# Section 1
# Introduction

Stormwater runoff is part of the natural hydrologic process. However, human activities such as urbanization and construction can impact stormwater runoff. Construction activities can alter natural drainage patterns and affect runoff water quality, adding pollutants to rivers, lakes, and streams as well as coastal bays and estuaries, and ultimately, the ocean. Urban runoff is a significant source of water pollution, causing possible declines in fisheries, restrictions on 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, etc.) 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 on quantity (e.g., drainage, flood control) and, to a limited extent, on quality of the stormwater (e.g., sediment and erosion control). However, in recent years awareness of the need to improve water quality has increased. With this awareness federal, state, and local programs have been established to pursue the ultimate goal of reducing 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). However, 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) that will eliminate or reduce the discharge of pollutants from construction sites to waters of the state. This handbook also provides guidance on developing and implementing Stormwater Pollution Prevention Plans (SWPPPs) that document the selection and implementation of BMPs for a particular construction project.

This handbook provides the framework for an informed selection of BMPs, and developments and implementation of a site-specific SWPPP. However, due to the diversity in climate, receiving waters, construction site conditions, and local requirements across California, this handbook does not dictate the use of specific BMPs and therefore cannot guarantee compliance with NPDES permit requirements or local requirements specific to the user's site.

### 1.1.1 Users of the Handbook

This handbook provides guidance suitable for use by a wide range of individuals involved in construction site water pollution control. Each user of the handbook is responsible for working within their capabilities obtained through training and experience, and for seeking the advice and consultation of appropriate experts at all times

The target audience for this handbook includes: developers, including their planners and engineers; contractors, including their engineers, estimators, superintendents, foremen,

tradesmen, and subcontractors; municipal agencies, including their engineers, municipal inspectors, building inspectors, permit counter staff, code enforcement officers, and construction staff; Regulatory agencies, including permit staff and enforcement staff, and the general public with an interest in stormwater pollution control.

## 1.1.2 Organization of the Handbook

The handbook is organized to assist the user in developing and implementing a stormwater program for construction sites to reduce potential impacts of both stormwater and non-stormwater discharges on receiving waters. The handbook consists of the following sections:

**California Stormwater BMP Handbook - Construction**

**Section 1**
**Introduction**
*This section provides a general review of the sources and impacts of construction activity stormwater discharges and provides an overview of the federal, state, and local programs regulating stormwater discharges.*

**Section 2**
**Stormwater Pollution Prevention Planning for Construction**
*This section describes how to prepare and implement a SWPPP for a construction project. It covers minimum requirements, construction activity assessment, BMP selection, and stormwater control planning. A SWPPP template is provided to facilitate SWPPP development and review by providing easy data entry and consistency in SWPPP documents.*

**Section 3**
**Erosion and Sediment Control BMPs**
*This Section provides an overview of BMPs for erosion, sediment, wind, and tracking control.*

**Section 4**
**Non-Stormwater Management and Materials Management BMPs**
*This Section provides an overview of BMPs for non-stormwater management and materials management including waste materials and material stockpiles.*

**Section 5**
**Glossary and List of Acronyms**
*This section identifies terms and abbreviations used in the handbooks.*

**Appendix A**
**General Permit**
*This Appendix contains a copy of the construction General Permit for application to most construction activities in the state.*

