continuing efforts to control NPS pollution in California, adopted the Plan for California's Nonpoint Source Pollution Control Program (NPS Program Plan). The NPS Program Plan prescribes implementation and monitoring of Best Management Practices to address nonpoint source pollution.

LAs shall be implemented consistent with the Statewide Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program through a general waiver of

waste discharge requirements (WDR), individual waivers, a general WDR, an individual WDR, a memorandum of understanding (MOU), a cleanup and abatement order, or any other appropriate order or orders, provided the program is consistent with the assumptions and requirements of the reductions described in Table 7-34.3, below.

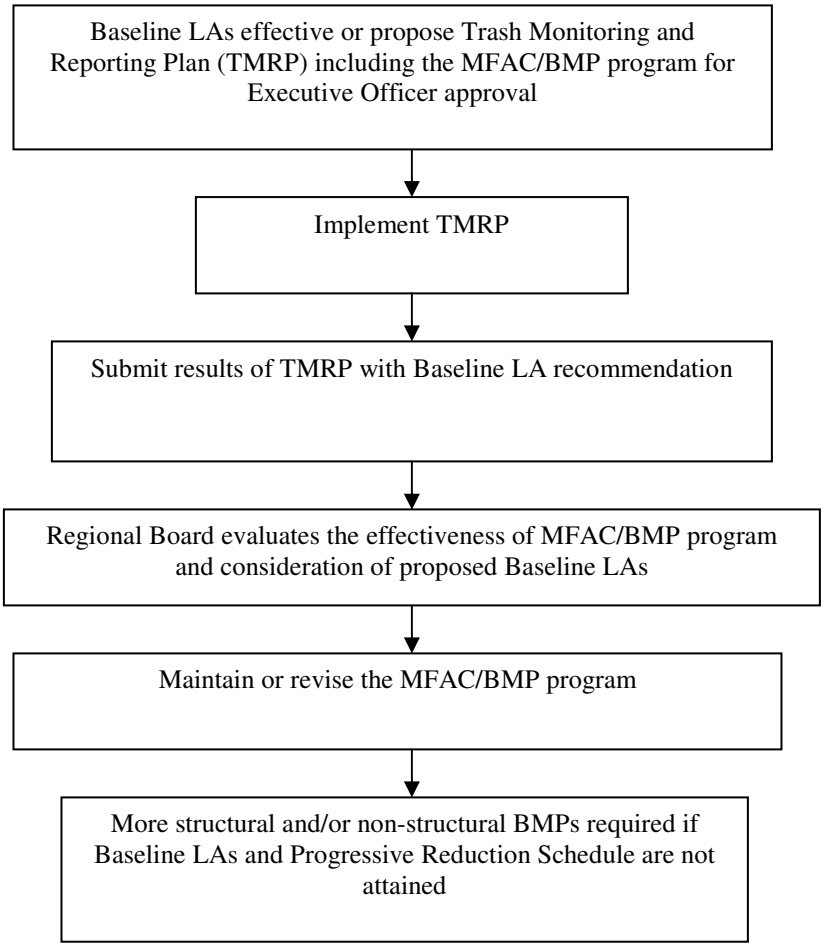
Nonpoint source dischargers may achieve the LAs by implementing an MFAC/BMP program approved by the Executive Officer. Responsible jurisdictions will be deemed in compliance with the LAs if an MFAC/BMP program, approved by the Executive Officer, demonstrates that there is no accumulation of trash, as defined in "Numeric Targets". The MFAC/BMP Program must include an initial minimum frequency of trash assessment and collection and suite of structural and/or nonstructural BMPs. The MFAC/BMP program shall include collection and disposal of all trash found in the source areas and along the shoreline. Responsible jurisdictions shall implement an initial suite of BMPs based on current trash management practices in land areas that are found to be sources of trash to waterbodies within the Santa Monica Bay WMA and to Santa Monica Bay.

The report submitted as a result of implementing the Trash Monitoring and Reporting Plan by responsible jurisdictions (also see Table 16) will provide data that may be used to propose an appropriate Baseline Load Allocation. Nonpoint source dischargers will be considered in compliance of attaining zero trash if trash does not accumulate in a deleterious amount on the surface and the shorelines to adversely affect the beneficial uses and cause nuisance to the Santa Monica Bay.

Responsible jurisdictions shall propose their initial minimum frequencies for clean up events in their respective Trash Monitoring and Reporting Plans, which must be approved by the Executive Officer of the Regional Board. In subsection A.2, below, cleanup frequencies are prescribed for open space and parks areas. In addition, as a general guideline for cleanup frequencies of beach and harbor areas, the Regional Board recommends the initial minimum frequencies for each responsible jurisdiction.

LAs will be implemented through a regulatory structure that provides for continued monitoring and iterative implementation of BMPs to attain zero trash within the TMDL Implementation Schedule (Figure 8). Based on the trash generation rate derived from the TMRP during the first two years of implementation, the Regional Board will consider the proposal of a site specific Load Allocation for individual waterbodies in the Santa Monica Bay Watershed (Table 14).

Figure 8. Implementation Schematic for Nonpoint Sources.



A.2.1 Responsible Jurisdictions for Non-Beach Open Space/Parks in the Santa Monica Bay Watershed

For each responsible jurisdiction, the initial minimum frequency shall be set as follows:

County of Los Angeles, County of Ventura, National Park Service, California Department of Parks and Recreation, and State Lands Commission are required to identify locations where the most trash is littered and accumulated within their jurisdictional areas in the proposed TMRP. These identified locations shall be cleaned with a frequency of no less than once per month throughout the year. The identified locations shall also be cleaned within 72 hours after critical conditions when safety hazards are removed, and immediately after special events held on the grounds of any responsible jurisdiction.

A.2.2 Beaches Along Santa Monica Bay

California Department of Parks and Recreation, Los Angeles County Department of Beaches and Harbors and the Cities of Hermosa Beach, Los Angeles, Santa Monica, and

Redondo Beach may achieve compliance with the Load Allocations by implementing an MFAC/BMP program approved by the Executive Officer. The MFAC/BMP Program includes an initial minimum frequency of trash assessment and collection and suite of structural and/or non-structural BMPs. The MFAC/BMP program shall include collection and disposal of all trash found on the shoreline and beach parking lots, or in areas close enough in proximity to the Santa Monica Bay such that wind or stormwater runoff may carry the trash into the bay.

For the beaches along the Santa Monica Bay, the Regional Board recommends that the Los Angeles County Department of Beaches and Harbors, and City of Santa Monica, together with the respective owners of specific beaches, including California Department of Parks and Recreation, and the Cities of Hermosa Beach, and Los Angeles:

1. Remove trash on the shorelines, beach and areas adjacent to Santa Monica Bay on a daily basis throughout the entire year.
2. Clean the shorelines, beach and areas adjacent to Santa Monica Bay immediately after critical conditions and after special events held at the beach, when no safety hazards are present.

Compliance Assessments

Assessment will be conducted at accessible areas as defined in the approved Trash Monitoring and Reporting Plan. Collection is defined as picking up 100% of trash and depositing it in a trash receptacle for proper disposal. All trash collected during the implementation of the MFAC, including trash from any beach raking and sanitizing operations, will be disposed of properly according to existing policies and regulations.

Compliance will be measured by quantifying trash left on the beaches between the high water line and the water immediately following the collection event. Zero trash must be demonstrated following collection events in order to be in compliance with the Santa Monica Bay Debris TMDL. Regional Board staff suggests that monitoring, based on the Rapid Trash Assessment protocol developed by the Storm Water Ambient Monitoring Program (SWAMP), be done once per beach per year during the hot season at a minimum of three locations per beach. Prioritization of the monitoring locations should be made by the responsible jurisdiction based on possible “hot spots” where trash may have a tendency to collect.

Afternoon Evaluations

In addition to compliance monitoring immediately following the collection event, the Regional Board recommends that the responsible jurisdictions for beaches also monitor twelve beaches per year (at least three locations per beach) at a given time in the afternoon to determine whether trash is showing a decreasing trend on the beaches. The same afternoon evaluation also applies to the beach under the management of the City of Santa Monica. Similar to the compliance monitoring following cleanup events, the locations chosen by the responsible jurisdiction will be prioritized based on possible “hot spots” where trash tends to collect on the beach. These monitoring events will include the shoreline and parking lots, or areas close enough in proximity to the Santa Monica Bay. If the afternoon monitoring does not show a decreasing trend of trash left on the beach, the responsible jurisdiction must implement further BMPs in order to remain in compliance with the Santa Monica Bay Debris TMDL.

The trash quantity collected from representative beaches in the afternoon is to compare with the benchmark established by data from Coastal Cleanup Days. The temporal data shall exhibit a decreasing trend which indicates the effectiveness of implementing structural or non-structural BMPs. If a decreasing trend is not observed, the responsible jurisdiction shall implement additional BMPs.

A.2.3 Harbors in the Santa Monica Bay

The State Water Resources Control Board is currently developing a statewide Marina Permit, which intends to regulate marinas and mooring fields in coastal regions of California that contain slips or mooring locations for 10 or more boats. The tentative requirements may be applied to discharges from general marina operations that result in the deposition of debris on the ground and light enough to be swept away by flowing storm water and/or air currents into marina waters. The Santa Monica Bay Debris TMDL will be consistent with the final requirements of the Statewide Marina Permit. Responsible jurisdictions shall fulfill the requirements set forth in this Santa Monica Bay Debris TMDL and continue to comply with both the TMDL and permit requirements once the permit becomes effective.

Los Angeles County Department of Beaches and Harbors and the City of Redondo Beach are responsible jurisdictions for harbors in the Santa Monica Bay. The responsible jurisdictions can achieve compliance with the Santa Monica Bay Debris TMDL by implementing an MFAC/BMP program that shall include collection and disposal of all trash found on harbor property (land) in areas close enough in proximity to the Santa Monica Bay such that wind or stormwater sheet flow may carry the trash into the bay, and in the water where it is accessible and safe to collect trash.

For harbors in the Santa Monica Bay, the Regional Board recommends that the Los Angeles County Department of Beaches and Harbors and the City of Redondo Beach:

1. Remove trash from the land areas of the harbors that are adjacent to the Santa Monica Bay on a daily basis throughout the year.
2. Remove trash on the accessible water areas of the harbors on a weekly basis throughout the year.
3. Clean the land areas of the harbors that are adjacent to the Santa Monica Bay, and clean accessible water areas of the harbors immediately after critical conditions and after special events held at the harbors, when no safety hazards are present.

The TMRP will define accessible areas where the assessment will take place, both on the water, and on the land areas of the harbors. Collection is defined as picking up and properly disposing of 100% of the trash.

Los Angeles County Department of Beaches and Harbors and the City of Redondo Beach shall also conduct compliance assessment and afternoon evaluations for harbors as described in A.2.2.

At the end of the implementation period, a revised MFAC/BMP program may be required if the Executive Officer determines that the amount of trash accumulating between collections is causing nuisance or otherwise adversely affecting beneficial uses. Specifically, the Executive Officer may approve or require a revised assessment and collection frequency and definition of the critical conditions:

(a) To prevent trash from accumulating in deleterious amounts that cause nuisance or adversely affect beneficial uses between collections;
(b) To reflect the results of trash assessment and collection;
(c) If the amount of trash collected does not show a decreasing trend, where necessary, such that a shorter interval between collections is warranted; or
(d) If the amount of trash collected is decreasing such that a longer interval between collections is warranted.

With regard to (a), (b) or (c), above, the Executive Officer is authorized to allow responsible jurisdictions to implement additional structural and/or non-structural BMPs in lieu of modifying the monitoring frequency.

Alternatively, responsible jurisdictions may propose, or the Regional Board may impose, an alternative program, provided the program is consistent with the assumptions and requirements of the reductions described in Table 16, below.

B. Implementation and Compliance for Plastic Pellets

As the Debris TMDL is inclusive of plastic pellets, industries that manufacture, store, transport, or otherwise handle plastic pellets as raw material must comply with a WLA of zero plastic pellets. The zero WLA for the plastic pellets requires that no plastic pellets are allowed to be released, found, or accumulated outside of the premises of the industries or in any stormwater capture device that may be connected with the MS4. Consistent with California Water Code § 13367 and 40 CFR 122.26(b)(12). WLAs for plastic pellets are assigned to permittees of the Industrial Storm Water General Permit (Order No. 97-03-DWQ, and NPDES Permit No. CAS 000001) within the Santa Monica Bay WMA. The Standard Industry Classification (SIC) codes associated with industrial activities involving plastic pellets may include, but are not limited to, 282X, 305X, 308X, 39XX, 25XX, 3261, 3357, 373X, and 2893. Additionally, industrial facilities with the term “plastic” in the facility or operator name, regardless of the SIC code, may be subject to the WLA for plastic pellets. Other industrial permittees within the Santa Monica Bay WMA that fall within the above categories, but are regulated through other general permits and/or individual industrial storm water permits are also required to comply with the WLA for plastic pellets.

Industries must comply with the Statewide Industrial Permit or other general or individual industrial permits, which require a Stormwater Pollution Prevention Plan (SWPPP) to be prepared and kept onsite at all times. The SWPPP should address the areas where pellets tend to spill, as well as an overall plan to keep plastic pellets from being released off of the premises. The SWPPP shall incorporate structural and nonstructural BMPs that are implemented to keep pellets on site, including specific practices that are used to clean up incidental or large spills.

Jurisdictions and agencies identified as responsible jurisdictions for point sources of trash in this Santa Monica Bay Debris TMDL and in the existing Malibu Creek and Ballona Creek Trash TMDLs shall either prepare a Plastic Pellet Monitoring and Reporting Plan (PMRP), or demonstrate that a PMRP is not required under certain circumstances. The PMRP will serve to monitor the amount of plastic pellets being discharged from the MS4, establish triggers for a possible need to increase industrial facility inspections and enforcement of SWPPP requirements for industrial facilities identified as responsible for the plastic pellet WLA, and address possible plastic pellet spills. In the event of a plastic pellet spill, the Regional Board shall be notified by the agency or jurisdiction within 24 hours of the responsible agency or jurisdiction becoming aware of the spill. The PMRP shall include protocols for a timely and appropriate response to possible plastic pellets spills within their jurisdictional area, and a comprehensive plan to ensure that plastic pellets are contained.

Responsible jurisdictions that have industrial facilities or activities related to the manufacturing, handling, or transportation of plastic pellets within their jurisdiction must prepare a PMRP.

Responsible jurisdictions that have no industrial facilities or activities related to the manufacturing, handling, or transportation of plastic pellets may not be required to conduct monitoring at MS4 outfalls, but must have a response plan in place to address plastic pellet spills. If satisfactory documentation is provided that shows there are no industrial facilities or activities related to plastic pellets within the jurisdiction, the responsible jurisdiction may be excused of the requirement to monitor MS4 outfalls.

Responsible jurisdictions that only have residential areas within their respective jurisdictions, and have limited commercial or industrial transportation corridors (including railways and roadways), may be exempted from the requirements of preparing a PMRP. In order for a responsible jurisdiction to be exempted from this requirement, sufficient documentation including municipal zoning plans must be submitted to the Regional Board and approved by the Executive Officer.

If a jurisdiction changes its zoning and land use plans, or issues operating licenses to industries that import, manufacture, process, transport, store, recycle, or otherwise handle plastic pellets within its jurisdiction, then it must submit a PMRP within 90 days of the above actions.

The foreseeable methods of compliance with the plastic pellet Waste Load Allocation assigned to industrial permittees, include the implementation of best management practices such as appropriate containment systems, sealed containers, vacuum devices for cleaning, and frequent inspection and cleaning at operational areas and outlets of water discharge, to effectively control and prevent discharges of pre-production plastics pellets. In addition, necessary best management practices shall be exercised to eliminate spillage of plastic pellets during transportation that could be later mobilized and transported to waters of the State. These BMPs are discussed further in Sections F and G, below.

The TMDL implementation plan provides a total of five years from the effective date of the TMDL for industrial facilities with the given SIC codes or any facilities that handle plastic pellets to comply with the final Waste Load Allocation. The requirements of the California Water Code, Chapter 5.2, section 13367 (discussed in section I, D) have been in place for almost three years (since January 1, 2008), and given their nature (i.e., installation of containment, capture, and cleanup systems), Regional Board staff find that it is appropriate to limit the implementation schedule for compliance with the plastic pellet WLA to no more than five years from the effective date of the TMDL.

C. Coordinated Compliance

Responsible jurisdictions for this TMDL include both point source and nonpoint source dischargers. Compliance with the TMDL may be based on a coordinated Monitoring and Reporting work plan that outlines TMDL responsibilities for each responsible jurisdiction. Dischargers interested in coordinated compliance shall submit a Coordinated Monitoring and Reporting Compliance plan that outlines BMPs that will be implemented and the schedule for implementing the BMPs and MFAC program.

D. Structural BMPs

A wide variety of methods that can reduce and eliminate trash impairment in Santa Monica Bay are listed below. Structural full capture systems can be put in areas that are extensively drained by municipal separate stormwater sewer systems.

D.1 Structural BMPs for Trash

Catch Basins and Catch Basin Inserts

A catch basin or storm drain inlet is an inlet to the storm drain system that typically includes a grate or curb opening where stormwater enters the catch basin and a sump to capture sediment, debris and associated pollutants. They are also used in combined sewer watersheds to capture floatables and settle some solids. Catch basins act as pretreatment for other treatment practices by capturing large particles. The performance of catch basins at removing sediment and other pollutants depends on the design of the catch basin, and routine maintenance to retain the storage available in the sump to capture sediment.

