

Section 1.0 Introduction and Purpose

This document introduces and describes a strategic approach to planning and assessing Municipal Separate Storm Sewer System (MS4) programs. It provides background on the development and use of strategic planning methods, and describes how planning results can be used to direct program resources, establish measurability, and assess the effectiveness of stormwater management programs.

1.1 Background

Under the 1987 Amendments of the federal Clean Water Act (CWA), the USEPA developed regulations to address stormwater discharges originating from Municipal Separate Storm Sewer Systems (MS4s) as point source discharges of pollution. In California, and elsewhere in the U.S., these regulations were developed and implemented in two phases. Phase I implementation began in the early 1990s and required that operators of MS4s serving populations of greater than 100,000 people obtain permits to discharge stormwater from their outfalls. There are currently 33 Phase I Area Wide MS4 permits in California, administered through nine Regional Water Quality Control Boards (RWQCBs). These permits are re-issued on approximate five-year cycles.

The second phase of MS4 regulations became effective in March 2003. The California Phase II Permit (WQ Order No. 2003-0005-DWQ)

extended permit coverage to smaller municipalities, including nontraditional Small MS4s, which are governmental facilities such as military bases, public campuses, state parks and prison and hospital complexes. An updated Phase II Permit (Order No. 2013-0001 DWQ), re-issued statewide through the State Water Resources Control Board (SWRCB), became effective in July 2013.

For a number of reasons, MS4 programs are inherently complex, often more so than other water quality and environmental programs. The first of these is that they typically address a number of major sources within their areas of jurisdiction; construction and development

A Municipal Separate Storm Sewer System (MS4) is a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) that is:

- Owned by a state, city, town, village, or other public entity that discharges to waters of the U.S.;
- Designed or used to collect or convey stormwater;
- Not a combined sewer; and
- Not part of a Publicly Owned Treatment Works (POTW) (sewage treatment plant).

Stormwater runoff is commonly transported through MS4s and often discharged untreated into local waterbodies.

sites, residential areas, municipal operations, and industrial and commercial facilities. Even a small municipality must establish and administer a program to thousands of individuals, sites, and sources. Larger municipal programs can easily address millions of individuals, sites, or sources. While it makes sense to apply these programs broadly, successful implementation depends on the unique behavioral responses of the people they're directed to. Planning and assessment must, therefore, reflect these differences but also support meaningful analysis at a broader programmatic level.

Another feature of MS4 programs adding to their complexity is that, due to their extensive geographic coverage, vast number of potential pollutants¹, and the volume of flows addressed, they tend to focus predominantly on the use of source control best management practices (BMPs), (e.g., good housekeeping practices, pesticide use reduction, picking up after pets, etc.). While treatment controls are also an

important part of MS4 programs, managers often find themselves seeking to bring about the broad-scale implementation of many very small controls by third parties. More often than not, they have limited control over outcomes and lack the specific feedback needed to determine if these practices were implemented or are effective. Moreover, because source controls can often be difficult to measure, and the individual impact of many of them is very small, it is difficult to paint a clear picture of their collective performance.

Managers must also consider the overall characteristics of discharges within and from their MS4s. The flows in an MS4 are transported via both manmade and natural, open systems. Contrast this, for example, with the flows in a wastewater system (e.g., sinks, toilets, etc.), the components of which are completely anthropogenic and contained. The ability to measure, modify, or control MS4 discharges is complicated by the co-mingling of both anthropogenic and natural flows and pollutants within these systems. In addition, MS4s are often impacted by a number of non-point sources such as groundwater seepage, wind-blown and directly-deposited materials, and aerial deposition.

Guidance on planning and assessing stormwater programs is needed by Phase I and Phase II MS4 stormwater program managers. MS4 programs can be particularly challenging to plan and assess because they:

- Address multiple major sources of stormwater pollution,
- Focus predominately on the use of source control best management practices, and
- Must prevent discharges of pollutants and flow that are co-mingled via manmade and natural, open systems.

¹ About 23 million substances have been indexed by the American Chemical Society's Chemical Abstracts Service.

Despite these and other challenges, stormwater program managers find themselves facing increasing pressure to demonstrate the effectiveness of their programs, often with little guidance on how to do so. **Effectiveness assessment** consists of the methods and activities that managers use to evaluate how well their programs are working and to identify modifications necessary to improve results. Without the specific knowledge or the tools needed to do so, stormwater managers can be faced with a perception that their programs are inadequate or failing.

1.2 Purpose

The primary purpose of this Guidance Document is to establish an up-to-date and specific “how to” guidance for managers in planning and assessing their MS4 programs. It approaches effectiveness assessment as an integral part of a comprehensive **strategic planning** process. It is designed for use by MS4 program managers involved in developing and implementing all aspects of stormwater programs, but it should also be useful to a variety of dischargers regulated under other stormwater permits and programs (e.g., construction and industrial), as well as other environmental managers with a need for guidance on management and assessment principles.

