

# Section 1

## Introduction

Stormwater runoff is part of a natural hydrologic process. Human activities particularly urbanization and agriculture, can alter natural drainage patterns and add pollutants to rivers, lakes, and streams as well as coastal bays, estuaries, and ultimately, the ocean. Numerous studies have shown urban runoff to be a significant source of water pollution, causing declines in fisheries, restricting swimming, and limiting our ability to enjoy many of the other benefits that water resources provide (USEPA, 1992). Urban runoff in this context includes all flows discharged from urban land uses into stormwater conveyance systems and receiving waters and includes both dry weather non-stormwater sources (e.g., runoff from landscape irrigation, water line and hydrant flushing) and wet weather stormwater runoff. In this handbook, urban runoff and stormwater runoff are used interchangeably.

For many years, the effort to control the discharge of stormwater focused mainly on the quantity (e.g. drainage, flood control) and, only to a limited extent, on the quality of the stormwater (e.g. sediment and erosion control). In recent years, however, awareness of the need to improve water quality has increased. With this awareness, federal, state, and local programs have been established to reduce pollutants contained in stormwater discharges to our waterways. The emphasis of these programs is to promote the concept and the practice of preventing pollution at the source, before it can cause environmental problems (USEPA, 1992). Where further controls are needed, treatment of polluted runoff may be required.

### 1.1 Handbook Purpose and Scope

The purpose of this handbook is to provide general guidance for selecting and implementing Best Management Practices (BMPs) to reduce pollutants in runoff from municipal operations. Federal and state programs require selected municipalities to reduce the discharge of pollutants in their stormwater discharges to the maximum extent practicable (MEP) using an array of control measures including BMPs. It is not the intent of this handbook to dictate the actual selection of BMPs (this will be done by the municipality), but rather to provide the framework for an informed selection of BMPs for the program.

Although MEP has not been defined by the federal regulations, the use of this handbook and the selection process presented herein should assist municipalities in achieving MEP. In selecting BMPs that will achieve MEP, it is important to remember that municipalities will be responsible to reduce the discharge of pollutants in stormwater to the maximum extent practicable. The following factors should be considered in deciding if a BMP is practicable:

- **Pollutant Removal** - Will the BMP remove (or control) the pollutant(s) of concern?
- **Regulatory Compliance** - Is the BMP compatible with stormwater regulations as well as other regulations for air, hazardous wastes, solid waste disposal, groundwater protection, etc.?
- **Public Acceptance** - Does the BMP have public support?

- Implementation - Is the BMP compatible with land uses, facilities, or activities in question?
- Cost - Will the cost for implementing the BMP significantly exceed the pollution control benefits? Does a revenue stream exist for ongoing maintenance?
- Technical Feasibility - Is the BMP technically feasible considering soils, geography, water resources, etc.?

Ultimately, the municipality must implement and maintain the selected BMPs and prepare and adhere to a schedule for implementation and maintenance.

### **1.1.1 Users of the Handbook**

This handbook is primarily designed to assist municipal staff with incorporating pollution prevention controls into their overall stormwater management program and specifically publicly owned/operated facilities (fixed facilities) and field activities (field programs). Users include public and private sector engineers, planners, environmental specialists, and stormwater program managers. Managers and employees of the various municipal facilities and municipal field programs may find this handbook especially helpful when implementing and evaluating the effectiveness of these stormwater management efforts.

### **1.1.2 Organization of the Handbook**

The handbook is organized to assist the user in selecting and implementing best management practices to reduce impacts of stormwater discharges on receiving waters. The handbook consists of the following sections:

**Section 1  
Introduction**

*This section provides a general review of the sources and impacts of municipal stormwater discharges and provides an overview of the federal and state programs regulating stormwater discharges.*

**Section 2  
Stormwater Pollution Prevention Planning for Municipal Operations**

*This section describes a process to follow in identifying and selecting BMPs for pollutant generating activities.*

**Section 3**

**Source Control BMPs**

*BMP fact sheets presented in this section address BMPs (or procedures) to control or eliminate sources of stormwater pollutants. These BMPs should be considered in all efforts to reduce pollutants from municipal operations*

**Section 4  
Treatment Control BMPs**

*BMP fact sheets presented in this section address BMPs that remove pollutants from runoff (treatment controls). These fact sheets focus on the maintenance requirements of these controls.*

**Section 5  
BMP Implementation and Evaluation**

*This section outlines development of a program to monitor BMP effectiveness and evaluate additional BMP requirements. Topics include site inspections, BMP monitoring, recordkeeping, and BMP review/modifications.*

**Section 6  
Glossary and List of Acronyms**

*This section identifies terms and abbreviations used in the handbooks.*

**Appendix A  
Inventory of Municipal Operations**

*This appendix provides an example of an inventory of municipal operations that may be sources of pollutants in stormwater runoff.*

**Appendix B  
Assessment of Municipal Operations**

*This appendix provides an example worksheet for assessing fixed facilities to determine the level of BMP implementation.*

**Appendix C  
BMP Selection Process**

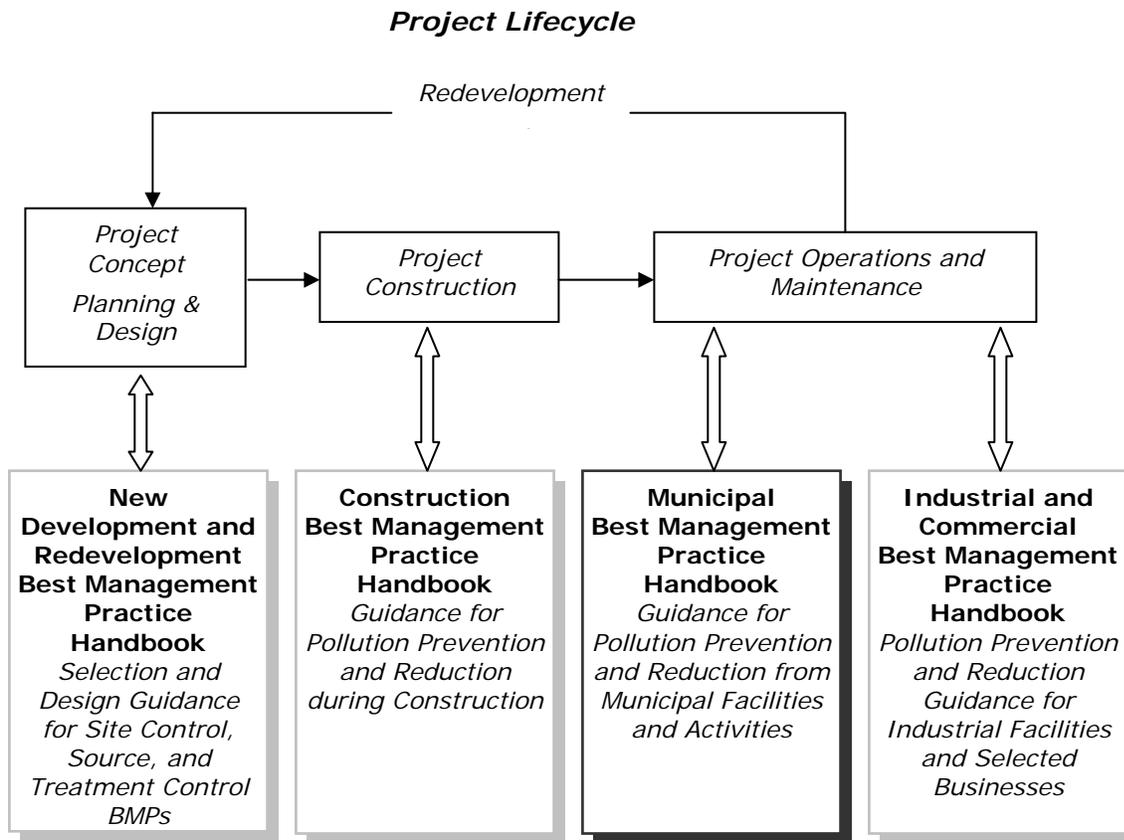
*This appendix provides an example of BMP selection for a fixed facility.*

**Appendix D  
Contract/Lease Agreement**

*This appendix provides example lease language for fixed facilities.*

### 1.1.3 Relationship to Other Handbooks

This handbook is one of four handbooks developed by the California Stormwater Quality Associations (CASQA) to address BMP selection. Collectively, the four handbooks address BMP selection throughout the life of a project, from planning and design through construction and into operation and maintenance. Individually, each handbook is geared to a specific target audience during each stage of a project.