Within a catch basin a "catch basin insert," may also be used to filter runoff entering the catch basin. There are several types of catch basin inserts. Catch basin and storm drain inserts may rely on screens, filters, bags, trays, and diversion chambers to collect and divert trash and debris.

Vortex Separation Systems

Vortex Separation Systems (VSS) units capture almost all trash deposited into a storm drain system. A VSS unit diverts the incoming flow of storm water and pollutants into a pollutant separation and containment chamber. Solids within the separation chamber are kept in continuous motion, and are prevented from blocking the screen so that water can pass through the screen and flow downstream. Solid pollutants including trash, debris and coarse sediments are retained in a centrally located solids catchment chamber with the heavier solids ultimately

settling into the base of the unit or sump. This is a permanent device that can be retrofitted for oil separation as well. Outfitting a large drainage with a number of large VSS units may be less costly than using a larger number of small VSS units.

Trash Nets

Trash nets are devices using the natural energy of the flow to trap trash, floatables and solids in disposable mesh nets. Trash nets can be placed in different ways, such as a retrofit on the end of an outfall, in line with an outfall pipe (underground), or floating at the end of an outfall.

"Release nets" are a relatively economical way to monitor trash loads from municipal drainage systems. However, in general, they can only be used to monitor or intercept trash at the end of a pipe and are considered to be partial capture systems, as the nets are usually sized at a 1/2" to 1" mesh. These nets are attached to the end of pipe systems. The nets remain in place on the end of the drain until water levels upstream of the net rise sufficiently to release a catch that holds the net in place. The water level may rise from either the bag being too full to allow sufficient water to pass, or from a disturbance during very high flows. When the nets release they are attached to the side of the pipe by a steel cable and as they are washed downstream (a yard or so) are tethered off so that no pollutants from within the bags are washed out.

Preliminary observations suggest that the nets rarely fill sufficiently to cause the bags to release. And therefore, if they are cleaned after a storm event, the entire quantity of material is captured and can be measured for monitoring purposes using two bags per trap. This makes it easy to replace the full or partially full bag with an empty one, so that the first bag can be taken to a laboratory for analysis without manual handling of the material it contains.

The nets are valid devices because of the ease of maintenance and also because the devices can be relocated after a set period at one location (provided the pipe diameters are the same).

Gross Solids Removal Devices

Several Gross Solids Removal Devices (GSRDs) were developed by the California Department of Transportation (Caltrans) to be retrofitted into existing highway drainage systems or implemented in future highway drainage systems. GSRDs are structures that remove litter and solids 5 mm (0.25 inch nominal) and larger from the stormwater runoff using various screening technologies. Overflow devices are incorporated, and the usual design of the overflow release device is based upon the design storm for the roadway. Though designed to capture litter, the devices can also capture some of the vegetative debris.

The Caltrans' GSRD Pilot Program consists of multiple phases with each phase representing one pilot study. A pilot study generally consists of one or more devices that are developed from concept, advanced through design and installation, and placed in service for two years of testing to evaluate overall performance. Three types of GSRDs have been shown the most promising: linear radial and two versions using an inclined screen.

Harbor Trash Skimmer Units

A harbor trash skimmer is a unit that is partially submerged in the water, and anchored to a dock. It uses a motor to displace water, and traps floating trash and debris, as it is sucked into the unit. The unit retains floating trash, and must be emptied.

Marine Trash Skimmer Boats

Marine trash skimmer boats consist of a catamaran type, twin hull vessel on which are mounted hydraulically powered and controlled open mesh conveyor systems to move materials. Twin, over-the-rear hydraulically powered propellers are used to clear debris without the need to take the vessel out of the water. A front mounted continuous conveyor can be lowered into the water and is capable of skimming floating debris off the surface to depths of up to 2-1/2 feet below the surface, 16 feet wide.

Debris coming up the main pickup conveyor dumps into the vessel's storage area which, with its sidewalls, can retain and store up to 12,000 pounds or 700 cubic feet of material. Once fully loaded, the vessel heads back to shore, where the operator offloads the material into dumpsters or dump trucks for off-site disposal.

D.2 Structural BMPs for Plastic Pellets

Plastic industries can utilize BMPs to ensure the complete containment of plastic pellets on site.

Containment Systems

Appropriate containment systems can be installed at all onsite storm drain discharge locations that are down-gradient of areas where preproduction plastic is present or transferred. A containment system can be a device or series of devices that traps all particles retained by a one millimeter mesh screen and has a design treatment capacity of not less than the peak flowrate resulting from a one-year, one-hour storm in each of the down-gradient drainage areas.

Capture Devices

At all points of storage and transfer of preproduction plastic, capture devices can be put in place under transfer valves and devices used in loading, unloading, or other transfer of preproduction plastic.

D.2.1 Landscape BMPs

Catch Basin Inserts

Most existing curb inlets can be retrofitted with filters to catch debris. Although many catch basin inserts capture particles larger than 5 millimeters, some technologies have been developed that will capture everything larger than fine sand. The screen creates a shearing action, and water flows across the surface which has small openings. The water can penetrate through, and the dewatered debris gets filtered out into a debris compartment.

Grading/Berms

Grading floors and parking lots of the facilities, or adding berms can ensure that plastic pellets will not be discharged. These BMPs keep pellets on site by not allowing them to be taken by stormwater or wind across a large area, where they can be dispersed and end up in the MS4. Berms and grading can allow the pellets to be directed and stormwater to flow to a smaller area, where they can be filtered out by other BMPs.

Retaining Walls

Short retaining walls can keep pellets on site. Similarly to grading and berms, retaining walls can enclose a facility and keep a specific area open, where other BMPs can catch and filter out plastic pellets.

E. Non-Structural BMPs

A wide variety of methods to address the trash impairment in Santa Monica Bay are listed below. Responsible jurisdictions shall propose the monitoring plan as well as the mitigation measures incorporating an individual method or combinations to progressively reduce nonpoint source trash. Non-structural BMPs may provide advantages over structural full capture systems in areas that are not extensively drained by municipal separate stormwater sewer systems. Foremost, institutional controls offer other societal benefits associated with reducing litter in our city streets, parks and other public areas. The capital investment required to implement non-structural BMPs is generally less than that for structural BMPs.

E.1 Non-structural BMPs for Trash

Litter Control

It is noted that ordinances which prohibit littering are already in place, listed below:

- County of Los Angeles (12.80.440 Littering and other discharge of polluting or damaging substances prohibited.)

  "No Person shall cause any refuse, rubbish, food waste, garbage, or any other discarded or abandoned objects to be littered, thrown, deposited, placed, left, accumulated, maintained or kept in or upon any street, alley, sidewalk, storm drain, inlet, catch basin, conduit, drainage structure, place of business, or upon any public or private property except when such materials are placed in containers, bags, recycling bins, or other lawfully established waste disposal facilities protected from stormwater or runoff."

- City of Ventura (i.e., San Buenaventura), Sec. 8.250.030. Littering; fine; picking up litter (Code 1971, § 4362)

  "It is unlawful to litter or cause to be littered in or upon any public or private property, or in any container, as described in this chapter, of another person without their permission."

- Ventura County (6923 Litter.)

"No Person shall throw, deposit, leave, maintain, keep, or permit to be thrown, deposited, kept, or maintained, in or upon any public or private driveway, parking area, street, alley, sidewalk, or component of the Storm Drain System or any Watercourse, any refuse, rubbish, garbage, litter, or other discarded or abandoned objects, articles, accumulations, and/or Pollutants so that the same may cause or contribute to pollution. Any Owner or Occupant of the property or responsible person who fails to remove pollutants within a reasonable time, as determined by the Director, may be charged with a violation of this Chapter."

- California Vehicle Code

  Throwing Substances on Highways or Adjoining Areas
  23111. No person in any vehicle and no pedestrian shall throw or discharge from or upon any road or highway or adjoining area, public or private, any lighted or nonlighted cigarette, cigar, match, or any flaming or glowing substance. This section shall be known as the Paul Buzzo Act. (Amended Ch. 1548, Stats. 1970. Effective November 23, 1970)

  Throwing, Depositing, or Dumping Matter on Highway
  23112. (a) No person shall throw or deposit, nor shall the registered owner or the driver, if such owner is not then present in the vehicle, aid or abet in the throwing or depositing upon any highway any bottle, can, garbage, glass, nail, offal, paper, wire, any substance likely to injure or damage traffic using the highway, or any noisome, nauseous, or offensive matter of any kind.
  (b) No person shall place, deposit or dump, or cause to be placed, deposited or dumped, any rocks, refuse, garbage, or dirt in or upon any highway, including any portion of the right-of-way thereof, without the consent of the state or local agency having jurisdiction over the highway. (Amended Ch. 74, Stats. 1980. Effective January 1, 1981)

- Fish and Game Code (Division 6, Part 1, Chapter 2, Article 1)

  5650. …It is unlawful to deposit in, permit to pass into, or place where it can pass into the waters of this state any of the following:
  (1) Any petroleum, acid, coal or oil tar, lampblack, aniline, asphalt, bitumen, or residuary product of petroleum, or carbonaceous material or substance.
  (2) Any refuse, liquid or solid, from any refinery, gas house, tannery, distillery, chemical works, mill, or factory of any kind.
  (3) Any sawdust, shavings, slabs, or edgings.
  (4) Any factory refuse, lime, or slag.
  (5) Any cocculus indicus.
  (6) Any substance or material deleterious to fish, plant life, or bird life.

  5652. It is unlawful to deposit, permit to pass into, or place where it can pass into the waters of the state, or to abandon, dispose of, or throw away, within 150 feet of the high-water mark of the waters of the state, any cans, bottles, garbage, motor vehicle or parts thereof, rubbish, or the viscera or carcass of any dead mammal, or the carcass of any dead bird.

<u>Boating Laws</u>

- International Treaty to Prevent Pollution from Ships (MARPOL Annex V)
  All ships of 400 gross tonnage and above and every ship certified to carry 15 persons or more will have to carry a Garbage Management Plan, to include written procedures for collecting, storing, processing and disposing of garbage, including the use of equipment on board. The Garbage Management Plan should designate the person responsible for carrying out the plan and should be in the working language of the crew.

  Every ship of 12 metres or more in length must also display placards notifying passengers and crew of the disposal requirements of the regulation; the placards should be in the official language of the ship's flag State and also in English or French for ships travelling to other States' ports or offshore terminals.

- 1899 Rivers and Harbors Act/Federal Refuse Act (1899 33 U.S.C. §407)
  Prohibits discharging or depositing any refuse matter of any kind into United States waters. Refuse includes: garbage, trash, oil and other liquid pollutants.

- Marine Plastic Pollution Research and Control Act

  33 CFR 151.57. Requires all oceangoing vessels 40 feet or more in length used in commerce or equipped with a galley and berthing to have a written waste management plan. The Master or person in charge of the vessel is responsible for ensuring that a written waste management plan is on board, and that each person handling garbage follows that plan. The plan must describe the vessel's procedures for collecting, processing, storing and discharging garbage, and designate the person who is in charge of carrying out the plan. Garbage (including food wastes) may not be thrown overboard on inland waters or in the ocean within three miles of land. Plastic may not be thrown overboard anywhere.

  33 CFR 151.59. Requires all vessels, 26 feet or longer to display, in a prominent place where the crew and the passengers can read it, an informational placard that notifies the reader of the following:

  (1) The discharge of plastic or garbage mixed with plastic into any waters is prohibited.

  (2) The discharge of all garbage is prohibited in the navigable waters of the United States and, in all other waters, within three nautical miles of the nearest land.

  (3) The discharge of dunnage, lining, and packing materials that float is prohibited within 25 nautical miles of the nearest land.

- California Health and Safety Code Section 117475-117500 (Pollution of navigable waters)
  117480. Every person who places, deposits, or dumps any garbage in or upon the navigable waters of this state, or who places, deposits, or loads it upon any vessel, with intent that it shall be dumped or deposited in or upon the navigable waters of this state, or at any point in the ocean within twenty miles of any point on the coast line of the state, is guilty of a misdemeanor.

- California Health and Safety Code Section 117550-117560 (Prohibited Waste Disposal)

117555. A person who places, deposits, or dumps, or who causes to be placed, deposited, or dumped, or who causes or allows to overflow, sewage, sludge, cesspool or septic tank effluent, accumulation of human excreta, or solid waste, in or upon a street, alley, public highway, or road in common use or upon a public park or other public property other than property designated or set aside for that purpose by the governing board or body having charge of the property, or upon private property without the owner's consent, is guilty of a misdemeanor.

Trash Receptacles

Most trash disposed of on the ground may result from the lack of trash receptacles. Installing trash receptacles can reduce nonpoint source trash loadings. The receptacles shall be visible and conveniently reachable for all park users. During the picnic seasons, sufficient trash and hot coal receptacles in the picnic area should be provided. Receptacles shall be equipped with lids to prevent wildlife from digging through trash or the wind from re-mobilizing the trash inside. Receptacles may be decorated but shall not cause visual intrusion to the background environment.

Varieties of land uses determine the proper locations and necessary density of the trash receptacles. More receptacles are needed along trails, near park entrances and exits, adjacent to picnic areas or areas with higher activity frequencies. Sanitation should be maintained to avoid nuisances.

Smoking Bans

- Santa Monica Municipal Code (Article 4, Chapter 4.44, Regulation of Smoking)

  "It is unlawful to smoke in the following places:…Any public beach; anywhere on the Santa Monica Pier; except in designated areas;…"

  "Disposal of Smoking Waste. No person shall dispose of any cigarette, cigar or tobacco, or any part of a cigarette or cigar, in any place where smoking is prohibited under this Chapter, except in a designated waste disposal container."

- City of Malibu Municipal Code (12.08.035 Smoking prohibited on beaches.) (Ord. 265 § 1, 2004)

  "Notwithstanding the provisions of Section 12.08.020(A), it is unlawful to smoke on any public beach or any area of the Malibu Pier not designated for smoking within the city of Malibu. For the purpose of this section, "smoking" means inhaling, exhaling, burning, or carrying any lighted cigarette, cigar or pipe. For the purpose of this section, beach shall not include parking lots or roadways."

Plastic Bag Bans

- City of Malibu Municipal Code (9.28.020 Plastic shopping bags prohibited.) (Ord. 323 § 1 (part), 2008)

"A. No affected retail establishment, restaurant, vendor or nonprofit vendor shall provide plastic bags or compostable plastic bags to customers.
B. Nothing in this section shall be read to preclude affected retail establishments, vendors and nonprofit vendors from making recyclable paper bags available to customers.
C. No person shall distribute plastic bags or compostable plastic bags at any city facility or any event held on city property.
D. This chapter shall apply only to plastic bags or compostable plastic bags provided at the point of sale for the purpose of carrying away goods. This chapter shall not apply to single-use plastic produce bags distributed in a grocery store exclusively for the purpose of transporting produce to the point of sale."

Polystyrene Bans

- City of Malibu Municipal Code (9.24.020 Food packaging prohibitions.)
  (Ord. 286 § 1 (part), 2005)

  "A. No restaurant, food packager, retail food vendor, vendor or nonprofit food provider shall provide prepared food to its customers in any food packaging that utilizes expanded polystyrene.
  B. The city of Malibu shall prohibit the use of expanded polystyrene food packaging at all city facilities. The city of Malibu shall not purchase or acquire expanded polystyrene food packaging.
  C. The use or distribution of expanded polystyrene food packaging at special events sponsored or co-sponsored by the city of Malibu shall be prohibited. This prohibition shall apply to the event organizers, agents of the event organizers, event food vendors and any other party (including nonprofit organizations) who enter into an agreement with one or more of the co-sponsors of the event to sell prepared food at the event or otherwise provide an event-related service.
  D. All facility rental agreements for any city-owned property or facility shall include a provision requiring contracting parties to assume responsibility for preventing the utilization and/or distribution of expanded polystyrene food packaging at the associated function. The facility rental agreement shall indicate that the violating contractor's security deposit will be forfeited if the parks and recreation director, or his or her designee, determines that expanded polystyrene food packaging was utilized in violation of the rental agreement."

Enforcement of Litter Laws

The existing litter laws shall be posted in the prominent location for visitors or resident to understand the regulations. It is to be noted that ordinances that prohibit litter are already in place in most cities because cities recognize that trash has become a pollutant in the storm drain system when exposed to storm water or any runoff, and prohibit the disposal of trash on public land.

Patrolling or designated personnel shall have authorities to illustrate, execute, and enforce the litter laws. The effectiveness of enforcement should be monitored.

Garbage Collection

Increasing the frequency of garbage collection may keep trash cans and receptacles from overflowing. An overflowing trash may cause the lid to be propped open, or may prevent a lid

from being used to cover the trash can. This can lead to trash being blown away, or wildlife taking trash out of the receptacles. An increase in the frequency of collection would help to ensure that trash was not accessible to wind or wildlife.

Street Sweeping

Street sweeping is one of most effective methods to keep debris, vegetation wastes, and trash away from catch basins. Although the correlation between street sweeping frequency and amount of trash collected in the waterbody has not been confirmed in the Santa Monica Bay Watershed area, it is convincing that more street sweeping will prevent more trash from being flushed by stormwater to the catch basins, and from being discharged to the waterbodies of concern.

Most municipalities have been undergoing or have had contracts with Los Angeles County and Ventura County for street sweeping programs. In the counties' unincorporated areas, street sweeping frequency may be increased to reduce trash loading.

Public Education

Public education refers to posting information, giving a presentation, or conducting direct or indirect communication with individuals. This outreach should be applied to public entities such as city halls, schools, community centers, senior centers, and to private meeting/activity locations.

The educational materials should include the relevant ordinances, the importance of protecting the environment, possible environmental and biological impacts from pollution, and the necessary response if pollution occurs.