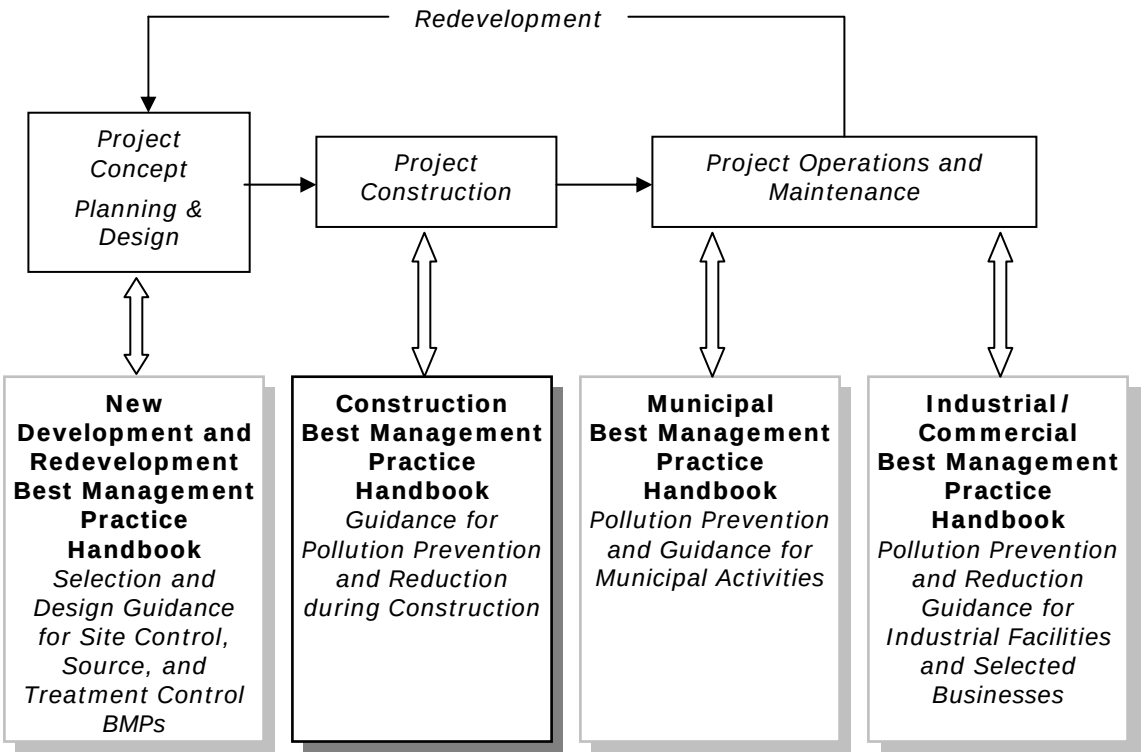
**Appendix B**
**SWPPP Template**
*This Appendix provides the SWPPP Template that was developed as an assistance tool for SWPPP preparation and review. The template contains elements required by the General Permit.*

**Appendix C**
**Construction Storm Water Sampling and Analysis Guidance Document**
*This Appendix contains a copy of the California Stormwater Quality Task Force's Construction Storm Water Sampling and Analysis Guidance Document*

## 1.1.3 Relationship to other Handbooks

This handbook is one of four handbooks that have been developed by the California Stormwater Quality Association (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 one stage of the life of a project. This handbook, the Construction Handbook, addresses selection and implementation of BMPs to eliminate or to reduce the discharge of pollutants associated with construction activity.

***Project Lifecycle***




For a comprehensive understanding of stormwater pollution control throughout the life cycle of a project, it is recommended that the reader 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 Construction Sites and their Impacts on Water Quality

## 1.2.1 Pollutants Associated with Construction Activities

Stormwater runoff naturally contains numerous constituents. However, urbanized and urban activities such as construction increase constituent concentrations to levels that impact water quality. Pollutants associated with stormwater include sediment, nutrients, bacteria and viruses, oil and grease, metals, organics, pesticides, gross pollutants (floatables), and miscellaneous waste Some constituents can also affect the pH of stormwater. Stormwater runoff can also be highly attractive to vector organisms, particularly mosquitoes, which can impact public health and become a legal liability. Stormwater pollutants are described in Table 1-1.