This handbook, the Municipal Handbook, provides information primarily for municipalities to use in selecting and implementing control measures for municipal operations including fixed facilities and field programs. In this context, information provided in Section 4, Treatment Control BMPs, is focused on maintenance requirements for existing treatment control BMPs. If a new treatment control BMP is being considered at an existing or new municipal facility, the reader is referred to the New Development and Redevelopment Handbook.

For a comprehensive understanding of stormwater pollution controls throughout the life cycle of development, it is recommended that the readers obtain and become familiar with all four handbooks. Typically, municipal stormwater program managers, regulators, environmental organizations, and stormwater quality professionals will have an interest in all four handbooks. For a focused understanding of stormwater pollution control during a single phase of the project life cycle, a reader may obtain and become familiar with the handbook associated with the appropriate phase. Typically, contractors, construction inspectors, industrial site operators, commercial site operators, some regulators, and some municipal staff may have an interest in a single handbook.

## 1.2 Stormwater Pollutants and Impacts on Water Quality

Stormwater runoff naturally contains numerous constituents; however, urbanization and urban activities (including municipal activities) typically increase constituent concentrations to levels that may impact water quality. Pollutants associated with stormwater include sediment, nutrients, bacteria and viruses, oil and grease, metals, organics, pesticides, and gross pollutants (floatables). In addition, nutrient-rich stormwater runoff is an attractive medium for vector production when it accumulates and stands for more than 72 hours. Stormwater pollutants are described in Table 1-1.

### Municipal Activities Generating Pollutants

Municipalities conduct various activities that are sources of pollutants in stormwater runoff. For the purpose of this handbook, these activities are categorized according to whether they occur at a specific location (fixed facility) or across a broader and non-specific area (field programs). Some of these activities are summarized in the list below. All activities are discussed in more detail in Section 2. These activities must be addressed through the implementation of BMPs to minimize or eliminate the pollutants from entering the local water bodies or drainage system.

#### Typical Municipal Operations that Generate Pollutants

##### ***Fixed Facilities Activities***

Building Maintenance & Repair

Parking Lot Maintenance

Landscape Maintenance

Waste Handling and Disposal

Vehicle Fueling and Storage Tank Filling

Equipment Maintenance & Repair

Vehicle and Equipment Storage

Vehicle and Equipment Cleaning

Material Handling & Storage

Material Loading & Unloading

Minor Construction

Over Water Activities

##### ***Field Program Activities***

Street Sweeping and Cleaning

Street Repair and Maintenance

Bridge and Structure Maintenance

Sidewalk Surface Cleaning

Graffiti Cleaning

Sidewalk Repair

Controlling Litter

Fountain Maintenance

Landscape Mowing/Trimming/Planting

Fertilizer & Pesticide Management

Controlling Illicit Connections

Controlling Illegal Dumping

Solid Waste Collection and Recycling

**Table 1-1 Pollutant Impacts on Water Quality**

<b>Sediment</b>	Sediment is a common component of stormwater, and can be a pollutant. Sediment can be detrimental to aquatic life (primary producers, benthic invertebrates, and fish) by interfering with photosynthesis, respiration, growth, reproduction, and oxygen exchange in water bodies. Sediment can transport other pollutants that are attached to it including nutrients, trace metals, and hydrocarbons. Sediment is the primary component of total suspended solids (TSS), a common water quality analytical parameter.
<b>Nutrients</b>	Nutrients including nitrogen and phosphorous are the major plant nutrients used for fertilizing landscapes, and are often found in stormwater. These nutrients can result in excessive or accelerated growth of vegetation, such as algae, resulting in impaired use of water in lakes and other sources of water supply. For example, nutrients have led to a loss of water clarity in Lake Tahoe. In addition, un-ionized ammonia (one of the nitrogen forms) can be toxic to fish.
<b>Bacteria and viruses</b>	Bacteria and viruses are common contaminants of stormwater. For separate storm drain systems, sources of these contaminants include animal excrement and sanitary sewer overflow. High levels of indicator bacteria in stormwater have led to the closure of beaches, lakes, and rivers to contact recreation such as swimming.
<b>Oil and Grease</b>	Oil and grease includes a wide array of hydrocarbon compounds, some of which are toxic to aquatic organisms at low concentrations. Sources of oil and grease include leakage, spills, cleaning and sloughing associated with vehicle and equipment engines and suspensions, leaking and breaks in hydraulic systems, restaurants, and waste oil disposal.
<b>Metals</b>	Metals including lead, zinc, cadmium, copper, chromium, and nickel are commonly found in stormwater. Many of the artificial surfaces of the urban environment (e.g., galvanized metal, paint, automobiles, or preserved wood) contain metals, which enter stormwater as the surfaces corrode, flake, dissolve, decay, or leach. Over half the trace metal load carried in stormwater is associated with sediments. Metals are of concern because they are toxic to aquatic organisms, can bioaccumulate (accumulate to toxic levels in aquatic animals such as fish), and have the potential to contaminate drinking water supplies.
<b>Organics</b>	Organics may be found in stormwater in low concentrations. Often synthetic organic compounds (adhesives, cleaners, sealants, solvents, etc.) are widely applied and may be improperly stored and disposed. In addition, deliberate dumping of these chemicals into storm drains and inlets causes environmental harm to waterways.
<b>Pesticides</b>	Pesticides (including herbicides, fungicides, rodenticides, and insecticides) have been repeatedly detected in stormwater at toxic levels, even when pesticides have been applied in accordance with label instructions. As pesticide use has increased, so too have concerns about adverse effects of pesticides on the environment and human health. Accumulation of these compounds in simple aquatic organisms, such as plankton, provides an avenue for biomagnification through the food web, potentially resulting in elevated levels of toxins in organisms that feed on them, such as fish and birds.
<b>Gross Pollutants</b>	Gross Pollutants (trash, debris, and floatables) may include heavy metals, pesticides, and bacteria in stormwater. Typically resulting from an urban environment, industrial sites and construction sites, trash and floatables may create an aesthetic "eye sore" in waterways. Gross pollutants also include plant debris (such as leaves and lawn-clippings from landscape maintenance), animal excrement, street litter, and other organic matter. Such substances may harbor bacteria, viruses, vectors, and depress the dissolved oxygen levels in streams, lakes, and estuaries sometimes causing fish kills.
<b>Vector Production</b>	Vector production (e.g., mosquitoes, flies, and rodents) is frequently associated with sheltered habitats and standing water. Unless designed and maintained properly, standing water may occur in treatment control BMPs for 72 hours or more, thus providing a source for vector habitat and reproduction (Metzger, 2002).

- **Program Evaluation:** including performance standards, annual and sub-annual reports, internal reporting and record keeping, and Stormwater Management Plan revisions.
- **Monitoring:** including system characterization, source identification, control measure effectiveness, pollutant loading, and data management

Smaller, Phase II communities (under 100,000 population) are covered by a General Permit. Phase II communities are required to develop and implement a stormwater management plan with the following six minimum control measures:

- **Public Education and Outreach** - Distributing educational materials and performing outreach to inform citizens about the impacts polluted stormwater runoff discharges can have on water quality.
- **Public Involvement and Participation** - Providing opportunities for citizens to participate in program development, implementation, and review, including effectively publicizing public hearings or participation.
- **Illicit Discharge Detection and Elimination** - Developing and implementing a plan to detect and eliminate illicit discharges to the storm drain system including illicit connections and illegal dumping.
- **Construction Site Runoff Control** - Developing, implementing, and enforcing an erosion and sediment control program for construction activities that disturb one or more acres of land.
- **Pollution Prevention / Good Housekeeping for Municipal Operations** - Developing and implementing a program to prevent or reduce pollutant runoff from municipal operations. (This is a primary focus of this handbook.)
- **Post-Construction Stormwater Management in New Development and Redevelopment** - Developing, implementing, and enforcing a program to address discharges of stormwater runoff from new and redevelopment areas.

In addition to the six measures listed above, the stormwater management plan must identify measurable goals (or performance standards) for each minimum control measure. Measurable goals will be used by the MS4 and the RWQCB to gauge compliance and evaluate the effectiveness of individual BMPs or control measures and the stormwater management program as a whole. Phase II communities must also monitor their efforts and prepare annual reports demonstrating that the community has implemented the minimum control measures and complied with the measurable goals.

