C-1.0 INTRODUCTION

C-1.1 Annual Reports

The Orange County Stormwater Program (the Program) is a cooperative regulatory partnership among the cities of Aliso Viejo, Anaheim, Brea, Buena Park, Costa Mesa, Cypress, Dana Point, Fountain Valley, Fullerton, Garden Grove, Huntington Beach, Irvine, La Habra, La Palma, Laguna Beach, Laguna Hills, Laguna Niguel, Laguna Woods, Lake Forest, Los Alamitos, Mission Viejo, Newport Beach, Orange, Placentia, Rancho Santa Margarita, San Clemente, San Juan Capistrano, Santa Ana, Seal Beach, Stanton, Tustin, Villa Park, Westminster, and Yorba Linda, the County of Orange and the Orange County Flood Control District (collectively the Permittees) who operate an interconnected municipal storm drain system which discharges stormwater and urban runoff pursuant to National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer Systems(MS4) Permits.

The MS4 Permits, administered by the Santa Ana and San Diego Regional Water Quality Control Boards (subsequently referred to as the Santa Ana Regional Board, the San Diego Regional Board or collectively as the Regional Boards), require the Permittees to develop and implement surface water quality protection and management programs and report annually on progress and program effectiveness. The Permittees' coordinated response to these requirements is the "Orange County Stormwater Program" (the Program). The Permits were first adopted in 1990 and subsequently renewed in 1996 (Second Term), 2002 (Third Term) and 2009 (Fourth Term[1]). This Annual Report discusses the Program's activities over the period July 1, 2012 to June 30, 2013.

C-1.2 Purpose and Organization of Reports

The purpose of this report is to:

- Describe of all activities that were conducted during the reporting period to comply with the Fourth Term Permits;
- Assess program effectiveness, and
- Identify of areas of future "Program Focus" which may involve either enhanced implementation or additional areas of program development.

The organization of the annual report reflects the organization and content of the program's principal planning document, which is the Drainage Area Management Plan (DAMP). The DAMP comprises policy and program guidance, jurisdiction specific Local Implementation Plans (LIPs), and watershed plans. Accordingly, this report comprises:

- A countywide assessment;

[1] Order No. R8-2009-0030 was adopted by the Santa Ana Regional Board on May 22, 2009. Order No. R9-2009-0002 was adopted on December 16, 2009

- Jurisdictional assessments completed individually by each Permittee; and
- A review of watershed-based initiatives;

Section headings, such as Municipal Activities, Public Education, etc. are consistent across all the major elements of program documentation. This document structure was developed to:

- Provide for an easier comparison of permit, DAMP and LIP requirements to Principal Permittee and Permittee accomplishments;
- Enable the independent jurisdictional review and revision of the local stormwater programs; and
- Enable review and revision of the watershed plans by watershed Permittees.

Commencing with the Third Terms Permits and continuing with the Fourth Term Permits, there has been divergence in a number of program areas between the requirements of the Santa Ana and San Diego Regional Board permits. Consequently, the Annual Progress Report contains elements that are specific to each area of Regional Board jurisdiction.

The countywide assessment discusses the activities undertaken by the Principal Permittee as program coordinator and presents an overview of countywide program implementation. The following information is presented:

- A review of the program management framework (committee and sub-committee structure) and a fiscal analysis report (**Section C-2.0**);
- A review of the stormwater and watershed planning processes and associated technical studies (**Section C-3.0**);
- A review of the status of program implementation and compliance with the schedules contained in the permits (**Sections C-4.0, C-5.0** and **C-7.0 – C-12.0**);
- A review of the status and effectiveness of the public education and outreach program (**Section C-6.0**);
- A review of the status of the control measures established under the ID/IC elimination program (**Section C-10.0**);
- A summary and analysis of monitoring results from the water quality monitoring program (**Section C-11.0**);
- A review of the status and effectiveness of the Watershed Workplans and Watershed Master Plans in the San Diego Regional Board and Santa Ana Regional Board areas, respectively) and concurrent complementary efforts to manage urban stormwater quality at the watershed scale (**Section C-12.0**);
- A review of any stormwater management program modifications made to reduce the discharge of pollutants to the maximum extent practicable (MEP) (**Section C-13.0**);
- Major changes in any previously submitted plan/policies (**Section C-13.0**); and
- A description of the proposed schedule of DAMP development for the period July 1, 2013 through June 30, 2014 (**Section C-13.0**).