Excessive erosion and sedimentation are perhaps the most visible water quality impacts due to construction activities. Other less visible impacts are associated with off-site discharge of pollutants such as metals, nutrients, soil additives, pesticides, construction chemicals, and other construction waste. The magnitude of stormwater impacts depends on construction activities, climatic conditions, and site conditions. Development of a comprehensive SWPPP requires a basic understanding of the impacts, pollutant sources and other contributing factors, as well as BMPs to eliminate or reduce these impacts.

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

| | |
|---|---|
| **Sediment** | 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. |
| **Nutrients** | 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. |
| **Bacteria and viruses** | 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. |
| **Oil and Grease** | 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. |
| **Metals** | 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. |
| **Organics** | 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. |
| **Pesticides** | 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. |
| **Gross Pollutants** | 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. |
| **Vector Production** | 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). |

## 1.2.2 Erosion and Sedimentation

Soil erosion is the process by which soil particles are removed from the land surface by wind, water, or gravity. Most natural erosion occurs at slow rates; however, the rate of erosion increases when land is cleared or altered and left unprotected. Construction sites, if unprotected, can erode at rates in excess of one hundred times the natural background rate of erosion.

Sediment resulting from excessive erosion is a pollutant. Sedimentation is defined as the settling out of particles transported by water. Sedimentation occurs when the velocity of water is slowed sufficiently allow suspended soil particles to settle. Larger particles, such as gravel and sand, settle more rapidly than fine particles such as silt and clay. Effective sediment control begins with proper erosion control, which minimizes the availability of particles for settling downstream.

### Erosion from Rainfall Impact

The impact of raindrops on bare soil can cause erosion. On undisturbed soil protected by vegetation or other cover, the erosion is minimal. Construction activities increase the amount of exposed and disturbed soil, which increases erosion potential from rainfall.

### Sheet Erosion

After rainfall strikes the ground, it flows in a thin layer for a short distance. The distance of sheet flow depends on slope, soil roughness, type of vegetative cover, and rainfall intensity. Erosion due to sheet flow on undisturbed soils is minimal and greater on soils disturbed by construction. However, sheet flows are capable of transporting soil particles dislodged by the impact of raindrops onto bare soil, and thus cannot be ignored.

### Rill and Gully Erosion

As runoff accumulates, it concentrates in rivulets that cut grooves (rills) into the soil surface. Rills generally run parallel to one another and to the slope of the soil surface. If left unchecked, several rills may join together to form a gully. Rills are small enough to be stepped across, whereas a gully requires added effort to be traversed. The rate of rill erosion can easily be one hundred times greater than that of sheet flow, and the rate of gully erosion can easily be one hundred times greater than rill erosion. Due to the significant amount of sediment generated by rill and gully erosion, these types of erosion must be given top priority for elimination, reduction, and control. Rills and gullies form sooner on exposed soils than on vegetated soils.

### Stream and Channel Erosion

In general, one or more of the following factors that may occur during construction can change the hydrology of the area to affect erosion of the banks and bottoms of natural drainage channels:

- Clearing the soil and re-contouring the site during construction may increase the volume and rate of runoff leaving the site.

- Replacing pervious natural ground with impervious cover such as buildings and pavement further increases runoff.

- Detention basins used to capture sediment extend the duration of flows leaving the site.

Control of erosion in streams and channels downstream of the construction site as a result of construction activities is a complex issue and is usually best addressed by local agencies through a comprehensive drainage master plan. Where these plans are available, the local drainage-planning agency may specify specific BMP requirements applicable to construction projects, which in turn must be incorporated into the SWPPP. Where these plans are not available, the goal of the SWPPP should be to minimize the difference between the predevelopment, construction, and post-construction hydrographs, and to minimize increases in sediment discharges. In some situations, local agencies may require developers of large projects to conduct a study of the specific impacts related to development of the project. This will most likely be the case where municipal permits include new development and redevelopment provisions such as Standard Urban Stormwater Mitigation Plans (SUSMPs).