## 1.4 Definitions

Many of the common definitions for stormwater control are found in the Glossary (see Section 6). Throughout the handbook, the user will find references to the following terms:

**NPDES Permit for Stormwater Discharges** NPDES is an acronym for National Pollutant Discharge Elimination System. NPDES is the national program for administering and regulating Sections 307, 318, 402 and 405 of the Clean Water Act (CWA). In California, the State Water Resources Control Board (SWRCB) has issued a General Permit for stormwater discharges associated with Phase II communities. For Phase I communities the Regional Water Quality Control Boards issue individual NPDES permits to either an individual permittee or a group of permittees.

**Notice of Intent (NOI)** is a formal notice to the SWRCB submitted by a Phase II municipality. The NOI provides information on the permittee, location of discharge, type of discharge and certifies that the permittee will comply with conditions of the Phase II General Permit. The NOI is not a permit application and does not require approval.

A **Best Management Practice (BMP)** is defined as any program, technology, process, siting criteria, operating method, measure, or device which controls, prevents, removes, or reduces pollution.

**Source Control BMPs** are operational practices that prevent pollution by reducing potential pollutants at the source. They typically do not require maintenance or construction.

**Treatment Control BMPs** are methods of treatment to remove pollutants from stormwater.

**Non-Stormwater Discharge** is any discharge to municipal separate storm sewer that is not composed entirely of stormwater.

**Vector** as defined in the California Health & Safety Code, Section 2200, is any animal capable of transmitting the causative agent of human disease or capable of producing human discomfort or injury, including, but not limited to, mosquitoes, flies, other insects, ticks, mites, and rodents.

## 1.5 References and Resources

California Department of Transportation, *Guidance Manual: Stormwater Monitoring Protocols*, 2nd ed., July 2000. Available at [www.dot.ca.gov/hq/env/stormwater/special/index.htm](http://www.dot.ca.gov/hq/env/stormwater/special/index.htm)

Metzger, M.E., D.F. Messer, C.L. Beitia, C.M. Myers, and V.L. Kramer. 2002. *The Dark Side of Stormwater Runoff Management: Disease Vectors Associated with Structural BMPs*. Stormwater 3(2): 24-39.

*Urban Runoff Quality Management*. Water Environment Federation/American Society of Civil Engineers. 1998. On-line: <http://www.wef.org>

United States Environmental Protection Agency (U.S.E.P.A.). *EPA Administered Permit Programs: The National Pollutant Discharge Elimination System, 40 CFR 122, (1983, amended 1991)*.

United States Environmental Protection Agency (USEPA). 1998. Federal Register. 40 CFR Part 122. Subpart B – Permit Application and Special NPDES Program Requirements. Section 122.26 Stormwater discharges (applicable to state NPDES programs). Revised July 1, 1998.

United States Environmental Protection Agency (USEPA). 1999. Federal Register. 40 CFR Parts 9, 122, 123, and 124 National Pollutant Discharge Elimination System – Regulations for Revision of the Water Pollution Control Program Addressing Stormwater Discharges; Final Rule. Report to Congress on the Phase II Stormwater Regulations. Wednesday, December 8, 1999.

United States Environmental Protection Agency (U.S.E.P.A). *Measurable Goals Guidance for Phase II Small MS4s*,  
<http://cfpub.epa.gov/npdes/stormwater/measurablegoals/part4.cfm#sub7>

United States Environmental Protection Agency (U.S.E.P.A.). *NPDES Stormwater Sampling Guidance Document*. 1992, EPA 833-B-92-001, U.S. Environmental Protection Office, Office of Wastewater Enforcement and Compliance, Washington, DC.

<http://www.swrcb.ca.gov/stormwtr/municipal.html#phaseii>. This link on the State Water Resources Control Board website provides Phase I MS4 area wide permits in each region, a link to Phase I and II resources.

<http://cfpub.epa.gov/npdes/stormwater/swphase1.cfm>. This link on the USEPA website provides an overview of the Phase I NPDES stormwater program and specific information on requirements pertaining to Phase I stormwater discharges.

### Municipal Programs

City of Monterey, City of Santa Cruz, California Coastal Commission, Monterey Bay National Marine Sanctuary, Association of Monterey Bay Area Governments, Woodward-Clyde, Central Coast Regional Water Quality Control Board. Model Urban Runoff Program, A How-To Guide for Developing Urban Runoff Programs for Small Municipalities. July 1998 (Revised February 2002).

City of Watsonville, City of Monterey, Monterey Bay National Marine Sanctuary, California Coastal Commission, and Central Coast Regional Water Quality Control Board, 2000. Model Urban Runoff Program, Supplementary 2000 Workbook: A Resource for Implementing Your Municipal Urban Runoff Program.

Los Angeles County Stormwater Quality Model Programs. Public Agency Activities  
[http://ladpw.org/wmd/npdes/model\\_links.cfm](http://ladpw.org/wmd/npdes/model_links.cfm)

Orange County Stormwater Program.  
[http://www.ocwatersheds.com/StormWater/swp\\_documents\\_intro.asp](http://www.ocwatersheds.com/StormWater/swp_documents_intro.asp)

San Diego Stormwater Co-permittees Jurisdictional Urban Runoff Management Plan. 2001. Municipal Activities Model Program Guidance. November 2001.



# Section 2

## Stormwater Pollution Prevention Planning for Municipal Operations

### 2.1 Introduction

As noted in Section 1 municipalities are required to develop and implement a comprehensive stormwater management program including the reduction of pollutants from municipal operations. In this section, a planning process is suggested for municipal operations, which allows the municipality to identify the activities that generate pollutants and the best management practices (BMPs) applicable to the activities. The recommended process includes the following key components:

- **Inventory:** First, an inventory is developed of all municipal facilities and activities that may be a source of pollutants in stormwater (Section 2.2).
- **Assessment:** Next, the activities are evaluated for their potential to discharge pollutants to storm drains and/or to receiving waters (Section 2.3).
- **BMP Selection:** BMPs are then selected to deal with the identified sources of stormwater pollution. Emphasis is placed on source control (procedures) BMPs and proper maintenance of treatment control BMPs (Section 2.4 and Sections 3 and 4).
- **Implementation:** BMPs are implemented and their effectiveness evaluated. The monitoring, reporting, and inspection requirements of the BMPs is oriented toward gaining insight into the performance of the BMPs (Section 5).

It is worth noting that some municipal facilities may be classified as an industrial-type facility subject to the State NPDES General Permit for Industrial Activities. The reader is referred to the Industrial and Commercial BMP Handbook to determine the classification of the municipal facility. If classified as an industrial facility then the reader should use the Industrial and Commercial BMP Handbook. For all other municipal facilities, the planning procedure described here is applicable.

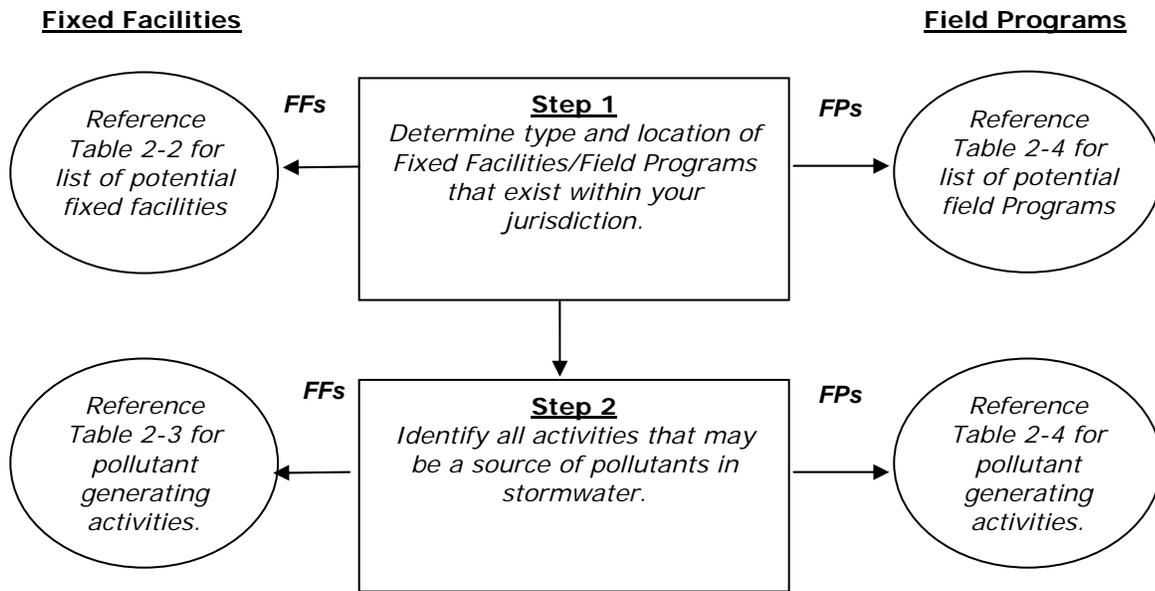
### 2.2 Develop Inventory of Public Agency Activities