Community Involvement

Involving communities may be more effective in promoting the importance of protecting water quality and the environment. The bonding between residents in the community makes the community more influential in educating residents about right concepts. Communities can organize activities to illustrate that environmental protection involves every individual's continuous efforts.

Beach Cleanups/Coastal Cleanup Day

Organizations such as Heal the Bay host voluntary beach cleanups throughout the year. The cleanups are hands-on opportunities for volunteers to take ownership and directly improve the condition of Santa Monica Bay beaches.

Recycling Program

A recycling program shall be developed to minimize trash sources in the vicinity of the Santa Monica Bay.

Reporting System

Patrol personnel, park and beach users, or residents should report accumulation of trash or illegal disposal of trash to the waterbodies and their adjacent areas. Information with a toll-free number and communication devise shall be conveniently available near the waterbodies for timely reporting. Responsible jurisdictions, after receiving reports, should conduct inspections to formulate proper cleanup actions.

Stenciling

Stencils are to remind the residents and park users of the importance of maintaining water quality and of the existing ordinances. Signs should be placed in prominent locations where most people will view them, and should contain appropriate symbols as well as clear written messages, and cite the appropriate federal, state and county codes including the largest possible penalty amount for violation of codes.

Consideration of Picnic Area Relocation

Trash found in the waterbodies may be the result of stormwater flushing or wind re-mobilizing trash originally disposed of around picnic areas. If stormwater or wind is the dominant factor causing trash impairment, and trash is constantly found near picnic areas, it may be a solution to reconsider the proper location of picnic area.

The further the picnic area away from waterbodies, the longer time or more mobilization energy it needs from stormwater or wind to carry trash to waterbodies of concerns. Trash may be cleaned before reaching waterbodies. A proper monitoring period to analyze the cause of trash is necessary prior to considering this option.

Imposition of Trash Tax

Trash often discovered on source areas in the Santa Monica Bay Watershed is paper or plastic food or beverage containers, plastic bottles, paper plates, aluminum cans, or plastic bags. This trash shares the same characteristics as packaging utilized in the fast food stores. The evidence of trash causing the Santa Monica Bay trash impairment may be used to justify an increase in the retail price of disposable food or beverage packaging to compensate for the potential environmental impacts. The additional tax income can contribute to preventive or cleanup actions for the Santa Monica Bay.

The City of Oakland enacted the first tax on fast food restaurants and convenience stores in the nation. They are using the money they raise from the litter tax to hire crews to clean up litter.

Cooperation of Potential Sources of Trash

Stores carrying goods considered potential sources of trash to the waterbody or its adjacent areas can advise their patrons to handle the packaging, residuals or any trash parts in an environmentally friendly manner. Similar to the stencils, signs with clear language containing ordinances, and a penalty of violation should be posted near the cashier, exit and parking lot.

Surveillance Camera

Surveillance cameras can be installed to monitor the water quality and any illegal disposal which may require immediate cleanup. They can also be used to enforce the littering laws if necessary.

Programs of Adopting Waterbodies, Parks, etc.

This concept is adapted from the “adopt a highway” program. The participation from industries in the Santa Monica Bay Watershed will help the responsible jurisdictions to maintain the cleanliness of the environment, and increase the cleaning frequency. Industries or any entities that contribute resources, time, or efforts to keep the environment clean may be encouraged by being acknowledged publicly or financially.

E.2 Non-structural BMPs for Plastic Pellets

- Zero Pellet Loss Programs

  Operation Clean Sweep is a program developed by the Society of the Plastics Industry and the American Plastics Council. The program focuses on zero pellet loss, and involves BMP training and education for industries. Issues that may be addressed in these programs include:

  Education and Training in the Workplace

  Plastic industries can hold training for new employees and refresher courses for existing employees every year, which address specific non-structural BMPs that should be applied in the workplace. At the end of the training, employees could sign agreements that ensure that they will carry out these BMPs on a daily basis.

  Sweeping, Vacuuming

  Industries should have the proper equipment present and in working order so that employees can clean large or incidental plastic pellet spills as they occur. For example, brooms, dust pans, and vacuums with the proper attachments should be available and utilized immediately after each transfer of pellets or anytime there are pellets released onto the premises.

  Bins and Trays to Catch Pellets

  Placing bins or trays underneath transfer points while transferring pellets can ensure that no loose pellets fall onto the ground. Plastic pellets that are spilled will be caught in the bins or on the trays.

  Sealing and Double Bagging Pellets

  Keeping plastic pellets double bagged and sealed during transport or when stored will keep pellets from being unnecessarily spilled. In addition, at all points of preproduction plastic storage and transfer, measures can be taken to prevent discharge by making sure that sealed containers or bags are durable enough so as not to rupture under typical loading and unloading activities.

  Sealing Transport Cars/Carriers

  When plastic pellets are being transported, completely sealing railroad cars and trucks will keep pellets from escaping.

F. Implementation Schedule

The TMDL Implementation Schedule is designed to provide responsible jurisdictions flexibility to implement structural and non-structural BMPs to address trash and plastic pellets in the source areas of the Santa Monica Bay Watershed. Implementation consists of implementing a suite of the aforementioned BMPs and development of monitoring plans by responsible jurisdictions and implementation of the Executive Officer approved Trash Monitoring and Reporting Plan.

Table 13. Implementation Schedule for Point Sources for Trash

Task No.	Task	Responsible Jurisdiction	Date
1	Submit Trash Monitoring and Reporting Plan (TMRP), including a plan for defining the trash baseline WLA, a proposed definition of "major rain event," and either a Plastic Pellet Monitoring and Reporting Plan (PMRP) for monitoring plastic pellet discharges from the MS4, increased industrial facility inspections and enforcement, and response to possible plastic pellet spills, or a demonstration that a PMRP is not required[3].	California Department of Transportation, Los Angeles County Flood Control District, Los Angeles County, Ventura County Watershed Protection District, County of Ventura, and Cities of Agoura Hills, Calabasas, Culver City, El Segundo, Hermosa Beach, Los Angeles, Malibu, Manhattan Beach, Palos Verdes Estates, Rancho Palos Verdes, Redondo Beach, Rolling Hills, Rolling Hills Estates, Santa Monica, Thousand Oaks, Torrance, and Westlake Village. For PMRP ONLY[4] The Cities of Beverly Hills, Inglewood, West Hollywood, and Hidden Hills.	6 months from effective date of TMDL. If a plan is not approved by the Executive Officer within 9 months, the Executive Officer will establish appropriate monitoring plans.
2	Implement TMRP and PMRP.	California Department of Transportation, Los Angeles County Flood Control District, Los Angeles County, Ventura County Watershed Protection District, County of Ventura, and Cities of Agoura Hills, Calabasas, Culver City, El Segundo, Hermosa Beach, Los Angeles, Malibu, Manhattan Beach, Palos Verdes Estates, Rancho Palos Verdes, Redondo Beach, Rolling Hills, Rolling Hills Estates, Santa Monica, Thousand Oaks, Torrance, and Westlake Village. For PMRP ONLY[4] The Cities of Beverly Hills, Inglewood, West Hollywood, and Hidden Hills.	6 months from receipt of letter of approval from Regional Board Executive Officer, or the date a plan is established by the Executive Officer.
3	Submit results of implementing TMRP and	California Department of Transportation, Los Angeles	Twenty (20) months from

[3] The responsible jurisdictions and agencies shall provide documentation as specified in Table 7-34.1.
[4] The monitoring and reporting requirements under the Ballona Creek Trash TMDL and Malibu Creek Trash TMDL for areas within those subwatersheds fulfill the requirement herein to prepare and implement a TMRP. Therefore, only a PMRP is required from these jurisdictions.

	PMRP, recommend trash baseline WLA, and propose prioritization of Full Capture System installation or implementation of other measures to attain the required trash and plastic pellet reduction.	County Flood Control District, Los Angeles County, Ventura County Watershed Protection District, County of Ventura, and Cities of Agoura Hills, Calabasas, Culver City, El Segundo, Hermosa Beach, Los Angeles, Malibu, Manhattan Beach, Palos Verdes Estates, Rancho Palos Verdes, Redondo Beach, Rolling Hills, Rolling Hills Estates, Santa Monica, Thousand Oaks, Torrance, and Westlake Village. For PMRP ONLY[4] The Cities of Beverly Hills, Inglewood, West Hollywood, and Hidden Hills.	receipt of letter of approval for the Trash Monitoring and Reporting Plan and PMRP from Regional Board Executive Officer, and annually thereafter.
4	Installation of Full Capture Systems or other measures to achieve 20% reduction of trash from Baseline WLA[5].	California Department of Transportation, Los Angeles County, County of Ventura, and Cities of Agoura Hills, Calabasas, Culver City, El Segundo, Hermosa Beach, Los Angeles, Malibu, Manhattan Beach, Palos Verdes Estates, Rancho Palos Verdes, Redondo Beach, Rolling Hills, Rolling Hills Estates, Santa Monica, Thousand Oaks, Torrance, and Westlake Village.[6]	Four years from effective date of TMDL.

[5] Compliance with percent reductions from the Baseline WLA will be assumed wherever properly-sized full capture systems are installed and properly operated and maintained in corresponding percentages of the conveyance discharging to waterbodies within the Santa Monica Bay Watershed or directly to Santa Monica Bay.
[6] Each responsible jurisdiction and agency, identified above, shall comply with the interim or final Waste Load Allocations for trash assigned to it and, therefore, should utilize all compliance strategies within its authority to achieve these allocations.

Flood control districts, such as the Los Angeles County Flood Control District or Ventura County Watershed Protection District, may be held responsible with a jurisdiction and/or agency for non-compliance where the flood control district has either:

(i) without good cause denied entitlements or other necessary authority to a responsible jurisdiction or agency for the timely installation and/or maintenance of full and/or partial capture trash control devices for purposes of TMDL compliance in parts of the MS4 physical infrastructure that are under its authority, or
(ii) not fulfilled its obligations regarding proper BMP installation, operation and maintenance for purposes of TMDL compliance within the MS4 physical infrastructure under its authority,

thereby causing or contributing to a responsible jurisdiction and/or agency to be out of compliance with its interim or final Waste Load Allocations.

5	Installation of Full Capture Systems or other measures to achieve 40% reduction of trash from Baseline WLA[5].	California Department of Transportation, Los Angeles County, County of Ventura, and Cities of Agoura Hills, Calabasas, Culver City, El Segundo, Hermosa Beach, Los Angeles, Malibu, Manhattan Beach, Palos Verdes Estates, Rancho Palos Verdes, Redondo Beach, Rolling Hills, Rolling Hills Estates, Santa Monica, Thousand Oaks, Torrance, and Westlake Village.[6]	Five years from effective date of TMDL.
6	Compliance with General or Individual Industrial NPDES permit requirements to achieve the plastic pellet WLA.	Permittees of the Industrial Storm Water General Permit (NPDES Permit No. CAS 000001), other general permits, or individual industrial storm water permits for industrial activities with SIC codes that may include, but are not limited to, 282X, 305X, 308X, 39XX, 25XX, 3261, 3357, 373X, 2893, or with the term "plastic" in the facility or operator name, regardless of SIC code.	Five years from the effective date of TMDL.
7	1. Evaluate the effectiveness of Full Capture Systems or other measures to achieve trash WLA, 2. Evaluate BMPs implemented at industrial facilities for effectiveness in achieving plastic pellet WLA, 3. Reconsider the trash and plastic pellet WLAs, if warranted, and 4. Consider extension of final compliance deadline for municipalities if local ordinances banning the	Regional Board.	Five years from effective date of TMDL.

Under these circumstances, the flood control district's responsibility shall be limited to non-compliance related to the drainage area(s) within the jurisdiction where the flood control district has authority over the relevant portions of the MS4 physical infrastructure.

	use of the most commonly found types of trash are adopted and in effect within five (5) years from adoption of this TMDL.		
8	Installation of Full Capture Systems or other measures to achieve 60% reduction of trash from Baseline WLA[5].	California Department of Transportation, Los Angeles County, County of Ventura, and Cities of Agoura Hills, Calabasas, Culver City, El Segundo, Hermosa Beach, Los Angeles, Malibu, Manhattan Beach, Palos Verdes Estates, Rancho Palos Verdes, Redondo Beach, Rolling Hills, Rolling Hills Estates, Santa Monica, Thousand Oaks, Torrance, and Westlake Village.[6]	Six years from effective date of TMDL.
9	Installation of Full Capture Systems or other measures to achieve 80% reduction of trash from Baseline WLA[5].	California Department of Transportation, Los Angeles County, County of Ventura, and Cities of Agoura Hills, Calabasas, Culver City, El Segundo, Hermosa Beach, Los Angeles, Malibu, Manhattan Beach, Palos Verdes Estates, Rancho Palos Verdes, Redondo Beach, Rolling Hills, Rolling Hills Estates, Santa Monica, Thousand Oaks, Torrance, and Westlake Village.[6]	Seven years from effective date of TMDL.
10	Installation of Full Capture Systems or other measures to achieve 100% reduction of trash from Baseline WLA[5].	California Department of Transportation, Los Angeles County, County of Ventura, and Cities of Agoura Hills, Calabasas, Culver City, El Segundo, Hermosa Beach, Los Angeles, Malibu, Manhattan Beach, Palos Verdes Estates, Rancho Palos Verdes, Redondo Beach, Rolling Hills, Rolling Hills Estates, Santa Monica, Thousand Oaks, Torrance, and Westlake Village.[6]	Eight years from effective date of TMDL.

Minimum Frequency of Assessment and Collection Program[7] - Trash from Nonpoint Sources

Task No.	Task	Responsible Jurisdiction	Date
1	Submit a TMRP including an MFAC/BMP Program.	National Park Service, California Department of Parks and Recreation, County of Los Angeles, County of Ventura, State Lands Commission for open space and parks, and California Department of Parks and Recreation, Los Angeles County Department of Beaches and Harbors, Cities of Hermosa Beach, Los Angeles, Santa Monica and Redondo Beach for beaches and harbors.	Six months from TMDL effective date. If a plan is not approved by the Executive Officer within 9 months, the Executive Officer will establish an appropriate monitoring plan.
2	Implement the TMRP and the MFAC/BMP Program.	National Park Service, California Department of Parks and Recreation, County of Los Angeles, County of Ventura, State Lands Commission for open space and parks, and California Department of Parks and Recreation, Los Angeles County Department of Beaches and Harbors, Cities of Hermosa Beach, Los Angeles, Santa Monica and Redondo Beach for beaches and harbors.	6 months from receipt of letter of approval from Regional Board Executive Officer, or the date a plan is established by the Executive Officer.
3	Achieve LA immediately after each collection and assessment event.	National Park Service, California Department of Parks and Recreation, County of Los Angeles, County of Ventura, State Lands Commission for open space and parks, and California Department of Parks and Recreation, Los Angeles County Department of Beaches and Harbors, Cities of Hermosa Beach, Los Angeles, Santa Monica and Redondo Beach for beaches and harbors.	6 months from receipt of letter of approval from Regional Board Executive Officer, or the date a plan is established by the Executive Officer.
4	Submit annual TMRP reports including proposal for revising MFAC/BMP for Executive	National Park Service, California Department of Parks and Recreation, County of Los Angeles, County of Ventura, State	Twenty (20) months from receipt of letter of approval for the

[7] Based on annual reports, the Executive Officer may adjust the minimum frequency of assessment and collection as necessary to ensure compliance between the required trash assessment and collection events.

Task No.	Task	Responsible Jurisdiction	Date
	Officer approval.	Lands Commission for open space and parks, and California Department of Parks and Recreation, Los Angeles County Department of Beaches and Harbors, Cities of Hermosa Beach, Los Angeles, Santa Monica and Redondo Beach for beaches and harbors.	Trash Monitoring and Reporting Plan from Regional Board Executive Officer, and annually thereafter.
5	Demonstrate full compliance by achieving LA between required trash collection and assessment events.	National Park Service, California Department of Parks and Recreation, County of Los Angeles, County of Ventura, State Lands Commission for open space and parks, and California Department of Parks and Recreation, Los Angeles County Department of Beaches and Harbors, Cities of Hermosa Beach, Los Angeles, Santa Monica and Redondo Beach for beaches and harbors.	Five years from effective date of TMDL.
6	Reconsider the TMDL based on evaluation of effectiveness of MFAC/BMP program, if warranted, and consider extending final compliance deadline for municipalities if local ordinances banning the use of the most commonly found types of trash are adopted and in effect within five (5) years from adoption of this TMDL.	Regional Board.	Five years from effective date of TMDL.

G. Reasonably Foreseeable Environmental Impacts from TMDL Implementation

An accompanying CEQA Substitute Environmental Document (SED) analyzes the potential negative environmental impacts of compliance with the Debris TMDL based on the implementation strategies discussed above. According to municipalities implementing previous Trash TMDL requirements by installing structural full capture systems, it was found the most significant environmental impacts result from construction activities associated with installation and maintenance activities. The primary construction impacts are caused by concrete and electrical work, and in some areas, earth work associated with structural improvements. The environmental impacts are resulting from maintaining, removing and disposing trash from structural treatment systems. Both construction and environmental impacts may be mitigated by available technologies.

Regarding cumulative impacts, it is noted that both the construction and maintenance activities are in small, discrete, discontinuous areas over a short duration. Consequently, cumulative impacts are not significantly exacerbated from the sum of individual project impacts. Project level environmental analysis for implementation of structural methods will likely be conducted by municipalities and responsible jurisdictions under notices of exemption. Categorical exemptions will be based on the nature of the projects including:

-Minor alteration of existing public structures involving negligible expansion of an existing facility.
-Modifications of existing storm drain system and addition of environmental protection devices in existing structures with negligible or no expansion of use.
-Modifications to sewers constructed to alleviate a high potential or existing public health hazard.