## Wind Erosion

Dust is defined as solid particles or particulate matters which are predominately large enough to eventually settle out from the air but small enough to remain temporarily suspended in the air for an extended period of time. Dust from a construction site originates from rock and soil surfaces, material storage piles and construction materials. It is generated by earthwork, demolition, traffic on unpaved surfaces, and strong winds. See Table 1-2.

**Table 1-2 Examples of Dust Sources at Construction Sites**

| Vehicle and Equipment Use | Exposed Areas | Contractor Activities |
|---|---|---|
| ■ Vehicle and equipment entering and leaving the project site<br>■ Vehicle and equipment movement and use within the project site<br>■ Sediment tracking off-site<br>■ Temporary parking lots and staging areas<br>■ On-site construction traffic | ■ Areas of exposed soil that have been cleared and grubbed<br>■ Areas of exposed soil that have been excavated, filled, compacted, or graded<br>■ Construction staging areas<br>■ Vehicle and equipment storage and service areas<br>■ Material processing areas and transfer points.<br>■ Construction roads<br>■ Construction sites, bare ground areas<br>■ Spilled materials<br>■ Construction stockpiles<br>■ Soil and debris piles | ■ Land clearing and grubbing<br>■ Earthwork including soil excavation, filling, soil compaction, rough grading, and final grading<br>■ Drilling and blasting<br>■ Materials handling, including material stockpiling, transfer, and processing<br>■ Batch dropping, dumping<br>■ Conveyor transfer and stacking<br>■ Material transferring<br>■ Crushing, milling and screening operations<br>■ Demolition and debris disposal<br>■ Tilling |

## 1.2.3 Other Pollutants

Erosion and sedimentation discharges are perhaps the most visible and significant source of pollutants associated with construction sites. However, pollutants such as nutrients, bacteria, viruses, oil, grease, metals, organics, pesticides, gross pollutants, and vectors must always be considered, as they can be associated with both acute and chronic problems in receiving waters. Table 1-3 presents a matrix that identifies the most common source of these other pollutants at construction sites.

**Table 1-3 Other Construction Activity Pollutants**

| Construction Activity | Pollutants | | | | | | |
|---|---|---|---|---|---|---|---|
| | Sediment | Nutrients | Trace Metals | Pesticides | Oil, Grease, Fuels | Other Toxic Chemicals | Miscellaneous Waste |
| **Construction Practices** | | | | | | | |
| Dewatering Operations | X | | | | | X | |
| Paving Operations | X | | | X | X | X | X |
| Structure Construction/Painting | | | X | | | X | X |
| **Material Management** | | | | | | | |
| Material Delivery and Storage | X | X | X | X | X | X | |
| Material Use | | X | X | X | X | X | |
| **Waste Management** | | | | | | | |
| Solid Waste | X | X | | | | | X |
| Hazardous Waste | | | | | | X | |
| Contaminated Spills | X | | | | | X | |
| Concrete Waste | | | | | | | X |
| Sanitary/Septic Waste | | | | | | | X |
| **Vehicle/Equipment Management** | | | | | | X | X |
| Vehicle/Equipment Fueling | | | | | | X | X |
| Vehicle/Equipment Maintenance | | | | | | X | X |

### 1.2.4 Impacts of Erosion and Sedimentation, and Other Pollutants

The impacts due to erosion and sedimentation can be placed in three categories:

- Degradation of aquatic and riparian ecosystems
- Pollutant transport
- Erosion of land and sedimentation within waterways and public facilities (i.e. storm drains).

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. In addition, sediment particles can transport other pollutants that are attached to them including nutrients, trace metals, and hydrocarbons. Sediment particles such as silts and clays are the primary components of total suspended solids (TSS), a common water quality analytical parameter.

In addition to impacts directly associated with sedimentation, various pollutants can also be transported along with sediment particles leaving construction sites. Such pollutants include metals, nutrients, conventional pollutants, pesticides, and coliform. These pollutants often originate from organic components, plant residues, and nutrient elements within soils on the construction site, and are thus mobilized by erosion and later deposited downstream during sedimentation. Alternatively, these other pollutants may be generated independent of erosion and because of their nature can have significant detrimental affects to receiving waters.