C-1.3 Background

C-1.3.1 Environment

The Program addresses the impacts to creeks, rivers, streams and coastal waters that can arise from the imprint of urban development on the landscape. Urbanization creates rooftops, driveways, roads and parking lots (Schueler and Holland, 2000[2], use the term *Imperviousness* as the unifying theme for understanding the adverse hydrologic impacts of urbanization) which (1) increase the timing and volume of rainfall runoff (compared to pre-development conditions) and (2) provide a source of pollutants that are flushed or leached by rainfall runoff or dry weather runoff into surface water systems. The environmental consequences of these impacts can be loss or impairment of aquatic beneficial uses due to:

- Water quality degradation from increased loadings of sediment, nutrients, metals hydrocarbons, pesticides, and bacteria;
- Stream channel instability and habitat loss from increased severity and frequency of runoff events;
- Loss of groundwater recharge, and
- Increased water temperatures from solar energy absorption by urban surfaces and elimination of riparian shading.

C-1.3.2 Clean Water Act

The 1972 Federal Water Pollution Control Act, subsequently known as the Clean Water Act (CWA), established the NPDES permitting program to regulate the discharge of pollutants to waterways. In 1987 Congress passed a Clean Water Act Amendment, the Water Quality Act, which brought stormwater discharges into the NPDES permitting program. United States Environmental Protection Agency (USEPA) subsequently promulgated stormwater regulations (40 CFR Parts 122, 123 and 124) on November 16, 1990, which established NPDES permit application requirements for municipal storm drain system operators and industrial dischargers of stormwater.

C-1.3.3 Municipal NPDES Stormwater Permits

In response to the stormwater regulations, the Permittees have obtained, renewed and complied with NPDES stormwater permits from the Santa Ana and San Diego Regional Boards (See **Table C-1.1, Permit History**). Each permit renewal has required the Permittees to coordinate the development and implementation of a surface water (i.e creeks, rivers, streams and coastal waters) quality protection and management program to:

- Prohibit illicit/illegal discharges into the municipal stormwater conveyance systems; and

[2] The Practice of Watershed Protection, 2000, T.R. Schuler and H.K. Holland, The Center for Watershed Protection

- Develop and implement Best Management Practices (BMPs) to control/reduce the discharge of pollutants from stormwater conveyance systems to waters of the United States to the Maximum Extent Practicable (MEP).

The permits have also required the preparation of Annual Progress Reports.

C-1.3.4 Drainage Area Management Plan (DAMP)

The DAMP is the Permittees' primary policy and planning document for municipal NPDES stormwater permit compliance. The **Proposed 2007 DAMP** (now 2013 DAMP) is being revised to address the requirements of the Fourth Term Permits and will be finalized in 2013 following approval of new requirements for land development in the San Diego Region of Orange County.

The main objective of the DAMP is to fulfill the commitment of the Permittees to develop and implement a program that satisfies NPDES permit requirements.

The need to address divergent permit requirements, while maintaining the beneficial and synergistic cohesion of a countywide program, has been addressed through separation of the DAMP's policy and planning areas from implementation. Since 2003, the DAMP has included Local Implementation Plans (LIPs), prepared by the Santa Ana Region Permittees, and LIPs (also termed Jurisdictional Runoff Management Plans (JRMPs)) prepared by the San Diego Region Permittees. The LIPs were created to assist each Permittee in implementing an increasingly complex program within its jurisdiction while maintaining a single policy document that is addressing two sets of permit requirements.

The requirement to overlay separate, but nonetheless, highly interrelated water quality protection and planning processes based on hydrologic rather than political boundaries was addressed through the creation of watershed plans. With the adoption of the Fourth Term Permits, the San Diego Region Permittees have been required to further develop these documents which are now termed Watershed Workplans and the Santa Ana Permittees have been required to undertake watershed master planning.