The analysis concludes that the implementation of this TMDL will result in water quality improvement in Santa Monica Bay, but may be associated with temporary or permanent localized adverse impacts to the environment. While specific projects employed to implement the TMDL may have significant impacts, these impacts may be limited, short-term or mitigated through effective design and scheduling. Under circumstances that none of the alternatives or mitigation measures is available to mitigate the environmental impact caused by implementation of this Debris TMDL, implementing this Debris TMDL would outweigh the unavoidable adverse environmental effects because the minimum foreseeable environmental impacts shall be addressed by project level planning, construction, and operation methods as described in the CEQA SED.

IX. Monitoring

Assessment and monitoring of trash and plastic pellets are key components of the TMDL. The goal of trash and plastic pellet monitoring is to collect representative data across the watershed that can be used to refine Baseline Load and Waste Load Allocations, effectively site and design BMPs, including full capture systems, partial capture systems, or any other structural or non-structural BMPs, and determine compliance with Waste Load and Load

Allocations. Monitoring activities and results, including implementation and effectiveness of BMPs, will be reported to the Regional Board on an annual basis, as described in the Implementation schedule. Responsible jurisdictions will be required to propose and implement a Trash Monitoring and Reporting Plan approved by the Executive Officer.

A. Trash Monitoring

The Trash Monitoring and Reporting Plan will describe the methodologies that will be used to assess and monitor trash in the source areas within and, if applicable, in the vicinity of the Santa Monica Bay. Regional Board staff finds that monitoring protocols prescribed by the SWAMP Rapid Trash Assessment protocol are appropriate for this TMDL. Elements of the Trash Monitoring and Reporting Plan are described below.

- Monitoring Plan. Responsible jurisdictions shall submit a Trash Monitoring and Reporting Plan with the proposed monitoring sites. The TMRP must include, for each proposed monitoring location, maps of the drainage area and storm drains and locations where most trash accumulates on the beaches, in the harbors, and in the vicinity of the bay (for nonpoint sources). The TMRP will be submitted to the Regional Board according the TMDL Implementation Schedule. The Regional Board's Executive Officer will have full authority to review the monitoring plans, to revise the plans, to select among the alternate monitoring sites, and to approve or disapprove the plans.

- Jurisdiction. Allocations will be implemented through stormwater permits, prohibitions, or by Conditional Waivers. For this reason, each responsible jurisdiction must provide the Regional Board a list of entities, if any, located within their geographical boundary that are outside of their jurisdiction, including state or federal lands and facilities.

- Data Collection. Baseline data must be collected during the first two years of implementation. Because the amount of trash deposited into the Santa Monica Bay through storm drains or from nonpoint sources may depend on rainfall patterns and winds, monitoring will include dates in both the rainy season and the dry season. The rainy season is defined as the period from October 15 to April 15.

- Unit of Measure. Data will be reported in a single unit of measure that is reproducible and measures the amount of trash, irrespective of water content (e.g., compacted volume based on a standardized compaction rate, dry weight, etc.). The responsible jurisdictions may select the unit. The unit of measure used during baseline monitoring also will be used during implementation for determining compliance with Waste Load Allocations and Load Allocations.

- Vegetation. The responsible jurisdictions may exclude vegetation from their reported discharge except where there is evidence that the vegetation is the result of the illegal discharge of yard waste. However, all monitoring data must be reported uniformly (either with or without vegetation). If the responsible jurisdictions include vegetation in the discharges reported during baseline monitoring, they will

be obligated to include natural vegetation in their reports of discharge during implementation.

- Disposal of Collected Trash. Trash captured during the monitoring plan must be disposed of in accordance with all applicable laws and regulations.

- Location. Trash monitoring in the source areas and on the shores of the Santa Monica Bay shall focus on visible trash at representative and critical locations and hot spots determined by the responsible jurisdictions and approved by the Executive Officer in the Trash Monitoring and Reporting Plan. Locations for trash assessment shall include, but not be limited to, (1) locations where trash enters the Santa Monica Bay and beaches along the Santa Monica Bay and accumulates in the harbors and shorelines, and (2) areas of recreational access and wildlife habitat. Trash assessment on the water and shorelines shall include the type of trash and amount of trash according to a metric proposed and approved in the Monitoring and Reporting Plan.

- Representative Data. In order to provide representative data to be used in deriving the baseline Waste Load Allocation and baseline Load Allocation, the minimum requirements for the Trash Monitoring and Reporting Plan include:

  - The plan shall provide representative data across the subwatershed.
  - The plan shall provide data in units that are easily reproducible and comparable with data to be collected during the implementation phase.
  - The baseline Waste Load Allocation and baseline Load Allocation may be revised based on data generated from the plan.

- Land Use Areas. Dischargers may propose trash monitoring according to Land Use Areas in the Santa Monica Bay Watershed. Monitoring data can be used to establish specific trash generation rates per land use for siting and design of BMPs.

In addition to the general monitoring requirements, two TMDL monitoring strategies are outlined below for the proposed point and nonpoint compliance options.

1. Monitoring of Point Source Trash Discharges

Monitoring of full capture devices and other structural and/or non-structural BMPs for point sources focuses on the description and quantification of trash collected by the proposed devices and BMPs, and an assessment of their effectiveness in reducing trash. The Monitoring and Reporting Plan will describe how trash collected from full capture devices and other structural and/or non-structural BMPs will be quantified and how trash reductions in the Santa Monica Bay and on the beaches and shorelines will be assessed.

2. Monitoring of Nonpoint Source Trash Discharges

Responsible jurisdictions must identify monitoring locations that are considered “hot spots” within the vicinities surrounding the Santa Monica Bay. The TMRP should describe how proposed monitoring locations will demonstrate that all visible trash on the beaches and

open spaces within the Santa Monica Bay Watershed can be assessed and collected. Responsible jurisdictions must collect 100% of the trash accumulated between MFAC events. The MFAC depends on the composition of land uses along the waterbodies. The detailed MFAC for each specific nonpoint source area is provided in Section VIII.A.2.

The County of Los Angeles, County of Ventura, National Park Service, California Department of Parks and Recreation, and State Lands Commission will monitor open space areas in their respective jurisdictions. California Department of Parks and Recreation, Los Angeles County Department of Beaches and Harbors and the Cities of Hermosa Beach, Los Angeles, Santa Monica, and Redondo Beach will monitor the beaches in their jurisdictions along the Santa Monica Bay. Los Angeles County Department of Beaches and Harbors and the City of Redondo Beach will monitor harbors within their jurisdiction in the Santa Monica Bay.

The reports submitted for Regional Board review must contain information, including but not limited to, dates of inspection, descriptions of trash type, estimates of trash quantity if weighting is not available, and immediate action of trash removal. At least one photo at each designated observation location per assessment and collection event, and as needed, must be taken and attached to the report to support the observation.

B. Plastic Pellet Monitoring

MS4 permittees identified as responsible jurisdictions for point sources of trash in the Santa Monica Bay Debris TMDL and in the existing Malibu Creek and Ballona Creek Trash TMDLs shall either prepare a Plastic Pellet Monitoring and Reporting Plan (PMRP), or demonstrate that a PMRP is not required, under certain circumstances listed in Section VIII, B (Implementation and Compliance for Plastic Pellets). The PMRP will be used to monitor the amount of plastic pellets being discharged from the MS4 at critical locations and times, establish triggers for the possible need for increased industrial facility inspections and enforcement of SWPPP requirements for industrial facilities identified as responsible for the plastic pellet WLA, and address possible plastic pellet spills. The PMRP shall include protocols for a timely and appropriate response to possible plastic pellets spills within a Permittee's jurisdictional area, and a comprehensive plan to ensure that plastic pellets are contained.

- Monitoring Plan. Responsible jurisdictions shall submit a Plastic Pellet Monitoring and Reporting Plan that will address monitoring of plastic pellets at all outfalls in the MS4 under their respective jurisdictions. The PMRP shall also include protocols for a timely and appropriate response to possible plastic pellets spills within a Permittee's jurisdictional area, and a comprehensive plan to ensure that plastic pellets are contained. The PMRP will be submitted to the Regional Board according to the TMDL Implementation Schedule. The Regional Board's Executive Officer will have full authority to review, revise, approve, or disapprove the monitoring plans.

- Data Collection. Because the amount of plastic pellets deposited into the Santa Monica Bay through storm drains may depend on rainfall patterns, monitoring will include events at a minimum of once in the rainy season and once in the dry season every year. The rainy season is defined as the period from October 15 to April 15.

- Unit of Measure. The amount of plastic pellets discharged at storm drain outfalls shall be reported in a single unit of measure. The responsible jurisdictions may select the unit. The unit of measure will be used to establish triggers for the possible need for increased industrial facility inspections and enforcement of SWPPP requirements for industrial facilities identified as responsible for the plastic pellet WLA.

- Disposal of Collected Plastic Pellets. Plastic pellets captured during the monitoring plan must be disposed of in accordance with all applicable laws and regulations.

- Location. Plastic pellets will be monitored at the selected outfalls of storm drains within the Santa Monica Bay watershed, where industrial permittees are located.

X. Cost Considerations

Porter-Cologne Section 13241(d) requires staff to consider costs associated with the establishment of water quality objectives. The TMDL does not establish water quality objectives, but is merely a plan for achieving existing water quality objectives. Therefore cost considerations required in Section 13241 are not required for this TMDL.

The purpose of this cost analysis is to provide the Regional Board with information concerning the potential cost of implementing this TMDL and to addresses concerns about costs that have been raised by responsible jurisdictions. This section takes into account a reasonable range of economic factors in fulfillment of the applicable provisions of the California Environmental Quality Act (Public Resources Code Section 21159.)

An evaluation of the costs of implementing this Debris TMDL amounts to evaluating the costs of preventing trash and pellets from being deposited to and accumulating in the Santa Monica Bay. This brief report gives a summary overview of the costs associated with the most likely ways the responsible jurisdictions will achieve the required reduction in discharges via the storm drain system and reduction in accumulation resulting from the potential nonpoint source areas. Such an analysis would be incomplete if it failed to consider the existing cost that presently is transferred to "innocent" downstream communities; there is an unquantified cost to aquatic life within the Santa Monica Bay caused by the existing debris impairments.

Cost of Implementing Trash TMDL

The reference provided by Los Angeles County indicated that it costs more than 4 million dollars to clean trash from 31-miles of beach annually. The city of Long Beach, at the mouth of the Los Angeles River, also spends almost $1 million annually to clean up storm debris accumulated in the Long Beach Harbor. These expenses should be taken into consideration when calculating the potential cost of implementing the Debris TMDL.

The cost of implementing this TMDL will range widely, depending on the method that the responsible jurisdictions select to meet the Waste Load and Load Allocations.

Alternatives for implementing the Debris TMDL include enforcement of existing litter ordinances to achieve the final Waste Load and Load Allocations at minimal cost and installation and maintenance of full capture systems on all MS4 catch basins that discharge to the Santa Monica Bay.

The following discussion consists of general cost analyses for retrofitting all the catch basins in the urbanized portion of the watershed with structural full capture methods and for implementing an MFAC/BMP program. The costs are not additive and should be considered separately depending on the implementation strategy chosen.

1. Catch Basin Inserts

At a cost of approximately $200 - 800 per insert, catch basin inserts are the least expensive structural treatment device in the short term. At the lesser cost estimate of $200 per catch basin insert, it is assumed that responsible jurisdictions would be fully implementing institutional controls. It is assumed that all catch basins will be monitored frequently and used in conjunction with street sweeping.

The 2006 Compliance Report prepared by the County of Los Angeles for the Ballona Creek and Wetland Trash TMDL provides the number of catch basins per high, medium, and low trash generation areas for both the Los Angeles River Watershed and the Ballona Creek Watershed.

As discussed earlier, the areas to the south and east of the Malibu Creek Subwatershed have a high trash generation rate. Therefore, these areas are similar to the high and medium trash generation areas of the Los Angeles River and Ballona Creek Watersheds. The catch basin density for the areas to the south and east of the Malibu Creek Subwatershed was calculated by taking the average of the catch basin densities in high and medium trash generation areas in both the Los Angeles River and Ballona Creek Watersheds. Likewise, the catch basin density in the Malibu Creek Subwatershed and the areas to the north and west of the Malibu Creek Subwatershed was calculated using the average of the catch basin densities in medium and low trash generation areas for the Los Angeles River and Ballona Creek Watersheds.

It was calculated that there are approximately 286 catch basins per square mile in the areas to the south and east of the Malibu Creek Subwatershed, and 170 catch basins per square mile in the Malibu Creek Subwatershed and the areas to the north and west of the Malibu Creek Subwatershed. Since responsible jurisdictions have existing schedules to maintain catch basins as required by MS4 permits, each catch basin may need an additional budget of $100 per year in response to the requirement of this TMDL. The cost of installing catch basin inserts ranges from $200 per catch basin to $800. WLAs require the compliance to be achieved in 8 years, with 5 years for retrofitting catch basins. Table 15 presents the costs of installing catch basin inserts.

Table 14. Cost range for retrofitting catch basin inserts at a cost of $200-$800 per insert. (Dollars in thousands)

Number of years in the program	1	2	3	4	5	6	7	8
Operations and Maintenance (yearly, cumulative)	$550	$1,099	$1,649	$2,198	$2,748	$2,748	$2,748	$2,748
Capital Cost (yearly)	$1,099 - $4,397	$1,099 - $4,397	$1,099 - $4,397	$1,099 - $4,397	$1,099 - $4,397			
Annual Costs per year (Capital + Operation and Maintenance)	$1,649 - $4,946	$2,198 - $5,496	$2,748 - $6,046	$3,298 - $6,595	$3,847 - $7,145	$2,748	$2,748	$2,748

2. Full Capture Vortex Separation Systems (VSS)

The cost of installing a VSS is higher than a catch basin insert, so the number of units which can be installed during any single fiscal year may be limited by funding.

The point source area in this TMDL is approximately 68,539 acres. Table 16 provides capacities and the associated costs of various sizes of VSS units. Staff assumes the cost of yearly servicing of a VSS unit to be $2000.

Table 15. Costs associated with utilizing vortex separation systems (VSS).

Capacity	Acres Treated (average)	Unit Capital Cost	Number of devices needed on urban portion of watershed	Capital costs	Yearly costs for servicing all devices
1 to 2 cfs	5	$12,800	13,707	$175,424,000	$164,460,000
19 to 24 cfs	100	$90,000	685	$61,650,000	$8,220,000

Tables 17 and 18 compare the estimated costs of retrofitting the point source areas with low capacity VSS (1 to 2 cfs) and large capacity VSS (19 to 24 cfs), given that the VSS units will be installed within the first five years after the effective date of this TMDL.

Table 16. Costs associated with low capacity vortex gross pollutant separation systems. (Dollars in thousands)

Number of years in the program	1	2	3	4	5	6	7	8
Units Installed	2,741	2,741	2,741	2,741	2,741			
Operations and Maintenance (yearly, cumulative)	$5,482	$10,964	$16,446	$21,928	$27,410	$27,410	$27,410	$27,410
Capital Cost (yearly)	$35,085	$35,085	$35,085	$35,085	$35,085			
Annual Costs per year (Capital + Operation and Maintenance)	$40,567	$46,049	$51,531	$57,013	$62,495	$27,410	$27,410	$27,410

Table 17. Costs associated with large capacity vortex gross pollutant separation systems. (Dollars in thousands)

Number of years in the program	1	2	3	4	5	6	7	8
Units Installed	137	137	137	137	137			
Operations and Maintenance (yearly, cumulative)	$274	$548	$822	$1,096	$1,370	$1,370	$1,370	$1,370
Capital Cost (yearly)	$12,330	$12,330	$12,330	$12,330	$12,330			
Annual Costs per year (Capital + Operation and Maintenance)	$12,604	$12,878	$13,152	$13,426	$13,700	$13,700	$13,700	$13,700

Outfitting a large drainage area with a small number of large VSS systems may be less costly than using a larger number of small VSS systems. Maintenance costs decrease dramatically as the size of the system increases. Topographical and geotechnical considerations also should come into play when choosing VSS systems or other structural systems or devices.

3. End of Pipe Nets

Because end of pipe nets require attachment to the end of a pipe, the number of locations within a drainage system that can be treated are limited. In addition, these nets cannot be installed on very large channels (7 feet in diameter is the maximum). Thus, the costs shown in Table 19 are given per pipe, and no drainage coverage is given.

Table 18. Sample Costs for End of Pipe Nets.

Pipe Size	Release nets (cost estimates)
End of 3 ft pipe	$10,000
End of 4 ft pipe	$15,000
End of 5 ft pipe	$20,000
In 3 ft pipe network	$40,000
In 4 ft pipe network	$60,000
In 5 ft pipe network	$80,000

Actual costs for implementation of structural BMPs can be optimized through consideration of site specific considerations when selecting the appropriate equipment and methods. Capital costs can also be off set through grants and loans from state and federal agencies, as available.

4. Cost Consideration – Plastic Pellet Monitoring

In order to comply with the Santa Monica Bay Debris TMDL, MS4 Permittees must implement a Regional Board Executive Officer approved Plastic Pellet Monitoring and

Reporting Plan. This section approximates the cost of monitoring at the 40 storm drain outfalls along the Santa Monica Bay beaches.

Responsible jurisdictions may monitor each of the 40 storm drain outfalls twice per year (one dry event, and one wet event per year). Assuming that each event takes one staff person four hours to conduct at a burdened hourly rate of $37.50 per hour, the total cost of implementing the PMRP is $12,000 per year (Table 20).