Construction activity may cause increased erosion and sedimentation within waterways and public facilities. Some construction activity will increase impervious area and/or change drainage patterns, resulting in increased runoff volumes and rates, which have the potential to erode downstream watercourses. Other construction activities such as grading may increase erosion from the construction site by disturbing and exposing the soil. The eroded soil particles from the construction site may flow downstream and fill drainage systems, reservoirs, and harbors.

In order to control the impact of erosion, sedimentation, and other pollutants on receiving waters, the *State Water Resources Control Board (SWRCB) Order No. 99-08-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000002, Waste Discharge Requirements (WDRs) for Discharges of Stormwater Runoff Associated with Construction Activity (General Permit)* requires the implementation of BMPs to eliminate or reduce the discharge of pollutants in stormwater discharges, and prohibits the discharge of non-stormwater from the construction site as these non-stormwater discharges are likely to carry pollutants to receiving waters. The General Permit recognizes that discharges of non-stormwater may be necessary for the completion of certain construction projects. Such discharges include, but are not limited to:

- Irrigation of vegetative erosion control measures

- Pipe flushing and testing
- Street cleaning, and
- Dewatering

Such discharges are authorized by this General Permit as long as they (a) do comply with Section A.9 of the General Permit, (b) do not cause or contribute to violation of any water quality standard, (c) do not violate any other provision of the General Permit, (d) do not require a non-stormwater permit as issued by some RWQCBs, and (e) are not prohibited by a Basin Plan. If a non-stormwater discharge is subject to a separate permit adopted by a RWQCB, the discharge must additionally be authorized by the RWQCB.

## 1.3 Regulatory Programs

The need to protect our environment has resulted in a number of laws and subsequent regulations and programs. In the following sections, various federal, state, and local programs are discussed in relationship to the control of pollutants in stormwater. The programs are expected to change over the next several years and the user is advised to contact state and local officials for further information.

### 1.3.1 Federal NPDES Programs

In 1972, the Federal Water Pollution Control Act (also referred to as the Clean Water Act [CWA]) was amended to provide that the discharge of pollutants to waters of the United States from any point source is unlawful unless the discharge is in compliance with an NPDES permit. The 1987 amendments to the CWA added Section 402(p), which establishes a framework for regulating municipal and industrial stormwater discharges, including discharges associated with construction activities, under the NPDES Program.

On November 16, 1990, the U.S. Environmental Protection Agency (USEPA) published final regulations that establish stormwater permit application requirements. The regulations, also known as Phase I of the NPDES program, provide that discharges of stormwater to waters of the Unites States from construction projects that encompass five or more acres of soil disturbance are effectively prohibited unless the discharge complies with an NPDES Permit.

Phase II of the NPDES program expands the requirements by requiring operators of small MS4s in urbanized areas and small construction sites to be covered under an NPDES permit, and to implement programs and practices to control polluted stormwater runoff. The program applies to:

- Operators of small MS4s located in “urbanized areas” as delineated by the Bureau of the Census. A “small” MS4 is any MS4 not already covered by the Phase I NPDES stormwater program.
- Small construction sites with a soil disturbance equal to or greater than one and less than five acres of land or part of a larger common plan of development which disturbs more than one acre.

## 1.3.2 State NPDES Programs

In California, the NPDES stormwater permitting program is administered by the State Water Resources Control Board (SWRCB) through its nine Regional Water Quality Control Boards (RWQCBs). The SWRCB has established a construction General Permit that can be applied to most construction activities in the state. Construction permittees may choose to obtain individual NPDES permits instead of obtaining coverage under the General Permit, but this can be an expensive and complicated process, and its use should generally be limited to very large construction projects that discharge to critical receiving waters. Because individual permits are rare and would likely follow the General Permit to a large extent, this Handbook is structured around the General Permit.