This section describes steps that may be used to generate and maintain comprehensive inventories of the pollutant generating activities associated with municipal operations. These activities can be categorized into two groups as described below:

- **Fixed Facilities** – specific locations municipalities own and operate and at which municipal activities occur. These types of facilities may also be municipally owned but privately leased. Examples of fixed facility types include municipal waste facilities and corporation yards.
- **Field Programs** - a set of related municipal activities that take place throughout the municipality. These types of activities may also be privately contracted. Examples of

municipal field programs include roads, streets, and highways maintenance, and drainage system operation and maintenance.

The flow chart presented in Figure 2-1 illustrates the two steps involved in compiling the inventories for both fixed facilities and field programs. A summary of the information that is collected as part of inventory is provided in Table 2-1. Sections 2.2.1 and 2.2.2 provide the guidelines for fully completing the inventories.



**Figure 2-1**  
**Inventory Process for Fixed Facilities and Field Programs**

- Control measures that affect stormwater discharges
- Locations of all catch basins
- Location of authorized non-stormwater discharges to the storm drain
- Outline of all impervious areas of the facility
- Locations where materials are directly exposed to precipitation
- Locations where significant spills or leaks have occurred
- Areas of municipal activities

The inventory should also determine whether the facility is within or adjacent to or discharging directly to an Environmentally Sensitive Area (ESA). For the purposes of this Handbook, “adjacent” is defined as being located within 200 feet of the listed water body. “Discharging directly to” is defined as a discharge from a drainage system servicing the subject facility or activity that flows to the ESA without mixing with other flows (i.e., discharge from an urban area that co-mingles with downstream flows prior to an ESA is not subject to this definition).

An ESA exists if any of the following designations have been applied to the water body of concern:

- Clean Water Act 303(d) listed impaired water body. It should be noted that the 303(d) list is updated on a regular basis by the state and USEPA. Each time that happens, maps showing 303(d) listed water bodies and the inventories will need to be updated.
- Areas designated as Areas of Special Biological Significance (also known as State Water Quality Protection Area) by the SWRCB
- Water bodies designated with the RARE beneficial use by the SWRCB
- Water bodies located within areas designated as preserves or equivalent under the Natural Community Conservation Planning Program
- Areas designated as Critical Aquatic Resources
- Any other equivalent ESAs that contain water bodies which have been identified to be of local concern

An example of an inventory of municipal operations is provided in Appendix A.

## Step 2 – Identify Potential Pollutant Generating Activities

In addition to the identification of the main and subcategories of fixed facility types in Step 1, the potential pollutant generating activities and potential pollutants for each fixed facility should be identified and included in the inventory.

A list of fixed facility activities that have the potential to generate pollutant discharges and the potential pollutants that are associated with those activities is presented in Table 2-3. This list is not inclusive but does provide a good starting point to identify potential pollutants. In addition to these activities, efforts should be made to compile a list of past significant spills and leaks and a list of materials and chemicals stored on-site.

Finally, determine if pollutants associated with identified activities have the potential to discharge into 303 (d) listed water bodies for which the pollutant is listed.

Fixed Facility Activity	Potential Pollutants								
	Sediment	Nutrients	Trash	Metals	Bacteria	Oil & Grease	Organics	Pesticides	Oxygen Demanding Substances
Building and Grounds Maintenance and Repair	X	X	X	X	X	X	X	X	X
Parking/Storage Area Maintenance	X	X	X	X	X	X	X		X
Waste Handling and Disposal	X	X	X	X	X	X	X	X	X
Vehicle and Equipment Fueling			X	X		X	X		
Vehicle and Equipment Maintenance and Repair				X		X	X		
Vehicle and Equipment Washing and Steam Cleaning	X	X	X	X		X	X		
Outdoor Loading and Unloading of Materials	X	X	X	X		X	X	X	X
Outdoor Container Storage of Liquids		X		X		X	X	X	X
Outdoor Storage of Raw Materials	X	X	X			X	X	X	X
Outdoor Process Equipment	X		X	X		X	X		
Over water Activities			X	X	X	X	X	X	X
Landscape Maintenance	X	X	X		X			X	X

## **2.2.2 Field Program Inventory Procedures**

### **Step 1 – Determine Field Program Type and Location**

The first step in the inventory process is to identify all field programs conducted by a municipality. The field program and associated activities that have the potential for pollutant discharges are listed in Table 2-4. This list is not inclusive but serves as a starting point for identifying applicable field programs. Baseline information about field programs should be included in the inventory, such as the approximate area of coverage for the field program and an identifier if the performance of the field program is contracted out.

In addition, the watershed where the program occurs should be identified. Most field programs are conducted throughout a political jurisdiction and therefore may affect multiple watersheds. The inventory should reflect all those watersheds in which field programs occur. Mapping the field program infrastructure according to watershed may be useful in this step. As with the fixed facilities inventory information regarding environmentally sensitive areas including location and stressor pollutant should be compiled as part of the inventory effort. See Table 2-1 for a more complete list of information that may be collected during the inventory procedure.

### **Step 2 – Identify Potential Pollutant Generating Activities**

The potential pollutant generating activities and potential pollutants for each field program must be identified and included in the inventory. A list of field program activities that have the potential to generate pollutant discharges and the potential pollutants that are associated with those activities is presented in Table 2-4.

Although Table 2-4 identifies the primary pollutants typically associated with stormwater runoff there are other environmental conditions that may be applicable to a field program. These include pH, temperature, and toxicity.

Section 2  
 Stormwater Pollution Prevention Planning for Municipal Operations

**Table 2-4 Field Program Activities and Associated Potential Pollutants**

Field Programs	Activities	Potential Pollutants								
		Sediment	Nutrients	Trash	Metals	Bacteria	Oil & Grease	Organics	Pesticides	Oxygen Demanding Substances
Roads, Streets, and Highways Operation and Maintenance	Sweeping and Cleaning	X		X	X		X			X
	Street Repair, Maintenance, and Striping /Painting	X		X	X		X	X		
	Bridge and Structure Maintenance	X		X	X		X	X		
Plaza, Sidewalk, and Parking Lot Maintenance and Cleaning	Surface Cleaning	X	X			X	X			X
	Graffiti Cleaning	X	X		X			X		
	Sidewalk Repair	X		X						
	Controlling Litter	X		X		X	X			X
Fountains, Pools, Lakes, and Lagoons Maintenance	Fountain and Pool Draining		X					X		
	Lake and Lagoon Maintenance	X	X	X		X			X	X
Landscape Maintenance	Mowing/Trimming/Planting	X	X	X		X			X	X
	Fertilizer & Pesticide Management	X	X						X	
	Managing Landscape Wastes			X					X	X
	Erosion Control	X	X							
Drainage System Operation and Maintenance	Inspection and Cleaning of Stormwater Conveyance Structures	X	X	X		X		X		X
	Controlling Illicit Connections and Discharges	X	X	X	X	X	X	X	X	X
	Controlling Illegal Dumping	X	X	X	X	X	X	X	X	X
	Maintenance of Inlet and Outlet Structures	X		X	X		X			X
Waste Handling and Disposal	Solid Waste Collection		X	X	X	X	X	X		X
	Waste Reduction and Recycling			X	X					X
	Household Hazardous Waste Collection			X	X		X	X	X	
	Controlling Litter			X	X	X		X		X
	Controlling Illegal Dumping	X		X		X	X		X	X
Water and Sewer Utility Operation and Maintenance	Water line Maintenance	X				X	X			
	Sanitary Sewer Maintenance	X				X	X			X
	Spill/Leak/Overflow Control, Response, and Containment	X	X			X		X		X

## 2.3 Assessment

This section outlines the procedures for assessing fixed facilities and field programs for BMP selection and implementation. Data gathered during the inventory process should be used to support the assessment process described below.