Throughout this document, managers will find a consistent emphasis on the following key principles:

- **Strategic planning** -- Managers will learn how to “plan for assessment.” During planning, they’ll follow a consistent and logical structure to establish measurable targets that can later be used to evaluate implementation results and determine success.
- **Structure and measurability** – A standardized classification of “outcomes” is introduced to direct programs toward measurable and meaningful endpoints. By exploring “cause and effect” relationships between different outcome types, managers will incrementally improve their understanding of what works and what doesn’t.
- **Prioritization** – Albert Einstein once said “not everything that can be counted counts, and not everything that counts can be counted.” Stormwater managers have neither the ability nor the resources to track or to evaluate every measurable outcome, and must therefore focus their limited resources where they most matter.
- **Sustainability** – Stormwater management is more than a technical exercise. Every decision that managers make comes at a cost, and has potential implications to individuals, the environment or society as a whole. Decision-making processes in this document are approached through a balanced consideration of regulatory, technical, economic, and social factors.

In recent years, effectiveness assessment has begun to emerge as a distinct discipline within the broader stormwater program management field. Leading the way, the California Stormwater Quality Association (CASQA) released its *Municipal Stormwater Program Effectiveness Assessment Guidance* in May 2007. Since its release, this document has been used in interactive training workshops with Phase I and Phase II municipal stormwater program managers and staff, as well as regulators in California. It was also the primary reference for a 2008 USEPA webcast on effectiveness assessment, and has been incorporated into other regulatory guidance documents. See for example, USEPA's *MS4 Program Evaluation Guidance* manual (USEPA 2007) and *Evaluating the Effectiveness of Municipal Stormwater Programs* document (USEPA 2008).

Reissued California Phase I and Phase II municipal stormwater permits are also increasingly reflective of the 2007 CASQA Guidance, in large part due to the March 2011 release of the *Guidance for Assessing the Effectiveness of Municipal Storm Water Programs and Permits* by the State Water Resources Control Board. California Assembly Bill 739 (Laird, 2007) required the SWRCB to develop this guidance in accordance with the general effectiveness assessment principles established through CASQA, and required the SWRCB and Regional Water Quality Control Boards to utilize the document when establishing assessment requirements for programs and permits.

Considerable experience has been gained since CASQA initially began its program effectiveness assessment work in 2004. To this end, this updated Guidance Document reflects new information, lessons learned, and the refinement of assessment concepts over that period.

A structured and well-executed approach to planning and assessing stormwater programs can help managers to ensure that their programs are properly targeted, determine whether intended results are being efficiently and cost-effectively achieved, and, ultimately, relate implementation results to conditions in urban runoff and receiving waters. Moreover, when considered as part of a larger program planning process, assessment principles and approaches can help to guide managers toward implementation strategies with the greatest opportunity for long-term success.

1.3 Organization

Table 1.1 provides an overview of the organization of this Guidance Document, and briefly describes the purpose of each section. It is generally structured to follow the strategic planning process introduced in Section 3.0 (Introduction to Strategic Planning for Stormwater Management Programs). Sections 4.0 through 6.0 provide detailed guidance on applying these strategic planning principles to the three primary components of the stormwater management model introduced in Section 2.0 (General Concepts and Principles). The intent of these sections is to help

managers develop defensible strategic planning approaches that fully incorporate targeted, measurable outcomes which can be used to assess and improve their programs over time. Sections 7.0 and 8.0 provide additional discussion of options and approaches for assessing the data and information collected during the implementation phase.

Table 1.1: Organization of the Guidance Document

1.0 Introduction and Purpose	Section 1.0 provides background on the development and use of effectiveness assessment methods, and explains their importance to stormwater program managers.
2.0 General Concepts and Principles	Section 2.0 introduces the main components of the program planning and assessment processes, describes their use, and defines standardized concepts and terminology used throughout the remainder of the Guidance Document. These general concepts provide a basis for the specific instruction provided in the remainder of the document.
3.0 Introduction to Strategic Planning for Stormwater Management Programs	Section 3.0 builds on the concepts and principles presented in Section 2.0. It describes a stepwise process for developing a Comprehensive Program Planning Strategy. This includes problem characterization, goal setting, selection of control strategies and program activities, and the establishment of methods and metrics to assess effectiveness.
4.0 Source and Impact Strategies	Section 4.0 applies the strategic planning process introduced in Section 3.0 to the development of Source and Impact Strategies.
5.0 Target Audience Strategies	Section 5.0 applies the strategic planning process introduced in Section 3.0 to the development of Target Audience Strategies.
6.0 Program Implementation Strategies	Section 6.0 applies the strategic planning process introduced in Section 3.0 to the development of Program Implementation Strategies.
7.0 Assessment Tools and Strategies	Section 7.0 identifies and discusses tools and strategies for conducting assessments.
8.0 Interpretation and Use of Results	Section 8.0 provides examples of effectiveness assessments that have been conducted by stormwater programs throughout the state. These are intended to provide concrete examples of how others have approached assessment, and how managers might approach the analysis and use of results.
Att. A Glossary of Acronyms and Terms	Attachment A defines key acronyms and terms used throughout the document.

Att. B	Source Profiles	Attachment B provides additional background information on the following source categories: <ol style="list-style-type: none">1. Planning and land development sources and activities2. Construction sources and activities3. Industrial and commercial sources and activities4. Municipal operations sources and activities
Att. C	Constituent Profiles	Attachment C provides additional background information on the following common constituents: <ol style="list-style-type: none">1. Bacteria2. Sediment3. Nutrients4. Mercury5. Pesticides6. Trash