In California, owners of construction projects may obtain NPDES permit coverage by filing a Notice of Intent (NOI) to be covered under the *State Water Resources Control Board (SWRCB) Order No. 99-08-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000002, Waste Discharge Requirements (WDRs) for Discharges of Stormwater Runoff Associated with Construction Activity (General Permit)* and subsequent adopted modifications.

The primary objectives of the General Permit are to:

- Reduce erosion
- Minimize or eliminate sediment in stormwater discharges
- Prevent materials used at a construction site from contacting stormwater
- Implement a sampling and analysis program if stormwater is exposed to construction materials.
- Eliminate unauthorized non-stormwater discharges from the construction sites
- Implement appropriate measures to reduce potential impacts on waterways both during and after construction of projects
- Establish maintenance commitments on post-construction pollution control measures

Failure to comply with the General Permit may result in significant fines for each violation and possible imprisonment.

### Who must comply with the Construction General Permit?

- The General Permit applies to stormwater discharges associated with construction activity which disturbs one acre or greater of soil.
- The owner of the land is responsible for compliance.

## Who does not need to seek coverage under the Construction General Permit?

- Projects on Tribal Lands, in the Lake Tahoe Hydrologic Unit, the San Jacinto Watershed, covered by an individual NPDES Permit for stormwater discharges, and landfill construction that is subject to the General Industrial Permit.

- Activities to maintain the original line, grade, and hydraulic function of a facility, and emergency activities, do not require coverage under the General Permit. However, reasonable pollution control during these activities may still be required under other state and local regulations and ordinances.

- Construction activities meeting all three of the following criteria do not require coverage under the General Permit; (1) result in soil disturbances of less than one acre, (2) are not part of a larger common plan of development that disturbs one or more acres of soil, and (3) do not constitute a threat to water quality.

## How to comply with Construction General Permit

- Submit a Notice of Intent (NOI) and pay fees prior to the beginning of construction. Allow ten working days for processing the NOI and issuing the WDID number. A copy of the General Permit (SWQ 99-08) and the NOI can be found at http://www.swrcb.ca.gov/stormwtr/construction.html or in Appendix A.

- Prepare the SWPPP before construction begins. The SWPPP describes:

  - The project location, site features, and materials/activities that may result in the off-site discharge of pollutants during construction.

  - Controls to be implemented during construction - BMPs selected to control erosion, the discharge of sediment, and other pollutant sources.

  - An inspection and maintenance program for BMPs.

  - A sampling and analysis plan for sediment discharges to impaired water bodies as well as a plan to sample for non-visible pollutants.

  - Post construction controls – BMPs to prevent or control pollutants in runoff after construction is complete, including long-term maintenance.

- Keep the SWPPP on the site; implement it during construction and revise it as needed to reflect all phases of construction.

- Submit Notice of Termination (NOT) when construction is complete and conditions of termination listed in the NOT have been satisfied. A copy of the NOT can be found at http://www.swrcb.ca.gov/stormwtr/construction.html or at Attachment P in Appendix B.

### 1.3.3 Municipal NPDES Programs

Phase I Municipal Stormwater Program and municipal NPDES Permits cover and regulate municipalities with populations of over 100,000, drainage systems interconnected with these municipalities' systems, or municipalities determined to be significant contributors of pollutants. In California, most of the major urbanized counties have already obtained NPDES stormwater permits.

Municipalities with NPDES stormwater permits for their own municipal separate storm sewer system (MS4s) are responsible for developing a management program for public and private construction activities in their jurisdiction. Each program addresses appropriate planning and construction procedures; ensures the implementation, inspection, and monitoring of construction sites which discharge stormwater into their systems; and provides for education and training for construction site operators.