### 2.3.1 Assessment of Fixed Facilities

The first step in the assessment is to identify BMPs already in place at a facility. These may include pavement sweeping, drain inlet cleaning, covered waste storage bins, and spill prevention and cleanup procedures. This information should be considered when determining which BMPs should be selected and implemented at a site. Worksheet 1 provides a checklist that may be helpful in determining existing BMPs at a site. Other BMPs that were installed for reasons unrelated to stormwater control, such as berming, covered materials storage, and designated wash areas, should also be identified.

Once the existing BMPs have been identified and the inventory completed per Section 2.2, an assessment of all municipal activities and potential pollutant sources should be conducted to determine which areas of the facility are likely sources of pollutants in stormwater and non-stormwater discharges, and which pollutants are likely to be present in stormwater and non-stormwater discharges. Worksheet 1 may help with this task.

Facility operators must then decide whether additional or new BMPs should be implemented to reduce stormwater pollutants to the maximum extent practicable from a site. The municipality should consider and evaluate various factors when performing this assessment, such as:

- effectiveness of current BMPs
- type of activities
- type and quantities of significant materials handled, produced, stored, or disposed of
- history of spill or leaks
- non-stormwater discharges
- size of facility (including percent impervious)
- proximity to receiving water and/or type of receiving water

The municipality should also consider whether its facility is discharging pollutants identified to be causing impairment in the local water bodies. Appendix B provides an example of a method for assessing a facility for BMP implementation.

### 2.3.2 Assessment of Field Programs

Similar to the effort at a fixed facility a municipality should identify BMPs that are already in place and the extent of their effectiveness. Using this information and the inventory data the municipality can identify the activities with the potential for discharging pollutants, the type of

pollutants being discharged, and the extent that the pollutants are being addressed with current procedures or BMPs. The municipality can then assess whether additional or new BMPs are necessary. In considering the need for new or additional BMPs, a municipality should consider:

- effectiveness of current BMPs
- type of field program and pollutants being discharged
- exposure of activities to stormwater
- land use category
- proximity to receiving water and/or type of receiving water

## 2.4 Identify and Select BMPs

Selection of BMPs should focus first on source control BMPs and second on treatment control BMPs. Typically, source control BMPs will serve to reduce pollutants from activities to the maximum extent practicable. Treatment control BMPs should be considered when source control BMPs have been shown to be ineffective or when special environmental or site conditions warrant a more comprehensive approach. The reader is referred to the New Development and Redevelopment BMP Handbook if treatment control BMPs are determined to be necessary. An example of selecting source control BMPs is provided in Appendix C.

Municipalities can identify and select BMPs from those presented in Section 3 – Source Control BMPs. The BMPs are described in activity-based and field program-based fact sheets that also provide information on the pollutants that can be addressed by the BMP. The BMPs shown in Section 3 are a comprehensive collection and not all may be applicable to the activities or field programs of a particular municipality. In order to be effective, BMPs must be appropriate to the application and properly implemented.

Municipalities must also consider the maintenance requirements of existing treatment control BMPs. In this regard, the municipality should refer to Section 4 – Treatment Control BMPs. The fact sheets in Section 4 are focused on the maintenance requirements of these treatment control BMPs. Proper maintenance is necessary for these controls to operate effectively.

### WORKSHEET 1

Facility Name:  
Contact Name:

Site Address:  
Phone:

1. **ACTIVITIES** – In the table below check each activity present at the site and evaluate its **potential for pollutant discharge (PPD)**: 1 = high potential, 2= medium potential, 3= low potential
2. **BMP EFFECTIVENESS** – In the table below, provide an effectiveness rating using the provided scale.

ACTIVITY AND BMP CHECKLIST				
	APPLICABLE ACTIVITY			EFFECTIVENESS RATING *
	Yes	No	PPD	
A. VEHICLE AND EQUIPMENT FUELING BMPs employed:	[ ]	[ ]	[ ]	① ② ③ ④ ⑤
B. VEHICLE AND EQUIPMENT WASHING/STEAM CLEANING BMPs employed:	[ ]	[ ]	[ ]	① ② ③ ④ ⑤
C. VEHICLE AND EQUIPMENT MAINTENANCE AND REPAIR BMPs employed:	[ ]	[ ]	[ ]	① ② ③ ④ ⑤
D. OUTDOOR LOADING/UNLOADING OF MATERIALS BMPs employed:	[ ]	[ ]	[ ]	① ② ③ ④ ⑤
E. OUTDOOR CONTAINER STORAGE OF LIQUIDS BMPs employed:	[ ]	[ ]	[ ]	① ② ③ ④ ⑤
F. OUTDOOR PROCESS EQUIPMENT OPERATIONS AND MAINTENANCE BMPs employed:	[ ]	[ ]	[ ]	① ② ③ ④ ⑤
G. OUTDOOR STORAGE OF RAW MATERIALS BMPs employed:	[ ]	[ ]	[ ]	① ② ③ ④ ⑤
H. WASTE HANDLING AND DISPOSAL BMPs employed:	[ ]	[ ]	[ ]	① ② ③ ④ ⑤
I. BUILDING AND GROUNDS MAINTENANCE BMPs employed:	[ ]	[ ]	[ ]	① ② ③ ④ ⑤
J. PARKING/STORAGE AREA MAINTENANCE BMPs employed:	[ ]	[ ]	[ ]	① ② ③ ④ ⑤
K. OVER WATER ACTIVITIES BMPs employed:	[ ]	[ ]	[ ]	① ② ③ ④ ⑤
L. OTHER (describe):	[ ]	[ ]	[ ]	① ② ③ ④ ⑤

- \*① **No BMPs used and stormwater pollution likely**    ② **Some BMPs used but not effective**    ③ **Some BMPs used and moderately effective**  
 ④ **Source control BMPs used and very effective/structural BMPs needed**    ⑤ **All necessary BMPs used and very effective**

**3. TYPE AND QUANTITY OF MATERIALS USED**

Material	Typical Quantity/Frequency	Is Stored Material Likely to Generate Pollutants
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**4. HISTORY OF SPILLS AND LEAKS**

- a) Is there a chronic history of spills and leaks? \_\_\_\_\_

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- b) Is there no evidence of leaks and drips from equipment and machinery? \_\_\_\_\_
- c) Is there a spill prevention and response team? \_\_\_\_\_
- d) Are appropriate spill containment and cleanup materials kept on-site and in convenient locations? \_\_\_\_\_
- e) Are cleanup procedures for spills followed regularly and correctly? \_\_\_\_\_
- f) Are used absorbent materials removed and disposed of in a timely manner? \_\_\_\_\_
- g) Are personnel regularly trained in the use of spill control materials? \_\_\_\_\_

**5. NON-STORMWATER DISCHARGES**

- a) Outfall directly observed during assessment \_\_\_\_\_
- b) Are BMPs implemented to prevent, treat, or control non-stormwater discharges? \_\_\_\_\_
- c) Is there a potential for non-stormwater discharges (i.e. non-stormwater sources observed without BMPs implemented) \_\_\_\_\_

**6. SIZE OF FACILITY** (incorporating the size of a facility serves as a surrogate measure for flow)

- a) Total area \_\_\_\_\_
- b) The impervious area (including parking lot) is \_\_\_\_\_

**7. PROXIMITY TO RECEIVING WATER**

Does the facility discharge directly or adjacent to a 303(d) water body or other environmentally sensitive area? \_\_\_\_\_

# Section 3

## Source Control BMPs

### 3.1 Introduction

This section provides a description of specific source control Best Management Practices (BMPs) for activities related to municipal operations. As noted in Sections 1 and 2, municipal fixed facilities conduct activities that have the potential to generate pollutants. The source control BMPs in this section address these activities (see Table 3-1).

In addition, municipalities conduct various field programs where activities may occur and create pollutants. BMPs for these field programs and associated activities are listed in Table 3-2.