Table 19. Estimation of costs associated with implementing the plastic pellet monitoring and reporting plan.

Monitoring Events per Year	Hours per Event	Rate	Total Cost per Year
80	4	$37.50	$12,000

5. Cost Consideration – Minimum Frequency Trash Assessment and Collection

This section provides an estimate of costs to comply with the Minimum Frequency of Assessment and Collection program for nonpoint source responsible jurisdictions. The cost estimate is based on the minimum frequency of assessment, collection (including cleanup after critical conditions) and evaluation monitoring recommended in section VIII.A.2.

It is assumed that the personnel for trash assessment and collection will be employed by one of the agencies that provide services to the nonpoint source area of the Santa Monica Bay Watershed. As such, equipment and vehicles are available and costs for these items are assumed to be included in the estimate below. It is also assumed that a single person can conduct the complete critical conditions clean up in eight hours per event, and the morning trash assessment and afternoon evaluation in two hours per event.

An estimation of the total number of hours per year to implement critical conditions cleanup events is provided in Table 21. Critical conditions take into account the 27 weekends between April 15 and October 15, plus four major storms. These 31 critical conditions can be directly applied to the City of Santa Monica. For LACDBH, this number is multiplied by the 14 beaches along the Santa Monica Bay that fall within their jurisdiction. In addition, since LACDBH also manages Marina del Rey Harbor, the 31 critical conditions is multiplied by the eight basins in the harbor. Similarly, since the City of Redondo Beach manages King Harbor, the 31 critical conditions are multiplied by five areas in the harbor. For the five other open space nonpoint sources, the critical conditions only take into account the four major storm events.

Table 20. Estimation of Critical Condition hours for Implementing Minimum Frequency of Assessment and Collection Program

Jurisdiction	Critical Conditions (per year)	Hours per Event	Total Hours
Beaches			
Los Angeles County Department of Beaches and Harbors (jointly with other agencies and jurisdictions for specific beaches, as defined in Section V, Table 12)	434	8	3,472

City of Santa Monica (jointly with other agencies and jurisdictions for specific beaches, as defined in Section V, Table 12)	31	8	248
Harbors			
Los Angeles County Department of Beaches and Harbors	248	8	1,984
City of Redondo Beach	155	8	1,240
Open Space/Parks			
County of Los Angeles, County of Ventura, National Park Service, California Department of Parks and Recreation, State Lands Commission	20	8	160

Currently, LACDBH and the City of Santa Monica conduct daily cleanup events along the beaches of the Santa Monica Bay. As a result, the cost for these jurisdictions to comply with the MFAC program will not include the current practices of daily cleanup, and will only include the additional costs of trash compliance assessment and afternoon evaluation. The estimated hours needed to conduct assessment, collection, and evaluation events that are required through this TMDL are summarized in Table 22, below. For beaches managed by LACDBH, the number of MFAC events per year were calculated by adding the 14 compliance assessments per year to the twelve afternoon evaluations per year, and multiplying this by the three locations per beach that will be assessed/evaluated at each event. For the harbors managed by LACDBH and the City of Redondo Beach, the MFAC events were calculated by adding the four morning assessments per year to the two afternoon evaluations per year, and multiplying this by the 39 locations within the harbors (13 basins/areas x 3 locations).

Table 21. Estimation of Assessment, Collection, and Evaluation hours for implementing MFAC program

Jurisdiction	MFAC Description	MFAC (per year)	Hours per Event	Total Hours
Beaches				
County of Los Angeles Department of Beaches and Harbors	1. Assessment once per year per beach (at three sites per beach) in the morning, immediately following cleanup event. 2. Evaluation once per year at 12 beaches (at three sites per beach) at a given time in the afternoon.	78	2	156
City of Santa Monica	1. Assessment four times per year at Santa Monica Beach (at 3 sites) in the morning. 2. Evaluation four times per year at Santa Monica Beach (at 3 sites) in the afternoon.	24	2	48
Harbors				
Los Angeles County Department of Beaches and Harbors and City of Redondo Beach	1. Assessment four times per year at harbors (at 3 sites) in the morning 2. Evaluation two times per year at harbors (at 3 sites) in the afternoon.	234	2	468
Open Space/Parks				
County of Los Angeles, County of Ventura, National Park Service, California Department of Parks and Recreation, State Lands Commission	1. Assessment once per month immediately following cleanup event.	60	2	120

The costs per year to implement the Santa Monica Bay Debris TMDL are summarized in Table 23. Assuming a burdened hourly rate of $37.50 per hour, the estimated annual costs to conduct the Minimum Frequency of Assessment and Collection program is approximately $296,100 for the Santa Monica Bay Watershed.

Table 22. Costs per year from implementing MFAC Program

Jurisdiction	Critical Condition Hours/yr	Assessment and Collection Hours/yr	Total Hours/yr	Rate	Total Cost/yr
Los Angeles County Department of Beaches and Harbors	5,456	444	5,900	$37.50	$221,250
City of Santa Monica	248	48	296	$37.50	$11,100
City of Redondo Beach	1,240	180	1,420	$37.50	$53,250
County of Los Angeles, County of Ventura, National Park Service, California Department of Parks and Recreation, State Lands Commission	160	120	280	$37.50	$10,500
Total					$296,100

6. Cost Comparison

A comparison of costs between strategies based on catch basin inserts (CBIs), low capacity VSS, high capacity VSS, and enforcement of litter laws is presented in Table 24. This comparison was completed previously for a trash TMDL in the Los Angeles River watershed. Staff assumes the relative magnitude of the costs for the different options is applicable for the Santa Monica Bay Debris TMDL, with an additional cost resulting from the minimum frequency of trash assessment and collection program.

Table 23. Cost Comparison (amounts in millions)

	CBI only	Low capacity VSS Units	Large capacity VSS Units	Plastic Pellet Monitoring	Minimum Frequency Trash Assessment and Collection	Enfo Lit
Cumulative capital costs over 8 years	$5.5 – $22.0	$175.4	$61.7	$0	$0	
Cumulative maintenance and capital costs after 8 years	$22.0 – 38.5	$339.9	$69.9	.012	$0.30	
Annual servicing costs after full implementation	$2.7	$27.4	$1.37	.012	$0.30	

[8] Revenues from fines assessed to offset increased law enforcement cost. The cost of a database system used to calculate trash discharges estimated to be less than $250,000.

Trash abatement in the Santa Monica Bay Watershed will differ depending on the options selected by the responsible jurisdictions.

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Appendix I Land Use Classification

The land use classification was developed by Aerial Information Systems as a modified Anderson Land Use Classification and originally included 104 categories. The land use coverages were donated for GIS library use by Southern California Association of Governments (SCAG), and show land use for 2005. The coverages were map-joined into a single coverage by Teale Data Center. The Regional Board layers were aggregated from the TDC coverage into the land uses shown above.

Critical land uses were mapped regardless of resolution limits. Critical land use units below 1 acre in size were mapped as 1-acre units.

Land Uses	Description and subcategories of Each Land Use
High Density Residential	High density single family residential and all multi family residential, mobile homes, trailer parks and rural residential high density.
Low Density Residential	Under 2 units per acre.
Public Facilities	government centers, police and sheriff stations, fire stations, medical health care facilities, religious facilities large enough to be distinguished on an aerial photograph, libraries, museums, community centers, public auditoriums, observatories, live indoor and outdoor theaters, convention centers which were built prior to 1990, communication facilities, and utility facilities (electrical, solid waste, liquid waste, water storage and water transfer, natural gas and petroleum)
Education	Preschools and daycare centers, elementary schools, high schools, colleges and universities, and trade schools, including police academies and fire fighting training schools.
Transportation	Airports, railroads, freeways and major roads (that meet the minimum mapping resolution of 2.5 acres), park and ride lots, bus terminals and yards, truck terminals, harbor facilities, mixed transportation and mixed transportation and utility.
Mixed Urban	Mixed commercial, industrial and/or residential, and areas under construction or vacant in 1990.
Open Space and Recreation	Golf courses, local and regional parks and recreation, cemeteries, wildlife preserves and sanctuaries, botanical gardens, beach parks.
Agriculture	Orchards and vineyards, nurseries, animal intensive operations, horse ranches.
Water	Open water bodies, open reservoirs larger than 5 acres, golf course ponds, lakes, estuaries, channels, detention ponds, percolation basins, flood control and debris dams.

Appendix II Surface Areas of Land Uses

This table shows the square mileage for "high density residential", "low density residential", "commercial" (Comm.), "industrial" (Ind), "public facilities", "education" (Ed), "military", "transportation", "mixed urban", "open space" (Open), "agriculture", "water", and "recreation" (Rec) land uses for every city and incorporated areas in the watershed. The "water" land use of water is itself a nonpoint source of trash, and will therefore receive a combined Load Allocation. For cities that are only partially located on the watershed, the square mileage indicated is for the portion located in the watershed.

Square mileage estimated for each land use for cities in the watershed, and for unincorporated areas.

Owner	High Density Residential	Low Density Residential	Comm	Ind	Public Facilities	Ed	Military	Trans-portation	Mixed Urban	Open	Agricul -ture	Water	Rec	Total for all classes
Agoura Hills	0.065	0.493	0.145	0.006	0.005	0.002	0.000	0.063	0.054	0.794	0.034	0.015	0.020	1.696
Calabasas	0.082	0.127	0.000	0.000	0.000	0.000	0.000	0.000	0.047	2.314	0.007	0.000	0.011	2.588
CA Dept of Parks & Rec	0.072	0.051	0.041	0.002	0.021	0.004	0.000	0.000	0.000	18.374	0.004	0.001	0.673	19.243
Culver City	0.016	0.000	0.048	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.065
El Segundo	1.147	0.000	0.235	1.665	0.086	0.092	0.000	0.023	0.005	0.088	0.000	0.000	0.159	3.501
Hermosa Beach	0.988	0.000	0.177	0.011	0.032	0.027	0.000	0.000	0.000	0.000	0.000	0.000	0.177	1.411
Los Angeles	11.738	1.979	0.732	0.214	0.614	0.667	0.047	3.195	0.069	13.829	0.026	0.067	1.851	35.027
Los Angeles County	2.044	3.744	0.197	0.004	0.222	0.362	0.000	0.004	0.156	47.034	0.719	0.081	0.209	54.775
Malibu	0.911	1.947	0.124	0.003	0.022	0.041	0.000	0.011	0.037	5.743	0.114	0.000	0.176	9.130
Manhattan Beach	2.496	0.000	0.259	0.000	0.052	0.183	0.008	0.010	0.012	0.011	0.000	0.000	0.270	3.301
National Park Service	0.003	0.018	0.000	0.000	0.024	0.000	0.000	0.000	0.000	11.710	0.004	0.000	0.005	11.765
Palos Verdes Estates	2.252	0.553	0.020	0.000	0.024	0.146	0.000	0.051	0.003	0.983	0.000	0.000	0.311	4.343
Rancho Palos Verdes	3.815	0.539	0.096	0.000	0.058	0.127	0.021	0.088	0.080	3.719	0.057	0.000	0.625	9.225
Redondo Beach	2.995	0.000	0.418	0.023	0.228	0.227	0.000	0.016	0.005	0.027	0.036	0.008	0.221	4.204
Rolling Hills	0.003	0.350	0.000	0.000	0.009	0.016	0.000	0.011	0.000	0.276	0.000	0.000	0.000	0.665

Rolling Hills Estates	0.389	0.000	0.000	0.000	0.000	0.013	0.000	0.000	0.000	0.036	0.005	0.000	0.022	0.465
Santa Monica	4.773	0.090	1.288	0.348	0.136	0.288	0.000	0.369	0.035	0.051	0.000	0.000	0.306	7.685
Simi Valley	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.000	0.000	0.000	0.008
State Land Commission	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.375	0.000	0.000	0.000	1.377
Thousand Oaks	1.394	0.445	0.610	0.054	0.031	0.110	0.000	0.087	0.031	4.304	0.043	0.141	0.198	7.447
Torrance	2.586	0.001	0.161	0.035	0.043	0.177	0.000	0.000	0.000	0.053	0.044	0.000	0.155	3.255
Ventura County	0.225	0.747	0.004	0.013	0.005	0.000	0.000	0.004	0.115	7.943	2.349	0.223	0.364	11.992
Westlake Village	1.212	0.078	0.325	0.114	0.070	0.058	0.000	0.119	0.035	2.515	0.000	0.326	0.217	5.069
Totals	**39.204**	**11.164**	**4.882**	**2.492**	**1.683**	**2.539**	**0.076**	**4.052**	**0.684**	**121.188**	**3.440**	**0.861**	**5.970**	**198.236**

Appendix III Definitions

The definitions of terms as used in this TMDL are provided as follows:

Beneficial Uses. Beneficial Uses form the cornerstone of water quality protection under the Basin Plan. Once beneficial uses are designated, appropriate water quality objectives can be established and programs that maintain or enhance water quality can be implemented to ensure the protection of beneficial uses. The designated beneficial uses, together with water quality objectives (referred to as criteria in federal regulations) form water quality standards. Such standards are mandated for all waterbodies within the state under the California Water Code. In addition, the federal Clean Water Act mandates standards for all surface waters, including wetlands. Beneficial uses for waterbodies in the Malibu Creek Watershed are listed and defined below:

Municipal and Domestic Supply (MUN)
Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.

Industrial Service Supply (IND)
Uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, grabel washing, fire protection, or oil well re-pressurization.

Ground Water Recharge (GWR)
Uses of water for natural or artificial recharge of ground water for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers.

Navigation (NAV)
Uses of water for shipping, travel, or other transportation by private, military, or commercial vessels.

Water Contact Recreation (REC-1)
Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, or use of natural hot springs.

Non-contact Water Recreation (REC-2)
Uses of water for recreational activities involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.

Commercial and Sport Fishing (COMM)
Uses of water for commercial or recreational collection of fish, shellfish, or other organisms including, but not limited to, uses involving organisms intended for human consumption or bait purposes.

Warm Freshwater Habitat (WARM)
Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

Cold Freshwater Habitat (COLD)

Estuarine Habitat (EST)
Uses of water that support estuarine ecosystems including, but not limited to, preservation or enhancement of estuarine habitats, vegetation, fish, shellfish, or wildlife (e.g., estuarine mammals, waterfowl, shorebirds).

Marine Habitat (MAR)
Uses of water that support marine ecosystems including, but not limited to, preservation or enhancement of marine habitats, vegetation such as kelp, fish, shellfish, or wildlife (e.g., marine mammals, shorebirds).

Preservation of Biological Habitats (BIOL)
Uses of water that support designated areas or habitats, such as Areas of Special Biological Significance (ASBS), established refuges, parks, sanctuaries, ecological reserves, or other areas where the preservation or enhancement of natural resources requires special protection.

Migration of Aquatic Organisms (MIGR)
Uses of water that support habitats necessary for migration, acclimatization between fresh and salt water, or other temporary activities by aquatic organisms, such as anadromous fish.

Wildlife Habitat (WILD)
Uses of water that support terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.

Rare, Threatened, or Endangered Species (RARE)
Uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened, or endangered.

Spawning, Reproduction, and/or Early Development (SPWN)
Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.

Shellfish Harvesting (SHELL)
Uses of water that support habitats suitable for the collection of filter-feeding shellfish (e.g., clams, oysters, and mussels) for human consumption, commercial, or sports purposes.

Wetland Habitat (WET)
Uses of water that support wetland ecosystems, including, but not limited to, preservation or enhancement of wetland habitats, vegetation, fish, shellfish, or wildlife, and other unique wetland functions which enhance water quality, such as providing flood and erosion control, stream bank stabilization, and filtration and purification of naturally occurring contaminants.

Best Management Practices (BMPs). BMPs are the practice or combination of practices that are determined to be the most effective, practicable means of preventing or reducing the amount of pollution generated by point and nonpoint sources to a level compatible with water quality goals (including technological, economic, and institutional considerations). BMPs are defined in 40 CFR 122.2 as schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. In this TMDL, two general categories of structural BMPs and non-structural BMPs are discussed as possible means to reach "zero" trash goal.

Full Capture Device. A full capture system is any single device or series of devices that traps all particles retained by a 5 mm mesh screen and has a design treatment capacity of not less than the peak flow rate Q resulting from a one-year, one-hour storm in the subdrainage area. Rational equation is used to compute the peak flow rate: $Q = C \times I \times A$, where Q = design flow rate (cubic feet per second, cfs); C = runoff coefficient (dimensionless); I = design rainfall intensity (inches per hour), and A= subdrainage area (acres).

Baseline Load Allocation. The Baseline Load Allocation is analogous to the Baseline Waste Load Allocation for point sources, instead it is for nonpoint sources. Baseline Load Allocation is derived from the existing data, i.e. trash types and quantities, collected by municipalities for various land uses. The progressive reductions in the Load Allocation will be determined based on the Baseline Load Allocation.

Baseline Waste Load Allocation. The Baseline Waste Load Allocation is the Waste Load Allocation assigned to a responsible jurisdiction before reductions are required. The progressive reductions in the Waste Load Allocations could be based on a percentage or variable percentages of the Baseline Waste Load Allocation. The Baseline Waste Load Allocation was calculated based on the annual average amount of trash discharged to the storm drain system from a representative sampling of land use areas, as determined during the Trash Monitoring and Reporting Plan.

Monitoring Entity. The Monitoring Entity is the responsible jurisdiction or one of multiple responsible jurisdictions and/or co-responsible jurisdictions that has been authorized by all the other affected responsible jurisdictions or co-responsible jurisdictions to conduct baseline monitoring on their behalf.