Phase II of the Stormwater Program will regulate municipalities with populations less than 100,000, including urbanized areas (areas with a population of 50,000 and density greater than 1,000 people per square mile), cities, and county areas designated by the state based on site-specific criteria, and various state and federal facilities. Each designated entity must submit a Notice of Intent (NOI) along with a copy of its Stormwater Management Program. The Phase II Stormwater Management Program must address six minimum control measures, including the following measures related to construction activities:

- 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 Stormwater Runoff Control - Developing, implementing, and enforcing an erosion and sediment control program for construction activities that disturb one or more acres of land.

- 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.

While Phase I and Phase II programs for construction sites vary throughout the state, the programs have many similarities, including the requirement for construction sites to comply with the General Permit. For specific information on local program requirements, construction site owners must contact the municipal stormwater program coordinator in the jurisdiction where the project will be constructed.

## 1.4 Definitions

Many of the most common terms related to stormwater quality control are defined in the Glossary (see Section 5). Throughout the handbook, the user will find references to the following terms:

***NPDES General 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 industrial activities (see Appendix A).

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

***Sediment*** includes particles of sand, clay, silt, and other substances that settle at the bottom of a body of water. Sediment can come from the erosion of soil or from the decomposition of plants and animals. Wind, water, and ice often carry these particles great distances.

***Stormwater Pollution Prevention Plan (SWPPP)*** is a written plan that documents the series of phases and activities that, first, characterizes your site, and then, prompts the implementers to select and carry out actions which reduce pollutants in stormwater discharges.

***Stormwater Pollution Control Plan (SWPCP)*** is a less formal plan than the SWPPP that addresses the implementation of BMPs at facilities and businesses not covered by a General Permit but that have the potential to discharge pollutants.

***Best Management Practices (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.

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

## 1.5 References

Berman, L., C. Hartline, N. Ryan, and J. Thorne, (1991), *Urban Runoff: Water Quality Solutions.* American Public Works Association, Special Report #61.

*Clark County Stormwater Pollution Control Manual Best Management Practices for Business and Government Agencies*. 2000, Clark County Environmental Services Division. November 2000. On-line: http://www.co.clark.wa.us/pubworks/BMPman.pdf

*King County Stormwater Pollution Control Manual. Best Management Practices for Businesses*. King County Surface Water Management. July 1995. On-line: http://dnr.metrokc.gov/wlr/dss/spcm.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.

National Stormwater Best Management Practices Database. American Society of Civil Engineers, 1999. On-line: http://www.asce.org

*Pierce County Stormwater Pollution Prevention Manual: A Guide to Best Management Practices for Industries, Businesses and Homeowners.* Pierce County Public Works and Utilities. Revised March 2002. On-line: http://www.co.pierce.wa.us/services/home/environ/water/swm/sppman/index.htm

State of California Department of Transportation (Caltrans), Stormwater Quality Handbooks. 2000.

State of California Department of Transportation (Caltrans) Stormwater Quality Handbooks. Construction Contractor's Guide and Specifications. 1997.

State of California Department of Transportation (Caltrans), Stormwater Quality Handbooks. 1993.

State Water Resources Control Board, (1999), *NPDES General Permit No. CA2000002: Waste Discharge requirements for Discharges of Storm Water Runoff Associated with Construction Activity*. On-line: http://www.swrcb.ca.gov/stormwtr/construction

Stormwater Managers Resource Center. On-line: http://www.stormwatercenter.net

United States Environmental Protection Agency, Region 9: Water Programs: NPDES Storm Water Program. On-line: http://www.epa.gov/region09/water/npdes/stormwater.html

United States Environmental Protection Agency, (1992), *Draft Stormwater Pollution Prevention for Industrial Activities*, Office of Wastewater Enforcement and Compliance.

United States Environmental Protection Agency, (2000), *Storm Water Phase II Final Rule*, Office of Water. On-line: http://www.epa.gov/npdes/pubs/fact1-0.pdf

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