C-1.4 Major Program Accomplishments

During the reporting period there has been a significant allocation of resources to addressing new permit requirements, including the integration of Low Impact Development (LID) and hydromodification mitigation practices into the local regulatory framework for land development (South Orange County), the implementation of these requirements (North Orange County) and implementation of new "action level" based monitoring program elements (South Orange County). At the same time, full implementation of the DAMP at jurisdictional and watershed scales has continued. Notable accomplishments that occurred during the reporting period include:

- Continuing implementation of the County Area Spill Containment (CASC) Program and CASC activation to address significant sewage spills (**Section C-3.0** and **Section C-10.0)**;
- Coordination with Orange County Transportation Authority (OCTA) on development of a Structural BMP Prioritization and Analysis Tool (SBPAT) to support disbursement of Measure M2 funding for water quality projects. To date Tier 1 funding of $8.6 million has been awarded to 85 projects and Tier 2 funding of $12.7 million has been awarded to 8 projects (**Section C-3.0**);
- Continuing implementation of *Baseline BMPs* and further development and implementation of the Program's Integrated Pest Management (IPM) policy (**Section C-5.0**);
- The production of an estimated 134 million public education impressions, rebranding of the program (www.H2OC.org) and application of community based social marketing principles to a new campaign focused on eliminating irrigation overwatering (**Section C-6.0**);
- Implementation of the new Low Impact Development (LID) based Model Water Quality Management Plan (WQMP) and supporting Technical Guidance Document (TGD) in north Orange County (**Section C-7.0**).
- Completion of infiltration feasibility and hydromodification susceptibility mapping for the entire Orange County area and creation of a web portal to enable public access to the information (**Section C-7.0**);
- Processing of 351 Project WQMPs covering 1,238 acres of development (**Section C-7.0**);
- 7,123 construction sites inspected and 647 formal enforcement actions taken (**Section C-8.0**);
- Completion of 6,179 commercial/industrial facility inspections and 661 formal enforcement actions (**Section C-9.0)**;
- Completion of 11,304 food service establishment inspections and 2,680 follow-up investigations/actions (**Section C-9.0**);
- Implementation of a countywide mobile business database (**Section C-9.0**);
- Investigation of 2,744 complaints and 2,767 enforcement actions regarding illegal discharges or illicit connections (**Section C-10.0**);
- Continued implementation of innovative water quality monitoring programs and the development of new insights regarding the chemical, biological and physical impacts of urban dry and wet weather runoff (**Section C-11.0**);
- Continued implementation of Stormwater Action Level (SAL) based outfall monitoring program element for wet weather discharges in South Orange County (**Section C-11.0**);
- Full implementation of the Dry Weather Reconnaissance Monitoring Program in North Orange County and implementation of Non-stormwater Action Level (NAL) Program in South Orange County (**Section C-11.0**);
- Continued implementation of metals, sediment, selenium, nutrients, toxics and bacteria Total Maximum Daily Load (TMDL) programs in the Newport Bay, San Gabriel River-Coyote Creek, Aliso Creek and San Juan Creek watersheds (**Section C-12.0)**, and
- Implementation of Watershed Workplans for six South Orange County

watersheds and ongoing development of the Watershed Master Plan approach for North Orange County (**Section C-12.0)**.

C-1.5 Program Effectiveness Assessment (PEA) Strategy

Programmatic achievements can be characterized in terms of six levels of outcome. **Figure C-1.1** shows these levels as a gradation from activity-based to water quality-based outcomes and illustrates the progression in each level toward the ultimate goal of confirmation of environmental improvement. In general, Levels 1 to 3 can be considered *Implementation Outcomes*, Levels 5 and 6 *Water Quality Outcomes* and Level 4 a combination of the two types. Each level can have value in informing the management process. However, it bears emphasis that not all are necessary or possible in every instance (CASQA, 2007).[3]

C-1.5.1 Assessment Measures

In this Annual Progress Report, two basic categories of assessment measure are recognized, related to (1) the shorter term confirmation of BMP implementation corresponding to CASQA Outcome Levels 1-3 and (2) the longer term verification of environmental improvement corresponding to CASQA Outcomes Levels 4-6. In essence, this categorization of measures reflects two basic assessment questions:

- Are program elements being implemented correctly?
- Are environmental improvements being realized?