<b>Table 3-1 Municipal Fixed Facility BMPs</b>	
<b>Non-Stormwater Management</b>	
SC-10	Non-Stormwater Discharges
SC-11	Spill Prevention, Control and Cleanup
<b>Vehicle and Equipment Management</b>	
SC-20	Vehicle and Equipment Fueling
SC-21	Vehicle and Equipment Cleaning
SC-22	Vehicle and Equipment Repair
<b>Material and Waste Management</b>	
SC-30	Outdoor Loading/Unloading
SC-31	Outdoor Container Storage
SC-32	Outdoor Equipment Maintenance
SC-33	Outdoor Storage of Raw Materials
SC-34	Waste Handling and Disposal
<b>Building and Grounds Management</b>	
SC-41	Building and Grounds Maintenance
SC-43	Parking/Storage Area Maintenance
<b>Over Water Activities</b>	
SC-50	Over Water Activities
<b>General Stormwater Management</b>	
SC-60	Housekeeping Practices
SC-61	Safer Alternative Products

<b>Table 3-2 Municipal Field Program BMPs</b>	
SC-70	Road and Street Maintenance
SC-71	Plaza and Sidewalk Cleaning
SC-72	Fountains & Pools Maintenance
SC-73	Landscape Maintenance
SC-74	Drainage System Maintenance
SC-75	Waste Handling and Disposal
SC-76	Water and Sewer Utility Maintenance

## 3.2 Fact Sheet Format

Each BMP fact sheet is a short document that gives all the information about a particular BMP. Typically, each fact sheet contains the information outlined in Figure 3-1. Completed fact sheets for each of the activities listed in Tables 3-1 and 3-2 are provided in Section 3.3.

The fact sheets also contain side bar presentations with information on BMP objectives and targeted constituents.

The information provided in each fact sheet is extensive and may not be applicable to all municipal operations. The readers may find it helpful to modify and simplify the BMP fact sheets to better reflect their existing operations.

## 3.3 BMP Fact Sheets

BMP fact sheets for fixed facilities activities and field programs follow. The BMP fact sheets are individually page numbered and are suitable for photocopying and inclusions in stormwater quality management plans. Fresh copies of the fact sheets can be individually downloaded from the California Stormwater BMP Handbook website at <http://www.cabmphandbooks.com>

<p><b>SC-xx Example Fact Sheet</b></p> <p><u>Description of the BMP</u></p> <p><u>Approach</u></p> <ul style="list-style-type: none"><li>Pollution Prevention</li><li>Suggested Protocols</li><li>Training</li><li>Spill Response and Prevention</li><li>Other Considerations</li></ul> <p><u>Requirements</u></p> <ul style="list-style-type: none"><li>Costs</li><li>Maintenance</li></ul> <p><u>Supplemental Information</u></p> <ul style="list-style-type: none"><li>Further Details on the BMP</li><li>Examples</li></ul> <p><u>References and Resources</u></p>
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**Figure 3-1  
Example Fact Sheet**

# Section 4 Treatment Control BMPs

## 4.1 Introduction

This section discusses the inspection and maintenance requirements for treatment control BMPs shown in Table 4-1. The specific design requirements, performance specifications, and limitations of each of these BMPs are discussed in detail in the New Development and Redevelopment BMP Handbook. Inspection and maintenance requirements are necessary to verify that each treatment control BMP performs efficiently throughout its design life. Although specific inspection and maintenance frequencies are presented in the following fact sheets, these are only suggested and should be adapted to each site situation to best accommodate environmental, economic, and local regulatory concerns.

For the purpose of this Handbook, treatment control BMPs have been classified according to whether they are public domain or proprietary controls. Public domain controls, as the name implies, are controls that are available to the general public, while proprietary controls are typically patented devices and are purchased from a vendor.

## 4.2 Fact Sheet Format

A BMP fact sheet is a short document that gives pertinent maintenance and inspection information about a particular treatment control BMP. Typically, each fact sheet contains the information outlined in Figure 4-1. Completed fact sheets for each of the treatment control BMPs shown in Table 4-1 are provided in Section 4.3.

The fact sheets also contain side bar presentations with information on BMP maintenance concerns, objectives, and goals; targeted constituents; and removal effectiveness if known.

Table 4-1 Treatment Control BMPs	
<b>Public Domain</b>	
TC-10	Infiltration Trench
TC-11	Infiltration Basin
TC-12	Retention/Irrigation
TC-20	Wet Pond
TC-21	Constructed Wetland
TC-22	Extended Detention Basin
TC-30	Vegetated Swale
TC-31	Vegetated Buffer Strip
TC-32	Bioretention
TC-40	Media Filter
TC-50	Water Quality Inlet
TC-60	Multiple Systems
<b>Manufactured (Proprietary)</b>	
MP-20	Wetland
MP-40	Media Filter
MP-50	Wet Vault
MP-51	Vortex Separator
MP-52	Drain Inlet

TC-xx Example Maintenance Fact Sheet
<u>General Description</u>
<u>Inspection/Maintenance Considerations</u>
<u>Inspection Activities</u>
<u>Maintenance Activities</u>
<u>Additional Information</u>
<u>References</u>

Figure 4-1  
Example Fact Sheet

## 4.3 BMP Fact Sheets

Maintenance BMP fact sheets for public domain and manufactured BMPs follow. The BMP fact sheets are individually page numbered and are suitable for photocopying and inclusion in stormwater quality management plans. Fresh copies of the fact sheets can be individually downloaded from the California Stormwater BMP Handbook website at [www.cabmphandbooks.com](http://www.cabmphandbooks.com). As noted previously, the reader should refer to the New Development and Redevelopment BMP Handbook for details regarding BMP design, performance, and installation. In addition to the references at the end of each fact sheet, the 1993 version of the California Stormwater BMP Handbook was used as a general reference and starting point for the preparation of the maintenance fact sheets that follow.

In addition, it is worth noting that there are numerous proprietary treatment control devices available. Manufacturers typically have recommended inspection schedules and maintenance requirements for each device. If your facility utilizes proprietary treatment control devices for stormwater runoff, a maintenance agreement and detailed maintenance plan should be developed to ensure that they are well maintained, and operate according to design specifications. For many manufactured devices, municipalities can contract with the manufacturer or representative to provide maintenance services.

# Section 5

## BMP Implementation and Evaluation

### 5.1 Introduction

As noted in Section 1 each municipality regulated under stormwater NPDES permits, whether categorized as a Phase I or Phase II municipality, is required to implement a stormwater management program and to assess the effectiveness of the program. Although specific program requirements and the level of implementation required differ between Phase I and Phase II municipalities, both prohibit non-stormwater discharges into storm drains, and require controls to reduce the discharge of pollutants to the maximum extent practicable (MEP). As part of the program, the municipalities are required to address public agency (municipal) operations to reduce the discharge of pollutants and to assess these efforts. Section 2 provides information on some of the necessary elements and steps involved in identifying BMPs for municipal activities occurring at fixed facilities and in field programs, whereas this Section discusses the components necessary to successfully implement a BMP and evaluate its effectiveness.

### 5.2 BMP Implementation

Municipal employees perform numerous municipal activities that have the potential to discharge pollutants. Staff should consistently implement the procedures or BMPs applicable to these activities. Some municipal activities are contracted to other parties. For example, many municipalities contract out street sweeping or waste collection. Similarly, many municipalities lease city-owned facilities to other parties, at which activities take place that have the potential to discharge pollutants. To ensure measures are taken to reduce pollutants while contractors or lessees perform such activities, contract and lease language should explicitly specify requirements to comply with all BMP specifications. Sample contract/lease language is presented in Appendix D.

Successful implementation of a BMP is dependent on the following components:

- Effective training of municipal and contract employees working in both fixed facilities and field programs.
- Regular inspections of fixed facilities, field programs, and treatment controls.
- Maintenance of treatment controls as needed to ensure proper functioning.
- Periodic evaluation/monitoring of BMP performance consistent with NPDES permit requirements.
- Follow-up action to correct deficiencies in BMP implementation noted during inspections.
- Accurate record keeping to track training, inspections, monitoring, and BMP maintenance.
- Submittal of an annual report to the applicable RWQCB regarding the effectiveness of the municipal efforts to reduce pollutants from fixed facilities and field programs.

- For Phase II Programs, documentation showing how the municipality has met its measurable goals, or revisions to those goals with supporting documentation.

### 5.3 Staff Training

Education and training is the key to the success of BMP implementation. Typically, municipalities provide annual training sessions. In addition to municipally sponsored training, staff may also attend local, regional, statewide, or national training seminars or workshops related to stormwater management and water quality conducted by other organizations.