Nonpoint Source. It refers to diffuse, widespread sources of pollution. These sources may be large or small, but are generally numerous throughout a watershed. Nonpoint Sources include but are not limited to urban, agricultural, or industrial areas, roads, highways, construction sites, communities served by septic systems, recreational boating activities, timber harvesting, mining, livestock grazing, as well as physical changes to stream channels, and habitat degradation. NPS pollution can occur year round any time rainfall, snowmelt, irrigation, or any other source of water runs over land or through the ground, picks up pollutants from these numerous, diffuse sources and deposits them into rivers, lakes, and coastal waters or introduces them into ground water.

Responsible jurisdiction. The term "responsible jurisdiction" refers to any responsible jurisdiction or co-responsible jurisdiction of a stormwater permit.

Point Source. The term “point Source” means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include agricultural storm water discharges and return flows from irrigated agriculture.

Plastic Pellets. A plastic resin pellet that is the preproduction or raw material that is used to manufacture plastics. Plastic pellets are usually less than 5mm in diameter.

Standard Industrial Classification Codes. Four digit numerical codes assigned by the U.S. government to business establishments to identify the primary business of the establishment.

Trash. In this document, we are defining “trash” as man-made litter, as defined in California Government Code Section 68055.1(g):

> “Litter means all improperly discarded waste material, including, but not limited to, convenience food, beverage, and other product packages or containers constructed of steel, aluminum, glass, paper, plastic, and other natural and synthetic materials, thrown or deposited on the lands and waters of the state, but not including the properly discarded waste of the primary processing of agriculture, mining, logging, sawmilling or manufacturing."

For purposes of this TMDL, we will consider trash to consist of litter and particles of litter, including cigarette butts. These particles of litter are referred to as “gross pollutants” in European and Australian scientific literature. This definition excludes sediments, and it also excludes oil and grease, and vegetation, except for yard waste that is illegally disposed of in the storm drain system. Additional TMDLs for sediments[9] and oil and grease may be required at a later date.

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[9] Sediments which may be addressed in a separate TMDL are natural particulate matters such as silt and sand. Sediments result from erosion and are deposited at the bottom of a stream. Sediments do not refer to the decomposition of settleable litter into small particulate matters, which this TMDL is trying to prevent.

2511 Wood Household Furniture, Except Upholstered
2512 Wood Household Furniture, Upholstered
2514 Metal Household Furniture
2515 Mattresses, Foundations, and Convertible Beds
2517 Wood Television, Radio, Phonograph, and Sewing Machine Cabinets
2519 Household Furniture, NEC
2521 Wood Office Furniture
2522 Office Furniture, Except Wood
2531 Public Building and Related Furniture
2541 Wood Office and Store Fixtures, Partitions, Shelving, and Lockers
2542 Office and Store Fixtures, Partitions, Shelving, and Lockers, Except Wood
2591 Drapery Hardware and Window Blinds and Shades
2599 Furniture and Fixtures, NEC
2821 Plastics Materials, Synthetic and Resins, and Nonvulcanizable Elastomers
2822 Synthetic Rubber
2823 Cellulosic Manmade Fibers
2824 Manmade Organic Fibers, Except Cellulosic
2893 Printing Ink
3052 Rubber and Plastics Hose and Belting
3053 Gaskets, Packing, and Sealing Devices
3081 Unsupported Plastics Film and Sheet
3082 Unsupported Plastics Profile Shapes
3083 "Laminated Plastics Plate, Sheet, and Profile Shapes"
3084 Plastics Pipe
3085 Plastics Bottles
3086 Plastics Foam Products
3087 Custom Compounding of Purchased Plastics Resins
3088 Plastics Plumbing Fixtures
3089 "Plastics Products, NEC (plastics sausage casings)"
3089 Plastics Products, NEC
3261 Vitreous China Plumbing Fixtures and China and Earthenware Fittings and Bathroom Accessories
3357 Drawing and Insulating of Nonferrous Wire
3731 Ship Building and Repairing
3732 Boat Building and Repairing (boat building)
3911 Jewelry, Precious Metal
3914 Silverware, Plated Ware, and Stainless Steel Ware
3915 Jewelers Findings and Materials and Lapidary Work
3944 Games, Toys, and Children's Vehicles, Except Dolls and Bicycles (metal tricycles)
3949 Sporting and Athletic Goods, NEC
3952 Lead Pencils and Art Goods
3961 Costume Jewelry and Costume Novelties, Except Precious Metal (except cuff links)
3993 Signs and Advertising Specialties (screen printing purchased advertising specialties)
3996 Linoleum, Asphalted-Felt-Base, and Other Hard Surface Floor Coverings, NEC

3999 Manufacturing Industries, NEC
(burnt wood articles, matches, plastic products, hair clippers for humans, tape measures, flocking metal products, beauty and barber shop equipment, lamp shades or paper or textile, electric hair clippers, beauty and barber chairs, fur dressing and finishing)

Tracking Bacterial Pollution Sources in Stormwater Pipes

A final report to the
New Hampshire Estuaries Project/Office of State Planning

Submitted by

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April 2003

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Introduction

The New Hampshire Department of Environmental Services (DES) conducted two rounds of wet weather sampling in the Hampton Harbor watershed during 2002. Samples were collected from stormdrains, tributaries, and harbor stations for bacteria and flow in order to calculate bacteria loads. This information was needed to prioritize pollution sources as part of a Total Maximum Daily Load (TMDL) study of bacteria in Hampton Harbor (Trowbridge, 2003).

Two of the 16 monitored stormdrain pipes were selected for microbial source determination using ribotype profiling. Stormdrain pipe selection was based on the bacteria loading data from the first wet weather sampling that occurred on 7/23/02. The two sampling sites identified as HHPS069 and HHPS182 contributed 12% and 60%, respectively, of the bacteria load from the 16 monitored stormdrains during the first storm event. It was determined that these two pipes would be targeted for more intensive investigations based on the high relative loading of bacteria. Thus, samples were collected during a second storm on October 16, 2002 from these two pipes and analyzed for source species identification using ribotype profiling.

Project Goals and Objectives

The goal of this project was to determine the bacteria source species from two of the highest priority stormdrain pipes that discharge to Hampton Harbor. Specific objectives were to:

1. Collect water samples at the two selected sites during a storm of >0.25 inch total precipitation.
2. Analyze the water samples for bacteria concentrations and determine source species using ribotype profiling.
3. Issue a report for incorporation into the Hampton Harbor Wet Weather Study for the Bacteria TMDL.

Methods

Storm Selection

For this study, one storm was needed with the following characteristics: (1) onset at or around low tide; (2) >0.25 inches total precipitation; (3) occurrence during daylight hours on Monday-Thursday; and (4) very little rainfall for the prior three days. These criteria were met for the storm that DES used for this study.

The storm occurred on October 16, 2002 and was a classic "Nor'easter" with soaking rain and high winds lasting over 12 hours. A total of 1.39 inches of rain fell during the storm (Trowbridge, 2003).

Field Methods

The sampling sites were identified as HHPS182 which is located in Seabrook, west of Rt. 1A and south of Cross Beach Road and HHPS069 which is located in Hampton, west of the municipal parking lot on Ashworth Avenue. Samples were collected from the stormdrain pipe outfalls throughout the duration of the storm in accordance with the Quality Assurance Project Plan (QAPP). The samples were collected at periodic intervals to represent the entire storm. The samples were placed on ice packs in a cooler and delivered to the UNH Jackson Estuarine Laboratory.

The sampling site descriptions, photos and field collection methods for this study are described in detail in the approved QAPP, which is on file at DES.

Lab and Analytical Methods

Detection of Fecal Coliforms and E. coli

Appropriate volumes of water samples were filtered to give at least 20 colonies on agar plates, where possible. The membrane filters were rolled onto **mTEC** agar in petri dishes. Plates were inverted and incubated at 44.5±0.2 °C for 24 hours (USEPA, 1986). Fecal coliforms were enumerated by counting the yellow colonies after the incubation period, and *E. coli* was enumerated by counting the yellow colonies on the plate following incubation of the filter on urea substrate (Jones and Bryant, 2002).

For each sample/site, yellow colonies from the best dilution (10-30 readable colonies) were counted and recorded as fecal coliforms (Rippey et al., 1987). The yellow/yellow brown colonies remaining on the membrane filter after incubation on urea substrate were recorded as confirmed *E. coli* colonies.

Sample Processing

The procedures used for ribotyping *E. coli* isolates for this study have been used previously (Jones and Landry, 2003 and Jones, 2002) and are based to a large extent on those of Parveen et al. (1999). *E. coli* isolates were stored in cryovials at -80°C and re-cultured onto trypticase soya agar (TSA). Some of the stored isolates could not be re-cultured. Cultures on TSA were incubated overnight at room temperature (~20°C). Some of the resulting culture was transferred to duplicate cryovials containing fresh glycerol/DMSO cryo-protectant media for long-term storage at -80°C.

A RiboPrinter was used to process *E. coli* culture for ribotype determinations. After preparation of the samples, the automated process involved lysing cells and cutting

the released DNA into fragments via the restriction enzyme EcoR1. These fragments were separated by size through gel electrophoresis and then transferred to a membrane, where they were hybridized with a DNA probe and mixed with a chemiluminescent agent. The DNA probe targeted 5S, 16S and 23S ribosomal RNA genes. A digitizing camera captured the light emission as image data, from which the system extracted a RiboPrint® pattern. This pattern could be compared to others in the RiboPrinter database for characterization and identification based on densiometry data, although our approach has conformed to other ribotyping studies in using banding patterns instead as the basis for comparing patterns.

Band Identification

The images were transferred from the RiboPrinter into GelComparII (Applied-Maths) analytical software. The bands in lanes containing the standard were labeled and entered into the memory for optimization of gel pattern images. The densiometry data were processed for band identification. The ribopattern data for each separate water sample isolate were then selected for identification of source species.

Source Species Databases

The analysis of water sample isolates for identification of source species was based on two distinct databases. The first source species database used was composed of the *E. coli* strains isolated from source species sampled in the Hampton Harbor watershed. This database contained ribotypes for 11 non-human source species and wastewater, and included 120 total ribotypes (Table 1). All water ribotypes that matched the Hampton Harbor database at <90% similarity were reanalyzed using a full New Hampshire source species database. This state database was composed of 676 ribotypes from 26 different non-human source species, humans, septage and wastewater (Table 1). The state database contained ribotypes for more species and more for each shared species except for otters, cormorants and chickens, which were all from the Hampton Harbor watershed.

Table 1 Source species databases for New Hampshire and Hampton Harbor watershed.

Source species category	Source species	Number of Isolates	
		New Hampshire	Hampton Harbor
HUMANS/SEPTAGE			
	septage	16	0
	wastewater	107	25
	humans	68	0
PETS			
	cat	11	4
	dog	54	19

Source species category	Source species	Number of Isolates	
		New Hampshire	Hampton Harbor
LIVESTOCK			
	alpaca	3	0
	buffalo	10	0
	chicken	3	3
	cow	54	0
	goat	4	0
	horse	27	0
	sheep	2	0
WILDLIFE			
	coyote	19	4
	deer	59	7
	mouse	3	0
	muskrat	12	0
	otter	4	4
	raccoon	32	0
	rabbit	30	0
	red fox	25	4
	skunk	6	0
AVIAN SPECIES			
	cormorant	14	14
	duck	10	1
	geese	44	31
	gull	36	4
	pigeon	6	0
	robin	3	0
	sparrow	4	0
	starling	3	0
	wild turkey	7	0
	Total	676	120

Data Analysis

All data were analyzed with GelComparII software on a Dell computer, where the source species database was also stored. Hard copies of ribotype patterns and similarity coefficients for the unknown and its most closely related source species were printed for interpretation. Interpretation and accompanying graphical representations of the data were done using MS Excel on Macintosh computers.

Optimization was set at 1.56% and band position tolerance was set at 1.00%. Both of these parameters were used to adjust the ability to differentiate between bands for the degree of accuracy desired, and also to compensate for possible misalignment of homologous bands caused by technical problems.

Similarity indices were determined using Dice's coincidence index (Dice, 1945) and the distance among clusters calculated using cluster analysis. The source species profile with the best similarity coefficient at a given set of optimization and tolerance settings was accepted as an indication of the possible source species for the water sample isolate. For this study, the predetermined threshold similarity index that was considered to be a minimum value for identifying source species was 90% for comparisons to the source species databases. The identification of the source species was considered successful if the value calculated for a given water isolate was equal to or greater than the threshold value; if the calculated value was below the threshold similarity index, the water sample isolate was considered to be of unknown origin. Thus, the results of the identifications reported are less than completely accurate (0% tolerance and 100% similarity). Nonetheless, useful information has hopefully been gained to help guide management decisions and resource allocation for pollution source identification and elimination in the Hampton Harbor area.

Results and Discussion

Bacteria Concentrations throughout the Storm Event

Fecal coliform and *E. coli* concentrations were measured as part of this study. The concentrations in the pipes at the time of ribotype sample collection are summarized in Table 2. The *E. coli*:fecal coliform ratio was high (94%) for all samples. *E. coli* concentrations decreased steadily with time in HHPS069, from 304,000/100 ml to 72,000/100 ml (Figure 1). In HHPS182, concentrations increased through the first four sample times, from 14,400/100 ml to 1,1120,000/100 ml, before decreasing sharply thereafter to 172,000/100 ml. The gradual rise and sharp decline in *E. coli* concentrations at HHPS182 could be a result of the stormdrain pump stations (River Street and Ocean Boulevard stations) associated with the effluent from the northern pipe of this drainage system.

Table 2 Fecal coliform and *E. coli* concentrations in stormdrain pipes and number of isolates yielding useable ribotypes.

	HHPS069		Ribotype	**HHPS182**		Ribotype
Sample time	FC/100 ml	*Ec*/100 ml	isolates	FC/100 ml	*Ec*/100 ml	isolates
10:30				15,600	14,400	8
11:30	304,000	304,000	1			
11:47				20,400	18,800	9
12:30	236,000	212,000	6			

Sample time	HHPS069 FC/100 ml	HHPS069 *Ec*/100 ml	Ribotype isolates	HHPS182 FC/100 ml	HHPS182 *Ec*/100 ml	Ribotype isolates
13:16				136,000	120,000	5
14:00	180,000	172,000	6			
14:43				1,120,000	1,120,000	8
15:45	140,000	120,000	3			
16:09				180,000	172,000	5
16:50	72,000	72,000	8			

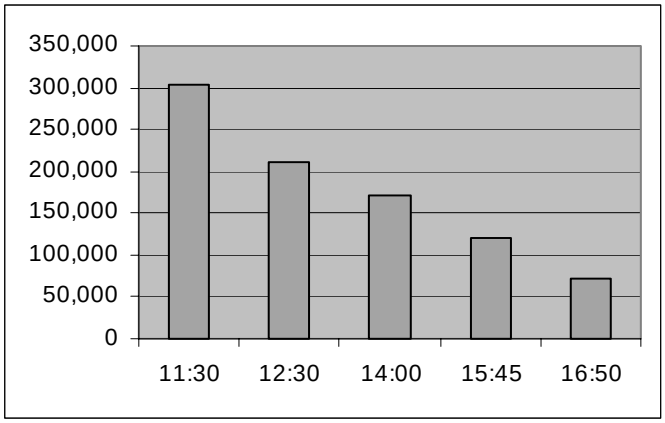

Figure 1 Site HHPS069 *E. coli* concentrations throughout the storm event.

Source Species Identification

The Hampton Harbor and New Hampshire source species databases were used to identify sources for 24 and 35 isolates from water samples taken from HHPS069 and HHPS182, respectively. Banding patterns for water sample and source species isolates were considered to be the same if there was 90% or greater similarity with reference isolates. Overall, sources for 78% of the 59 isolates were identified (Table 3).

Table 3 Identified source species (90% similarity) for 59 *E. coli* strains isolated in effluent from two stormdrain pipes.

Source	HHPS069	HHPS182	Both sites	%
human/wastewater	3	9	12	0.20
cormorant	3	8	11	0.19
goose	6	1	7	0.12
fox	3	2	5	0.08
raccoon	0	2	2	0.03
coyote	0	2	2	0.03
cat	0	2	2	0.03
seagull	1	1	2	0.03

Source	HHPS069	HHPS182	Both sites	%
dog	1	1	2	0.03
pigeon	1	0	1	0.02
Total	18	28	46	
%	0.75	0.80	0.78	
Unknowns	6	7	13	
%	0.25	0.20	0.22	

Source Species for Pollution Source HHPS069

Source species identification was successful for 18 of the 24 *E. coli* isolates (75%) from HHPS069 (Table 3). The most common source species was goose (6 isolates), followed by cormorant, fox and wastewater (3 isolates each). One isolate was identified for each of the following species: dog, pigeon and seagull. The timing of the appearance of the source species showed no clear trends, except that the goose isolates did not appear until the third sample (Table 4). Table 5 summarizes the identified source species by type. Birds were the most commonly identified source type (46%), followed by humans and wildlife (each at 13%) and pets (4%).

Table 4 Temporal identification of source species for *E. coli* in effluent from two stormdrain pipes.

Site HHPS	Time	cat	cormorant	coyote	dog	fox	goose	pigeon	raccoon	seagull	wastewater
069A	11:30										
069B	12:30		2			1		1			1
069C	14:00				1	1	2				
069D	15:45						3				
069E	16:50		1			1	1			1	2
	Total	**0**	**3**	**0**	**1**	**3**	**6**	**1**	**0**	**1**	**3**
182A	10:30	1	2			1	1			1	2
182B	11:47		1	2							3
182C	13:16	1									2
182D	14:43		4			1			2		1
182E	16:09		1		1						1
	Total	**2**	**8**	**2**	**1**	**2**	**1**	**0**	**2**	**1**	**9**
	Overall	***2***	***11***	***2***	***2***	***5***	***7***	***1***	***2***	***2***	***12***

Table 5 Identified source species types at two storm pipes in Hampton Harbor during a storm event on October 16, 2002.