Key attributes of the assessment measures include:

- Measurability (statistically measurable on a frequent basis);
- Relevance (significant, demonstrable relation to strategy and objectives);
- Reliability (easily documented and reproducible);
- Availability (based upon data obtainable at reasonable cost);
- Scientific validity (based on sound science), and
- Replicability (capable of being regularly updated).

Headline Indicators are intended to be a sub-set of assessment measures that reflect in simple terms how a stormwater program is progressing towards its goals and are intended to be easily understood. The Orange County Stormwater Program Headline Measures are presented in **Table C-1.2**.

C-1.5.2 Effectiveness Assessment

Effectiveness assessment requires the initial establishment of a set of baseline conditions. Thereafter effectiveness can be evaluated by comparisons of successive years of

[3] California Stormwater Quality Association (CASQA), 2007: "Municipal Stormwater Program Effectiveness Assessment Guidance".

indicator information against the baseline data. Where the period of evaluation is characterized by the implementation of new program requirements, determinations of program effectiveness will initially be limited to confirmation of program implementation. Indeed, it must be recognized that direct measures of program effectiveness may not be available within the timeframe of the Fourth Term Permits. This lack of direct measure confirmation arises because:

- Baseline water quality conditions are not readily established;
- Water quality changes in response to program implementation are likely to be very slow; and
- Establishing a link between receiving water condition and program activities is difficult at the watershed scale when programs are being implemented incrementally with the development/redevelopment cycle.

The process of stormwater program effectiveness assessment, which is illustrated in **Figure C-1.2**, is also conducted at two levels. At the jurisdictional or Permittee level, the assessment is conducted annually and focuses on program implementation. Inferences about the connection of management program elements to water quality improvements made in these assessments will predominantly be drawn from the assessment of programmatic indicators and indirect measures of progress. Further, the outcome of the assessment will be proposed revisions to the LIP. The Permittees' assessments are presented as **Exhibits** to this report.

At the countywide program level, the major assessment is done principally on a five yearly basis with an emphasis on using direct measures of progress. This assessment is targeted at informing the review and revision of the DAMP during preparation of the Report of Waste Discharge (ROWD) using information from the water quality monitoring program. In the intervening periods, this information may be used to direct LIP revision contingent upon its availability.

While program effectiveness assessment is a key step in the iterative process of program implementation, it should be realized that effectiveness assessment itself is a part of the management process that is also evolving. Assessing program effectiveness is recognized as a challenge for program managers across California, and the Program has supported the effort of the California Stormwater Quality Association (CASQA) to develop guidance in this area at a statewide level. This guidance was published as *Municipal Stormwater Program Effectiveness Assessment Guidance* (CASQA, 2007). New efforts being initiated by the State Water Resources Control Board (SWRCB) and CASQA to further develop program effectiveness guidance will inform this effort in the future.

Table C-1.1: Permit History

Permit Term	Santa Ana Regional Board			San Diego Regional Board		
	Order No.	NPDES No.	Date Adopted	Order No.	NPDES No.	Date Adopted
First (1990-1996)	90-71	CA 8000180	July 1990	90-38	CA 0108740	July 1990
Second (1996-2002)	96-31	CAS618030	March 1996	96-03	CAS0108740	August 1996
Third (2002-2009)	R8-2002-0010	CAS618030	January 2002	R9-2002-0001	CAS0108740	February 2002
Fourth (2009-)	R8-2009-0030	CAS618030	May 2009	R9-2009-0020	CAS0108740	December 2009