In general, a municipality should consider a training program for employees working in fixed facilities and/or field programs. The training program should address the following subjects:

- **Maintenance Procedure Implementation and Inspection** – In this training effort, proper procedures for performing municipal activities that may adversely affect stormwater quality are addressed. Maintenance procedures cover a wide range of municipal activities and the training may address either all maintenance procedures applicable to the municipality or a specific procedure (e.g. fertilizer and pesticide use). This training can be conducted in either a formal or a tailgate-style format.
- **Pollution Prevention/Spill Awareness** – This training addresses the general techniques municipal staff may implement to prevent pollution, as well as to respond to spills once they have occurred. Training can be tailored to management and other municipal staff who oversee pollution prevention measures, to field staff conducting activities that may result in spills, or to field staff who may encounter spills or illicit discharges.

### 5.4 Site Inspections

Inspections of municipal fixed facilities and field programs should be performed to verify that BMPs are being implemented, that they are appropriate for that facility or program, and that they continue to reduce the discharge of pollutants. Inspections generally consist of the following:

- **Fixed Facilities** – Inspections are typically performed by a combination of stormwater program staff and on-site fixed facility managers. The inspection of a fixed facility may include spot checks of the facility and activities being performed at the facility, and interviews with key line staff.
- **Field Programs**– Inspections are typically performed by a combination of stormwater program staff and field program supervisors. The inspection of a field program may include spot checks of activities being performed, and interviews with key staff.
- **Contracted Activities** – Inspections are typically performed by municipal staff to supplement and check on self-inspections and reporting by the management staff of the contract firm performing the activity. Performance should be checked against contract/lease language (see Appendix D).

- **Leased Facilities** – Inspections are typically performed by municipal staff to supplement and check on self-inspections and reporting by the management staff of the lessor (see Appendix D).

### 5.4.1 Inspection Frequencies

Fixed facility or field program inspection frequency depends on the nature of the facility or program. Annual inspection is typical, with a more frequent schedule for facilities/activities that pose a greater threat to discharge pollutants (e.g. corporation yards). In the event of an observed problem, such as ineffective maintenance procedures or detected non-stormwater discharges, the inspection frequency should be increased as appropriate to facilitate correction of the problem (see section 5.7 for discussion regarding follow-up enforcement).

### 5.4.2 Inspection Documentation Procedures

Inspection forms may be developed and used to properly document all inspections and gather the necessary information for record keeping and annual reporting. Examples include:

- **General Inspection Forms** – These primary forms provide for a general characterization of the fixed facility or field program being inspected, including the type of facility or program, the reason for inspection, activities that may take place, and BMPs applicable for the facility. A general form for all inspections and a single fixed facility specific form should be completed.
- **Activity Specific Inspection Forms** – These secondary forms include a series of questions or checklist items about specific activities taking place at a fixed facility or as part of a field program, as well as a list of suggested corrective action plans that can be implemented should a problem be found. All forms applicable to the activities being performed at a fixed facility or field program should be completed.

## 5.5 Treatment Control BMP Maintenance

Maintenance of treatment controls and drainage conveyance systems (e.g. detention and retention basins, infiltration devices, catch basins) including regular inspections as presented in Section 4, is needed to maintain efficient pollutant reduction. If treatment control BMPs are not properly maintained, BMP effectiveness is reduced and water quality deteriorates. Training should be provided where needed. Maintenance schedules should be periodically reviewed and updated as needed to maintain BMP effectiveness. Where regular scheduled maintenance is not appropriate, regular inspections should be scheduled to determine when repairs, cleaning, or replacement are necessary. See Section 4 for a comprehensive discussion regarding maintenance of treatment control BMPs.

Where municipal contractors are responsible for maintenance of treatment controls, special attention should be directed toward ensuring proper maintenance procedures are implemented. Contract and lease language should include recommended maintenance procedures and schedules. Regularly scheduled inspections of facilities or programs operated by the contractor should include compliance with BMP maintenance requirements.

## 5.6 Analytical Monitoring

Although expensive, stormwater monitoring is a valuable way to assess long-term BMP effectiveness and cost-effectiveness of selected BMPs at reducing pollutants to the “maximum extent practicable”. For Phase I municipalities, specific monitoring requirements depend on the individual NPDES permits issued. Phase II municipalities are covered by the Phase II General NPDES Permit and are not explicitly required to conduct chemical monitoring. Monitoring activities can include source identification, and chemical characterization of effluent/runoff, and non-stormwater discharges.

It is beyond the scope of this handbook to describe specific sampling and analytical techniques. For guidance on conventional stormwater sampling techniques and protocol, the reader should refer to NPDES Stormwater Sampling Guidance Document, 1992, published by the USEPA, or Caltrans’ Guidance Manual: Stormwater Monitoring Protocols, 2000.

## 5.7 Enforcement

To ensure proper BMP performance, enforcement procedures and mechanisms should be established for the municipal fixed facilities and field programs. Enforcement actions may occur as a result of a problem found during an inspection or in response to a complaint that is received. Several different types of enforcement mechanisms and penalties can be utilized to ensure compliance. The internal enforcement procedures, directed toward municipal staff, include initial verbal warnings, written warnings, and more serious disciplinary actions if verbal and written warnings do not result in appropriate action. External enforcement procedures which pertain to municipal contractors may be undertaken primarily by the municipality’s inspectors, managers, and supervisors who possess enforcement authority through established policies and procedures or ordinances. Depending on the severity of the violation, enforcement could range from the issuance of a notice of noncompliance to the loss of a contract or lease, or a fine.

## 5.8 Recordkeeping

As applicable, the municipality should maintain records demonstrating successful implementation of BMPs. Recordkeeping may include training, site inspection and maintenance, and if applicable, monitoring.

### Training and Workshops

Records of all training sessions provided to staff should be maintained to allow for:

- determining which staff requires which training;
- determining when training sessions must be conducted; and
- documenting training activities for enforcement and compliance purposes.

Municipal staff may attend training sessions or workshops sponsored by non-Permittees such as local or national organizations. For these sessions, the following information should be recorded:

- Name of Workshop/Training
- Sponsoring Organization
- General Description of the Subject Matter
- Location
- Date
- Attendee information (name, title, department, phone and/or email)

### **Site Inspection and BMP Maintenance**

Inspection reports should be kept to track frequency and results of inspections, BMPs implemented, condition of BMPs inspected, and follow-up actions taken. It is also important to keep a record of maintenance activities or any other BMPs that are of an “action” nature. It is easy to demonstrate that a BMP that involves a physical change, such as berming or covering, has been accomplished. However, actions that relate to good housekeeping can only be demonstrated by recordkeeping. Besides demonstrating compliance, records can assist in BMP management. Keeping a record of catch basin cleaning, for example, also provides insight into how long it takes for the catch basin sump to refill.

### **Monitoring**

Records of all stormwater monitoring information, inspections and visual observations, certifications, corrective actions and follow-up activities, and copies of all reports must be retained for a period of at least five years. These records shall include at a minimum, when applicable:

- Date, place, and time of sampling, visual observations, and/or measurements.
- Individual(s) who performed the sampling, visual observations, and or measurements.
- Visual observation records for storm events.
- Visual observations and inspections of non-stormwater discharges.
- Calibration and maintenance records of on-site instruments used.
- Visual observations and sample collection exception records,
- Date and approximate time of analyses.
- Individual who performed the analyses.
- Analytical results, method detection limits, and the analytical techniques or methods used.
- Quality assurance/quality control records and results.

- Sampling and analysis exemption and reduction certifications and supporting documentation.
- Records of any corrective actions and follow-up activities that resulted from the visual observations.

## 5.9 Reporting

Phase I municipalities are required to submit annual reports documenting BMP implementation, with due dates varying depending on individual NPDES permit requirements. Specific reporting requirements differ between individual permits. Typically, they include, but are not limited to, the following:

- Program implementation status.
- Summary of stormwater activities performed.
- Stormwater monitoring results summary and analysis.
- Assessment of the effectiveness of selected control measures or BMPs.
- Changes or suggested changes to the BMP that will improve overall effectiveness of the program.

Phase II municipalities will be required under the Phase II General NDPEs Permit, beginning in 2004, to submit annual reports to the appropriate RWQCB by August 15th of each year, or as otherwise required by the RWQCB executive officer. Specific reporting requirements will include:

- Program implementation status.
- Summary of stormwater activities performed.
- Results of information collected, such as monitoring data.
- Summary of proposed stormwater activities for the next reporting cycle.
- Changes made in BMP selection.
- Changes in stormwater management personnel.
- Changes made in program or measurable goals.