Source species type	HHPS069		HHPS182		Both pipes	
	# of isolates	%	# of isolates	%	# of isolates	%
Human (wastewater)	3	13%	9	26%	12	20%
Pets	1	4%	3	9%	4	7%
Birds	11	46%	10	29%	21	36%
Livestock	0	0%	0	0%	0	0%
Wildlife	3	13%	6	17%	9	15%
Unidentified	6	25%	7	20%	13	22%
Total isolates	**24**		**35**		**59**	

Source Species for Pollution Source HHPS182

Source species identification was successful for 28 of the 35 *E. coli* isolates (80%) from HHPS182 (Table 3). The most common source was wastewater with 9 isolates, followed by cormorant with 8 isolates, and cat, coyote, fox and raccoon with 2 isolates each. One isolate was identified for each of three other species: dog, goose and seagull. The timing of the appearance of the source species showed wastewater and cormorant sources appeared consistently through the sampling period (Table 4). The *E. coli* concentration was much higher for the fourth sample (Table 2), and cormorants were the most commonly identified source. Fox, raccoon and wastewater were also identified in the fourth sample.

Table 5 summarizes the identified source species by type. Birds (29%) and humans (26%) were the most commonly identified source types, followed by wildlife (14%) and pets (9%).

Source Species for Both Pipes

The source species identified for both pipes showed wastewater to be the most common source (12 isolates), followed by cormorant (11), goose (7) and fox (5) (Table 5). Two isolates were identified for each of the following: cat, coyote, dog, raccoon and seagull. One pigeon isolate was identified. Table 5 shows the overall most common type of source was birds (36%), followed by humans (20%), wildlife (15%) and pets (7%).

Conclusions

The present study represents the third published report on use of ribotyping to identify source species on New Hampshire estuarine waters. As such, the procedures and interpretations used have benefited from lessons learned in past studies (Jones and

Landry, 2003; Jones, 2002), and changes were made. Previous ribotyping studies in New Hampshire involved use of non-automated ribotyping procedures. The recent purchase of a fully automated RiboPrinter at UNH/JEL has provided the capacity to conduct ribotyping more rapidly, with more consistency and at a lower cost. The most striking difference resulting from use of a RiboPrinter in this study is the higher level of similarity (90%) used to provide for a reasonable percentage of identified isolates (78%). This means that the identified isolates were more accurately matched to source species than in previous reports where 80% similarity was used.

Another difference in approach used for this study compared to previous studies in New Hampshire was use of two source species databases. A local database was used first to identify sources, and then the larger state database was used to identify sources of isolates that did not meet the threshold similarity index in matching to known source ribotypes in the local database. This approach was used to see how well a small, local database works compared to a larger database. Both databases were still quite closely related from a geographic standpoint, as all ribotypes in the state database were collected from species in communities adjacent to the Great Bay Estuary, the Atlantic coast or Hampton Harbor.

There were distinct differences in identified source species for the two pipes. These differences probably reflect differences in species that are present and depositing fecal material to the drainage area. There are numerous factors that could affect the appearance of the different source species in the effluent from the two pipes. Some species may inhabit or have some presence in the pipe/drainage system prior to the storm. In the case of wastewater/human sources, these could include leaky sewer pipes underground that may cross the storm drainage pipes. The timing of the appearance of source species probably reflects time required for transport of the fecal material with runoff to the end of the pipe. The feces from birds on rooftops may take longer to reach the end of the pipes than pet waste deposited on sidewalks.

The types of source species identified were of interest. Many storm water/runoff studies have attributed fecal contamination to pet wastes. Of the four types of sources identified, pets were the least common, behind birds, humans and wildlife. It may be that pets are not common in the drainage area during October, while birds may be much more prevalent.

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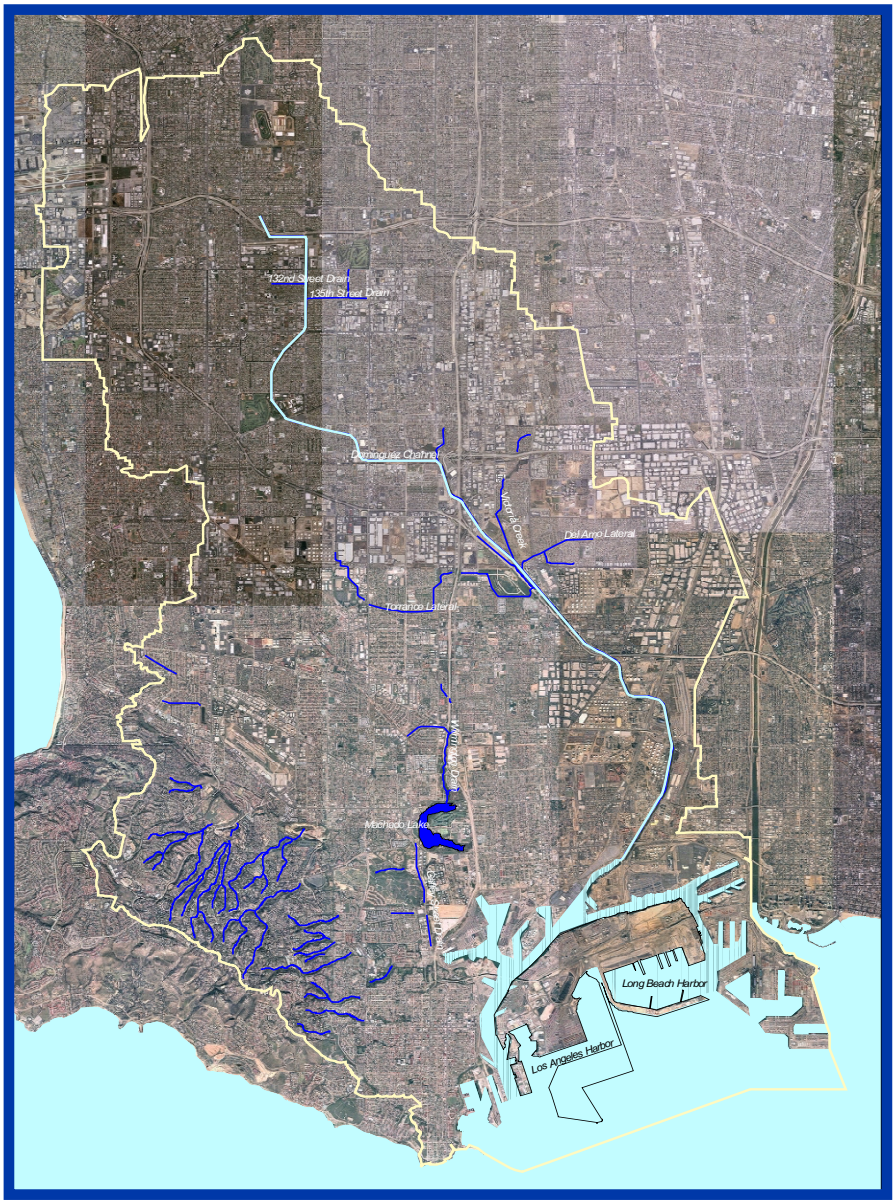
Dominguez Watershed Management Master Plan

"An urban industrial watershed in balance with the environment"



Dominguez Watershed Advisory Council

County of Los Angeles Department of Public Works

FINAL

Dominguez Watershed Management Master Plan

County of Los Angeles Department of Public Works
900 South Fremont Avenue, 11th Floor
Alhambra, California 91803-1331

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Carlsbad, California 92008

In association with:

Aspen Environmental Group, Inc.
Brown & Caldwell
Chambers Group, Inc.

April 2004

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ACRONYMS AND ABBREVIATIONS

AAW	Adopt-a-Waterway program
AB	Assembly Bill
ADT	Average daily traffic
af	Acre feet
AQMD	Air Quality Management Plan
ATSF	Atchison, Topeka, and Santa Fe Railway Company
BAT	Best Available Technology
BCT	Best Convention Technology
BEDI	Brownfields Economic Development Initiative
BHC	Benzene hexachloride
BMP	Best Management Practice
BOD	Biological Oxygen Demand
BPTCP	Bay Protection and Toxic Cleanup Program
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CCC	California Coastal Commission
CDFG	California Department of Fish and Game
CDHS	California Department of Health Services
CDMG	California Department of Mines and Geology
CDS	Continuous deflection separator
CEQA	California Environmental Quality Act
CERCLIS	Comprehensive Environmental Response, Compensation & Liability Information System
CESA	California Endangered Species Act
CFR	California Federal Regulation
cfs	Cubic feet per second
CGS	California Geological Survey
cms	Cubic meters per second
CNDDB	California Natural Diversity Data Base
CNPS	California Native Plant Society
CO	Carbon monoxide
COC	Constituent of Concern
COD	Chemical Oxygen Demand
County	Los Angeles County
CRA	Colorado River Aqueduct
CREEC	California Regional Environmental Education Community
CSUDH	California State University Dominguez Hills
CSTF	Contaminated Sediment Task Force
CTR	California Toxics Rule
CWA	Clean Water Act
CWSC	California Water Service Company
CZMA	Coastal Zone Management Act
DDT	Dichlorodiphenyltricholorethane
DO	Dissolved Oxygen
DOC	Department of Commerce
DOT	Department of Transportation
DTSC	Department of Toxic Substances Control

DURRF	Dominguez Urban Runoff Recycling Facility
DWAC	Dominguez Watershed Advisory Council
EBEP	Enclosed Bays and Estuaries Plan
ECP	Erosion Control Plan
EDQL	Ecological Data Quality Level
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EMAP	Environmental Monitoring and Assessment Program
EMC	Event Mean Concentration
EPA	U.S. Environmental Protection Agency
ER-L	Effects Range-Low
ER-M	Effects Range-Median
ERMQ	Effect Range Median quotients
ESA	Endangered Species Act
ESAs	Environmentally Sensitive Areas
EZ/EC	Empowerment Zone/Enterprise Communities
FAA	Federal Aviation Administration
FBO	Fixed Base Operators
FDA	Food and Drug Administration
FMP	Fishery Management Plan
ft	Feet
GIS	Geographic Information System
HDSFR	High-density single family residential
HUD	Department of Housing and Urban Development
IC_{50}	50% Inhibitory Concentration
ISWP	Inland Surface Waters Plan
JWPCP	Joint Water Pollution Control Plant
km	kilometer
KMHRP	Ken Malloy Harbor Regional Park
L	Liter
LAA	Los Angeles Aqueduct
LACDPW	Los Angeles County Department of Public Works
LADWP	Los Angeles Department of Water and Power
LAHD	Los Angeles Harbor Department
LARWPCB	Los Angeles Regional Water Pollution Control Board
LARWQCB	Los Angeles Regional Water Quality Control Board
LAX	Los Angeles International Airport
LBWD	Long Beach Water Department
LC_{50}	50% Lethal Concentration
LCP	Local Coastal Program
LDSFR	Low-density single family residential
LLNL	Lawrence Livermore National Laboratory
m	Meters
maf	Million acre feet
MBAS	Methylene Blue Active Substances
MCL	Maximum Contaminant Level
MDL	Method Detection Limit
MEP	Maximum Extent Practicable

MFR	Multi-family residential
MGD	Million gallons per day
mi	Mile
mL	Milliliter
MPN	Most probable number
MS4	Municipal Separate Storm Sewer System
mt	Metric ton
MTA	Los Angeles County Metropolitan Transportation Authority
MTBE	Methyltertiary butyl ether
mtpy	Metric tons per year
MW	Megawatts
MWD	Metropolitan Water District of Southern California
NAAQS	National ambient air quality standards
NAPL	Non-aqueous phase liquid
NEPA	National Environmental Protection Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOAEL	No Observed Adverse Effect Level
NOEC	No Observed Effect Concentration
NOI	Notice of Intent
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NTR	National Toxics Rule
NURP	Nationwide Urban Runoff Program
O_3	Ozone
PAHs	Polynuclear aromatic hydrocarbons
Pb	Lead
PCBs	Polychlorinated biphenyls
PCE	Tetrachloroethylene
pH	Acidity/Alkalinity
PIPP	Public Information and Participation Program
$PM_{2.5}$	Fine particulate matter equal to or less than 2.5 microns in size
PM_{10}	Particulate matter equal to or less than 10 microns in size
POTW	Publicly owned treatment works
ppb	Parts per billion
ppm	Parts per million
QA/QC	Quality Assurance/Quality Control
RARE	Rare, threatened, or endangered species beneficial use category
RCRA	Resource Conservation and Recovery Act
REC-1	Water contact recreation beneficial use category
REC-2	Non-contact water recreation beneficial use category
ROC	Reactive organic compounds
RWQCB	Regional Water Quality Control Board
SAL	State action level
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison Company

SCWC	Southern California Water Company
SCWRP	Southern California Wetland Recovery Project
SCCWRP	Southern California Coastal Water Research Project
SEA	Significant Ecological Areas
Section 303(d) List	List of Impaired Water Bodies
SERRF	Southeast Resource Recovery Facility
SFB	San Fernando Basin
SIC	Standard Industrial Classification
SMBRP	Santa Monica Bay Restoration Project
SMURRF	Santa Monica Urban Runoff Recycling Facility
SO_2	Sulphur dioxide
South Bay COG	South Bay Council of Governments
SP	Southern Pacific Transportation company
SQMP	Stormwater Quality Management Program
SR	State Route
SRF	State Revolving Fund
SSC	California Species of Special Concern
SUSMP	Standard Urban Storm Water Mitigation Plan
SVOCs	Semi-volatile Organic Compounds
SWAMP	Surface Water Ambient Monitoring Program
SWANCC	Solid Waste Agency of Northern Cook County
SWP	State Water Project
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
taf	Thousand acre feet
TBT	Tributyltin
TCE	Trichloroethylene
TDS	Total dissolved solids
TEA	Transportation Enhancement Activities
TEA21	Transportation Equity Act of the 21st Century
TEL	Lower threshold effect level
The California Water Code	Porter-Cologne Water Quality Control Act
TIE	Toxicity Identification Evaluation
TITP	Terminal Island Treatment Plant
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TOC	Total organic carbon
tpy	Tons per year
TRE	Toxicity Reduction Evaluation
TSS	Total suspended solids
TU	Toxicity Unit
μg	Microgram
UP	Union Pacific Railway Company
USACE	U.S. Army Corps of Engineers
USBR	United States Bureau of Reclamation
USDOE	U.S. Department of Energy
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Service

VOCs	Volatile Organic Compounds
WARM	Warm freshwater habitat beneficial use category
WBMWD	West Basin Municipal Water District
WCB	West Coast Basin
WMMP	Watershed Management Master Plan
WRD	Water Replenishment District of Southern California
WSPA	Western States Petroleum Association
WY	Water Year
yr	Year

GLOSSARY

Antidegradation Policy
Requires that existing high-quality waters be protected and maintained unless the need to lower water quality is justified.

Beneficial Uses
Defined as the uses of water necessary for the survival or well being of man, plants, and wildlife. Beneficial uses are designated in the Basin Plan for water bodies within the region. Examples include municipal and domestic supply, water contact recreation, wildlife habitat, and warm water aquatic habitat.

BMPs (Best Management Practices)
Schedules of activities, pollutant treatment practices or devices, prohibitions of practices, general good housekeeping practices, pollution prevention and educational practices, maintenance procedures, and other management practices or devices to prevent or reduce the discharge of pollutants directly or indirectly to receiving waters or the storm water conveyance system. BMPs also include but are not limited to treatment practices, operating procedures, and practices to control runoff, spillage of leaks, or drainage from raw materials storage. BMPs may include any type of pollution prevention, pollution control, or pollution treatment measure.

Brownfields
A term used to describe vacant, abandoned, or underutilized commercial or industrial property that has or is perceived to have hazardous waste contamination that may require clean up before the land can be redeveloped.

Daylight Historic Streams
The action of removing overlying land and pipeline associated with a buried storm drain, and then restoring the historical tributary or stream is referred to as daylighting.

Developer
A person who seeks or receives permits for or who undertakes land development activities.

Illicit Connection
A pipe, facility, or other device connected to the storm water conveyance system or receiving waters, which has not been reviewed and authorized by the City; or a permitted pipe, facility, or other device that subsequently conveys illegal discharges.

Illicit Discharge
Any discharge into urban runoff, the storm water conveyance system, or receiving waters that is prohibited. This includes, but is not limited to, discharges of non-storm water that are not exempt discharges, any discharge from an illegal connection, and any discharge that contains additional pollutants due to the absence of a required BMP or failure of a BMP. Discharges that require a County permit or a RWQCB permit that has not been issued or has not been acknowledged by the Discharger to be applicable are illegal discharges. Discharges regulated under an applicable RWQCB or County permit or SWPPP are illegal discharges unless compliance with all applicable permit and SWPPP conditions is maintained.

Impaired Water Body
Water body listed by the State Water Resources Control Board (SWRCB) as impaired by a particular pollutant of concern.

Impervious Surface
Constructed or modified surfaces that cannot effectively infiltrate rainwater. The term includes, but is not limited to, rooftops, pavement, sidewalks, and driveways.

Infiltrate
The process of percolating storm water or non-storm water into the soil.

Infiltration BMP
Any structural treatment BMP designed to percolate water into the soil, such as an infiltration trench or basin.