# Section 6

## Glossary and List of Acronyms

### 6.1 Glossary

**303(d) Listed:** Water bodies listed as impaired as per Section 303(d) of the 1972 Clean Water Act.

**Best Management Practices (BMPs):** Includes schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent, eliminate, or reduce the pollution of waters of the receiving waters. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

**Catch Basin (Also known as Inlet):** Box-like underground concrete structure with openings in curbs and gutters designed to collect runoff from streets and pavement.

**Clean Water Act (CWA):** (33 U.S.C. 1251 et seq.) requirements of the NPDES program are defined under Sections 307, 402, 318 and 405 of the CWA.

**Construction Activity:** Includes clearing, grading, excavation, and contractor activities that result in soil disturbance.

**Construction General Permit:** A National Pollutant Discharge Elimination System (NPDES) permit issued by the State Water Resources Control Board for the discharge of stormwater associated with construction activity from soil disturbance of five acres or more. Threshold lowered to one acre beginning October 10, 2003. Construction General Permit No. CAS000002.

**Denuded:** Land stripped of vegetation or land that has had its vegetation worn down due to the impacts from the elements or humans.

**Detention:** The capture and subsequent release of stormwater runoff from the site at a slower rate than it is collected, the difference being held in temporary storage.

**Discharge:** A release or flow of stormwater or other substance from a conveyance system or storage container. Broader – includes release to storm drains, etc.

**Effluent Limits:** Limitations on amounts of pollutants that may be contained in a discharge. Can be expressed in a number of ways including as a concentration, as a concentration over a time period (e.g., 30-day average must be less than 20 mg/l), or as a total mass per time unit, or as a narrative limit.

**Erosion:** The wearing away of land surface by wind or water. Erosion occurs naturally from weather or runoff but can be intensified by land-clearing practices related to farming, new development, redevelopment, road building, or timber cutting.

**Facility:** Is a collection of industrial processes discharging stormwater associated with industrial activity within the property boundary or operational unit.

**Grading:** The cutting or filling of the land surface to a desired slope or elevation.

**Hazardous Waste:** A waste or combination of wastes that, because of its quantity, concentration, or physical, chemical or infectious characteristics, may either cause or significantly contribute to an increase in mortality or an increase in serious irreversible illness; or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of or otherwise managed. Possesses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity) or appears on special EPA or state lists. Regulated under the federal Resource Conservation and Recovery Act and the California Health and Safety Code.

**Illicit Discharges:** Any discharge to a municipal separate storm sewer that is not in compliance with applicable laws and regulations as discussed in this document.

**Industrial General Permit:** A National Pollutant Discharge Elimination System (NPDES) Permit (No. CAS000001) issued by the State Water Resources Control Board for discharge of stormwater associated with industrial activity. Board Order 97-03-DWQ.

**Inlet:** An entrance into a ditch, storm drain, or other waterway.

**Integrated Pest Management (IPM):** An ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties. Pesticides are used only after monitoring indicates they are needed according to established guidelines, and treatments are made with the goal of removing only the target organism.

**Municipal Separate Storm Sewer System (MS4):** 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) designed or used for collecting or conveying storm water; (ii) which is not a combined sewer; and (iii) which is not part of a Publicly Owned Treatment Works (POTW) as defined at Title 40 of the Code of Federal Regulations (CFR) 122.2. A "Small MS4" is defined as an MS4 that is not a permitted MS4 under the Phase I regulations. This definition of a Small MS4 applies to MS4 operated within cities and counties as well as governmental facilities that have a system of storm sewers.

**Non-Stormwater Discharge:** Any discharge to municipal separate storm sewer that is not composed entirely of stormwater.

**Nonpoint Source Pollution:** Pollution that does not come from a point source. Nonpoint source pollution originates from aerial diffuse sources that are mostly related to land use.

**Notice of Intent (NOI):** A formal notice to SWRCB submitted by the owner of an industrial site or construction site that said owner seeks coverage under a General Permit for discharges associated with industrial and construction activities. The NOI provides information on the

owner, location, type of project, and certifies that the owner will comply with the conditions of the construction General Permit.

**Notice of Termination (NOT):** Formal notice to SWRCB submitted by owner/ developer that a construction project is complete.

**NPDES Permit:** NPDES is an acronym for National Pollutant Discharge Elimination System. NPDES is the national program for administering and regulating Sections 307, 318, 402, and 405 of the Clean Water Act (CWA). In California, the State Water Resources Control Board (SWRCB) has issued a General Permit for stormwater discharges associated with industrial activities (see Appendix A).

**Outfall:** The end point where storm drains discharge water into a waterway.

**Point Source:** Any discernible, confined, and discrete conveyance from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural stormwater runoff.

**Pollutant:** Generally, any substance introduced into the environment that adversely affects the usefulness of a resource.

**Pollution Prevention (P2):** Practices and actions that reduce or eliminate the generation of pollutants.

**Precipitation:** Any form of rain or snow.

**Pretreatment:** Treatment of waste stream before it is discharged to a collection system.

**Reclaim (water reclamation):** Planned use of treated effluent that would otherwise be discharged without being put to direct use.

**Retention:** The storage of stormwater to prevent it from leaving the development site.

**Reuse (water reuse):** (see Reclaim)

**Runoff:** Water originating from rainfall, melted snow, and other sources (e.g., sprinkler irrigation) that flows over the land surface to drainage facilities, rivers, streams, springs, seeps, ponds, lakes, and wetlands.

**Run-on:** Off site stormwater surface flow or other surface flow which enters your site.

**Scour:** The erosive and digging action in a watercourse caused by flowing water.

**Secondary Containment:** Structures, usually dikes or berms, surrounding tanks or other storage containers, designed to catch spilled materials from the storage containers.

**Sedimentation:** The process of depositing soil particles, clays, sands, or other sediments that were picked up by runoff.

**Sediments:** Soil, sand, and minerals washed from land into water, usually after rain, that collect in reservoirs, rivers, and harbors, destroying fish nesting areas and clouding the water, thus preventing sunlight from reaching aquatic plants. Farming, mining, and building activities without proper implementation of BMPs will expose sediment materials, allowing them to be washed off the land after rainfalls.

**Significant Materials:** Includes, but not limited to, raw materials; fuels; materials such as solvents, detergents, and plastic pellets; finished materials such as metallic products; raw materials used in food processing or production; hazardous substances designed under Section 101(14) of CERLCA; any chemical the facility is required to report pursuant to Section 313 of Title III of SARA; fertilizers; pesticides; and waste products such as ashes, slag, and sludge that have the potential to be released with stormwater discharges.

**Significant Quantities:** The volume, concentrations, or mass of a pollutant in stormwater discharge that can cause or threaten to cause pollution, contamination, or nuisance that adversely impact human health or the environment and cause or contribute to a violation of any applicable water quality standards for receiving water.

**Source Control BMPs:** Operational practices that reduce potential pollutants at the source.

**Source Reduction (also source control):** The technique of stopping and/ or reducing pollutants at their point of generation so that they do not come into contact with stormwater.

**Storm Drains:** Above- and below-ground structures for transporting stormwater to streams or outfalls for flood control purposes.

**Stormwater:** Defined as urban runoff and snowmelt runoff consisting only of those discharges, which originate from precipitation events. Stormwater is that portion of precipitation that flows across a surface to the storm drain system or receiving waters.

**Stormwater Discharge Associated with Industrial Activity:** Discharge from any conveyance which is used for collecting and conveying stormwater from an area that is directly related to manufacturing, processing, or raw materials storage activities at an industrial plant.

**Stormwater Pollution Control Plan (SWPCP):** A less formal plan than the SWPPP that addresses the implementation of BMPs at facilities/businesses not covered by a general permit but that have the potential to discharge pollutants.

**Stormwater Pollution Prevention Plan (SWPPP):** A written plan that documents the series of phases and activities that, first, characterizes your site, and then prompts you to select and carry out actions which prevent the pollution of stormwater discharges.

**Treatment Control BMPs:** Treatment methods to remove pollutants from stormwater.

**Toxicity:** Adverse responses of organisms to chemicals or physical agents ranging from mortality to physiological responses such as impaired reproduction or growth anomalies.