MEP (Maximum Extent Practicable)
The acceptability standard for BMPs. A BMP is considered effective if it prevents, reduces, or removes the pollutants that otherwise would be present in runoff due to human activity.

MS4 (Municipal Separate Storm Sewer System)
System of conveyances (including roads, streets, catch basins, curbs, gutters, ditches, natural drainage features or channels) for urban runoff.

Non-Point Source
Diffuse, widespread sources of pollution. Non-point sources include but are not limited to urban, agricultural, or industrial areas, roads, highways, construction sites, communities served by septic systems, and/or recreational boating activities.

Non-Structural BMP
A management practice or activity designed to reduce pollutants and/or to avoid the introduction pollutants to the storm water conveyance system, and/or to control the source of pollutants. Examples of non-structural BMPs include good housekeeping practices, employee training programs, preventative maintenance practices, public education and outreach, self-inspection and quality assurance practices, and spill response planning.

Pollutant
Any agent that may cause or contribute to the degradation of water quality such that public health, the environment, or beneficial uses of the waters may be affected.

Pollution Prevention Plan
Document that meets the requirements of a Storm Water Pollution Prevention Plan (SWPPP) set out in the State General Construction Storm Water Permit or State General Industrial Storm Water Permit.

Pollution Prevention Practices
Non-structural methods to prevent pollution from entering the storm water conveyance system such as use of smaller quantities of toxic materials, substitution of less toxic materials, changes to production processes to reduce waste, decreases in wastewater flows, segregation of wastes, and/or treatment of wastes onsite to decrease volume and/or toxicity.

Receiving Waters
All waters that are "Waters of the State" within the scope of the State Water Code, including, but not limited to, natural streams, creeks, rivers, reservoirs, lakes, ponds, water in vernal pools, lagoons, estuaries, bays, the Pacific Ocean, and groundwater.

Redevelopment
Any construction, alteration or improvement of an already developed site that will increase the total impervious surface area of that site, or that involves activities that could expose contaminants to rainfall.

Retrofit
A BMP designed for an existing development site or activity that previously had either no BMPs in place or that relied on BMPs inadequate to meet the storm water management requirements of the site or activity.

Storm Water
Urban runoff consisting only of those discharges that originate from a precipitation event.

(SWPPP) Storm Water Pollution Prevention Plan
A document that describes the BMPs to be implemented and other steps to be taken by the Discharger to meet the requirements set out in the General Construction Storm Water Permit or General Industrial Storm Water Permit.

Structural BMP
Any BMP that relies on either a physical condition (other than an entirely natural and undisturbed condition), or on a constructed or installed device to reduce or prevent pollutants in storm water discharges or non-storm water discharges. Constructed or enhanced BMPs also may depend on natural materials and processes (e.g., buffers, constructed swales, treatment wetlands), that require periodic maintenance to function as designed.

Tributary to an Impaired Water Body
A channel, stream, or ephemeral stream that conveys urban runoff to an impaired water body.

Urban Runoff
All flows in a storm water conveyance system and consists of the following components: (1) storm water (wet weather flows) and (2) non-storm water discharges (dry weather flows).

Watercourse
A permanent, ephemeral, or intermittent stream or other body of water, either natural or improved, which gathers or carries surface water.

Watershed
The geographically defined drainage area which drains to a receiving water body (e.g., Los Angeles Harbor).

Water Quality Objectives
Numeric and/or narrative limits or bans on substances, water characteristics, and activities.

Water Quality Standards
The water quality standards adopted by the State of California include water quality objectives, beneficial uses, and an antidegradation policy.

1AGREEMENT NO. _____

AGREEMENT
(Option 1)

This AGREEMENT, is entered into on _____, 2012, by and between the LOS ANGELES COUNTY FLOOD CONTROL DISTRICT, a body corporate and politic (hereinafter referred to as the LACFCD), and the □□CITY OF2□□a municipal corporation (hereinafter referred to as CITY).

RECITALS

WHEREAS, California Regional Water Quality Control Board, Los Angeles Region, has promulgated water-quality regulations, including a Total Maximum Daily Load for Trash (Trash TMDL) for Machado Lake, applicable to cities located in the Machado Lake Watershed; and

WHEREAS, CITY desires to achieve compliance with the Trash TMDL by installing TRASH EXCLUDERS (as hereafter defined) within catch basins owned by the LACFCD, located within CITY streets; and

WHEREAS, CITY will administer the procurement and installation of said TRASH EXCLUDERS;

NOW, THEREFORE, in consideration of the mutual covenants herein contained, the LACFCD and CITY hereto mutually agree as follows:

(1) DEFINITION:

a. TRASH EXCLUDER, as referred to in this AGREEMENT, shall mean any device, which partially blocks the opening or outlet of a catch basin to prevent trash from entering the storm drain system, including Automatic Retractable Screen devices and Connector Pipe Screen devices, installed by CITY at the opening of or inside any catch basin owned by the LACFCD. Exhibit A identifies locations of TRASH EXCLUDERS within CITY.

b. STORM SEASON, as referred to in this AGREEMENT, shall mean the period beginning October 1 and ending April 30 of each year.

c. MAJOR STORM EVENT, as referred to in this AGREEMENT, shall mean a storm with an intensity of one inch or more of rainfall per 12 hours, occurring within CITY. Countywide, an average storm season produces four major storm events.

d. DRY SEASON, as referred to in this AGREEMENT, shall mean the period beginning on May 1 and ending September 30 of each year.

(2) LACFCD AGREES:

a. To permit CITY to utilize catch basins owned by the LACFCD and located within CITY, as identified in Exhibit A, for the purpose of installing, operating, and maintaining TRASH EXCLUDERS.

b. To maintain all TRASH EXCLUDERS in accordance with the maintenance standards delineated in Exhibit B. The LACFCD may modify these maintenance standards from time to time, provided the LACFCD provides CITY at least 60 days advance written notice of the modifications together with the LACFCD's reason(s) for making the modifications.

c. To send a billing invoice to CITY, on a quarterly basis, itemizing the services performed and the costs incurred by the LACFCD in connection with the activities described in Section (2)b. above, during that quarter. The amounts billed to CITY shall be in accordance with the schedule of costs attached as Exhibit C.

d. To indemnify, defend, and hold the CITY and its officers, employees, and agents, harmless from and against any claims, demands, liability, damages or costs to the extent that such claim, demand, liability, damage, or cost arises from or is caused by any negligent or wrongful act or omission of the LACFCD or any of its officers, employees, agents or contractors, in connection with the performance of any of the LACFCD's duties under this AGREEMENT.

e. The LACFCD shall include CITY within the protection of any indemnification clause contained in any ancillary contract relating to the TRASH EXCLUDERS.

f. To pay CITY the amount of $15.25 in 2012 dollars, adjusted annually according the Consumer Price Index for all urban consumers in the Anaheim, Los Angeles, and Riverside areas, as published by the U.S. Government Bureau of Labor Statistics, per year, for each catch basin identified in Exhibit A. This amount represents the annual amount the LACFCD would otherwise have had to incur for removing trash and debris from the catch basins identified in Exhibit A, had CITY not installed TRASH EXCLUDERS in those catch basins.

(3) CITY AGREES:

a. To provide Exhibit A identifying locations of TRASH EXCLUDERS within CITY to be maintained by LACFCD.

b. To patrol areas in which any TRASH EXCLUDERS have been installed, during storm events, to verify that all TRASH EXCLUDERS are functioning properly and shall relieve any instances of plugging of any catch basin fitted with a TRASH EXCLUDER. Requests for Service coming to the LACFCD to clean or service any catch basin identified on Exhibit A, during a storm event, will be forwarded to CITY for their prompt handling, action, and closure.

c. To pay each billing invoice sent by the LACFCD, as described in Section (2)c., above, within 30 days of the date of said invoice.

d. To indemnify, defend, and hold the LACFCD and the County of Los Angeles and their officers, employees, agents and contractors, harmless from and against any claims, demands, liability, damages or costs arising from or caused by the breach of any of the CITY'S obligations under this AGREEMENT, or the TRASH EXCLUDERS or any of them, except to the extent that such claim, demand, liability, damage or cost arises from or is caused by the negligent or wrongful act or omission of the LACFCD or the County or any of its officers, employees, agents, or contractors.

(4) IT IS MUTUALLY UNDERSTOOD AND AGREED AS FOLLOWS:

a. The TRASH EXCLUDERS are the property of CITY. The LACFCD shall retain ownership of the catch basins, exclusive of the TRASH EXCLUDERS.

b. Termination

(i) CITY acknowledges that the LACFCD intends to retain a contractor to perform the operation and maintenance services on the TRASH EXCLUDERS described above. In the event that the LACFCD's contract with its contractor(s) is terminated or expires, the LACFCD may terminate this AGREEMENT in accordance with the following:

(1) LACFCD shall give CITY not less than 60 days prior written notice of the termination;

(2) CITY shall take over the operation and maintenance of the TRASH EXCLUDERS, and shall enter into a new Agreement

with the LACFCD providing for said operation and maintenance of the TRASH EXCLUDERS by CITY.

(3) If CITY fails to enter into said new Agreement within 90 days of the written notice of the termination by the LACFCD, LACFCD may, in its sole discretion, provide CITY with a written notice to remove the TRASH EXCLUDERS, or any of them, and restore the affected catch basin(s) to a condition similar to or better than that which existed prior to installation of the TRASH EXCLUDERS.

(4) If the LACFCD provides CITY with a notice to remove the TRASH EXCLUDERS, CITY shall complete all work required to comply with the notice within ninety (90) days. If CITY fails to do so, the LACFCD may, in its sole discretion, complete said work at CITY'S expense.

(ii) CITY may take over the operation and maintenance of the TRASH EXCLUDERS, or any of them, by giving a thirty (30)-day prior written notice to the LACFCD of CITY'S intent to do so, and by entering into a new agreement with the LACFCD, for CITY to perform the operation and maintenance of the TRASH EXCLUDERS. Upon the execution of the new agreement by both CITY and the LACFCD, this AGREEMENT shall be deemed terminated.

(iii) CITY may unilaterally terminate this AGREEMENT without cause, in CITY'S sole discretion, at any time, by giving a thirty (30)-day prior written notice to the LACFCD. In the event this AGREEMENT is terminated, pursuant to this Section, the LACFCD may, in its sole discretion, provide CITY with a written notice to remove the TRASH EXCLUDERS, or any of them, and restore the affected catch basin(s) to a condition similar to or better than that which existed prior to installation of the TRASH EXCLUDERS. If the LACFCD provides CITY with such a notice, CITY shall complete all work required to comply with the notice within ninety (90) days. If CITY fails to do so, the LACFCD may, in its sole discretion, complete said work at CITY'S expense.

(iv) If CITY fails to comply with any of the terms or conditions of this AGREEMENT, the LACFCD may, in its sole discretion, terminate this AGREEMENT and provide CITY with a written notice to remove the TRASH EXCLUDERS, or any of them, and restore the catch basin(s) to a condition similar to or better than that which existed prior to installation of the TRASH EXCLUDERS. If the LACFCD provides CITY with such a notice, CITY shall complete all

work required to comply with the notice within ninety (90) days. If CITY fails to do so, the LACFCD may, in its sole discretion, complete said work at CITY'S expense.

(v) If the LACFCD removes any TRASH EXCLUDER pursuant to Sections (4)b.(i), (4)b.(iii), or (4)b.(iv), the LACFCD shall submit a billing invoice to CITY indicating the costs and expenses incurred by the LACFCD in connection with the removal of the TRASH EXCLUDER, specifically including any work required to restore the affected catch basin to a condition similar or better than that which existed prior to installation of the TRASH EXCLUDER, and CITY shall reimburse the LACFCD all such costs and expenses within thirty (30) days of the billing invoice.

c. The LACFCD may remove any TRASH EXCLUDER if the LACFCD determines, in its reasonable discretion, that removal of the TRASH EXCLUDER is necessary to prevent or mitigate flooding of any public or private property. CITY expressly releases the LACFCD from, and waives, all claims for any damages, loss, costs, or expenses resulting from the LACFCD'S removal of any TRASH EXCLUDER pursuant to this Section (4)c. In such case, CITY may thereafter reinstall the TRASH EXCLUDER only after first consulting with the LACFCD with regards to the reasons for the removal and obtaining the LACFCD'S approval of the reinstallation. If CITY thereafter chooses to reinstall the TRASH EXCLUDER, it must do so at its sole expense.

d. The LACFCD is not responsible for assisting CITY with any regulatory compliance activities related to the TRASH EXCLUDERS including for example, conducting monitoring, weighing of trash, and reporting amounts of trash collected from inside catch basins where TRASH EXCLUDERS have been installed.

e. This AGREEMENT may be modified only by the mutual written consent of both parties.

f. This AGREEMENT contains the complete and final understanding of the parties in connection with the subject matter herein and shall supersede any and all previous contemporaneous oral or written agreements between the parties regarding said subject matter.

g. The provisions of this AGREEMENT shall be interpreted and enforced pursuant to the laws of the State of California.

h. Any correspondence, communication, or contact concerning this AGREEMENT, shall be directed to the following:

CITY:

□□Name1□□
□□Title1□□
□□City of1□□
□□Address1□□

LACFCD:

Mr. Gary Hildebrand
County of Los Angeles
Department of Public Works
Watershed Management Division, 11th Floor
P.O. Box 1460
Alhambra, CA 91802-1460
Telephone: (626) 458-7072
Fax: (626) 289-3618
For emergencies, contact 626-458-HELP (4337)

IN WITNESS WHEREOF, the parties hereto have caused this AGREEMENT to be duly executed by their respective duly authorized officers, by the CITY OF _____ on _____, 2012, and by the LOS ANGELES COUNTY FLOOD CONTROL DISTRICT, on _____, 2012.

LOS ANGELES COUNTY FLOOD
CONTROL DISTRICT,
a body corporate and politic

By _____
Chief Engineer

APPROVED AS TO FORM:

JOHN KRATTLI
Acting County Counsel

By _____
Deputy

City of □□City of 2□□

By _____
Director of Public Works

APPROVED AS TO FORM:

By _____
City Attorney

RJG:sw
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Microbial Source Tracking & Identification

A Fact Sheet from the Southern California Coastal Water Research Project

March 2012

Finding Sources of Contamination Helps Managers Protect Public Health

California's coastlines host millions of visitors each year. To protect public health, county health agencies and others regularly monitor water quality in streams, coastal discharges, and at beaches. If an area shows chronically high fecal bacteria levels, managers need a way to track the contamination source. Microbial source tracking and identification methods help characterize site-specific issues. With these tools, managers can better allocate resources to reduce public health risk and beach closures over the long run, improving beach access and the local economy.

Examples of Fecal Bacteria Sources & Pathways in Southern California

- Sewage leaks or spills
- Failing septic tanks
- Illegal dumping
- Homeless camps
- Pet waste
- Wildlife
- Livestock waste
- Growth on storm drain channels, sand, soil, decaying plant matter, and beach debris
- Transport in overland runoff/ stormwater

Source Tracking

Following bacterial signal back to its source (e.g., a specific storm drain, campground, or leaking sewage pipe)

Source Identification

Characterizing the origin of the bacteria (e.g., human, bird, dog, or livestock fecal material)

Indicators vs. Pathogens

Fecal material often contains pathogens (bacteria, viruses, or other microorganisms that can cause disease). Rather than testing for each individual pathogen, scientists look for the presence of "fecal indicator bacteria" (FIB). These bacteria are often found when fecal contamination is present, but may be associated with non-fecal sources like decaying plant matter. To further enhance public health protection, extensive research to investigate new source-specific monitoring methods is ongoing.

How Does Source Tracking and Identification Work?

Source tracking and identification tests detect evidence of sewage or target specific microorganisms' molecular or genetic material (called "markers"). These tests typically aim to separate human from non-human sources; some are designed to differentiate among individual animal species. Routine source-specific identification and tracking standards do not yet exist, and many newer methods are still experimental.

SCCWRP research develops new source tracking and identification methods, evaluates comparative method performance, and provides scientific guidance for management applications.

Source Tracking and Identification Examples

Method	Evidence Detected	Pros	Cons
Optical Brighteners	Laundry detergent additives found in household wastewater	Low-cost; fast results; linked to human sources	Dissipate in sunlight; low sensitivity
FIB Culture	Growth of fecal indicator bacteria	Method already used at many labs	Slow; not source-specific
Human Markers	A microbe (virus, bacteria, or protozoa) found primarily in humans	Relatively fast results; species-specific	Highly technical; higher cost
Animal Markers	A microbe found primarily in one animal species	Relatively fast results; species/ source-specific	Highly technical; higher cost
Community Analysis	Many microbial markers detected simultaneously	May identify dominant source	Highly technical; higher cost

Source Identification Protocol Project (SIPP)

The State Water Resources Control Board's Clean Beach Task Force commissioned the SIPP to develop protocols for tracking and identifying bacteria sources at beaches throughout California. SCCWRP is one of four core laboratories implementing the multi-year study, which will produce a standard guidance manual for beach managers.

Method Comparison Study

Part of the SIPP calls for a large-scale method comparison study. Samples from multiple fecal sources were prepared at SCCWRP and shipped to researchers around the world for analysis. The results will clarify the performance, benefits, and drawbacks of each method; prioritize research; and set the stage for user-based testing.

Management Application: QMRA

One potential application of source tracking and identification methods is quantitative microbial risk assessment (QMRA). QMRA estimates the relative risk to human health based on information about differential microbial behavior among fecal sources. The US Environmental Protection Agency (EPA) is currently evaluating QMRA as a means for developing site-specific beach bacteria standards. SCCWRP will partner with the EPA to assess its applicability in a southern California pilot study.