Table C-1.2: Headline Measures

Program Element	Headline Measure	Process Measure	Result Measure	
			Indirect	Direct
C-2.0 Program Management	Participation in General Permittee Committee	X		
C-5.0 Municipal Activities	Solid Waste Collected		X	
	Drainage Facility Maintenance - Solid Waste Collected		X	
	Catchbasin Stenciling	X		
	Street Sweeping - Solid Waste Collected		X	
	Household Hazardous Waste Collected		X	
	Used Oil Collected		X	
	# of Facilities Inspected	X		
	Prioritization (High, Medium, Low) of Facilities		X	
	Reduction in Total Pesticide Application		X	
	Reduction in Total Fertilizer (Nitrogen) Application		X	
	Reduction in Total Fertilizer (Phosphorus) Application		X	
C-6.0 Public Education	# of Impressions	X		
	Changes in Public Awareness and Behavior		X	
C-7.0 New Development	# of WQMPs processed	X		
	Area (Acreage) to which BMPs have been Applied		X	
	# of BMPs Implemented		X	
C-8.0 Construction	# of Sites Inspected	X		
	Extent of Compliance		X	
	# and Level of Enforcement Actions	X		
C-9.0 Existing Development	# of BMPs Implemented		X	
	Prioritization of Facilities		X	
	# and Level of Enforcement Actions	X		
C-10.0 ID/IC	# of Complaints		X	
	# and Level of Enforcement Actions	X		
C-11.0 Water Quality	Monitoring			X

Figure C-1.1: General Classification of Outcome Types

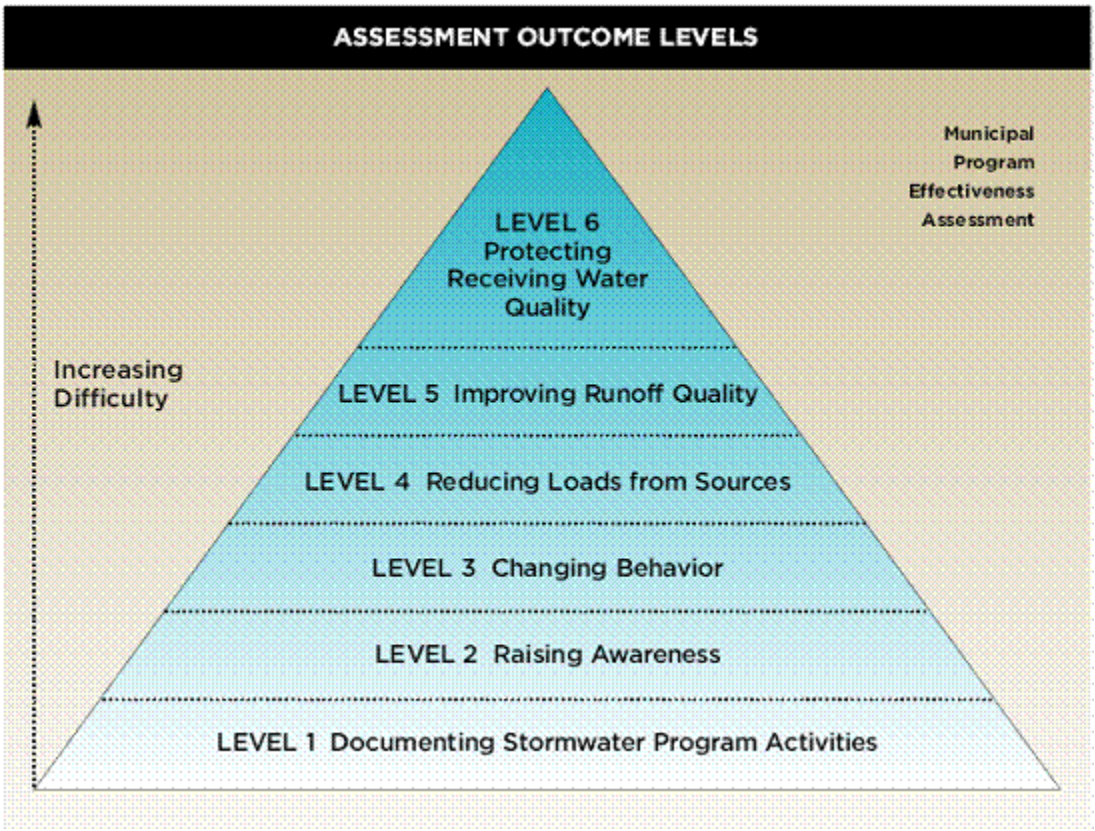
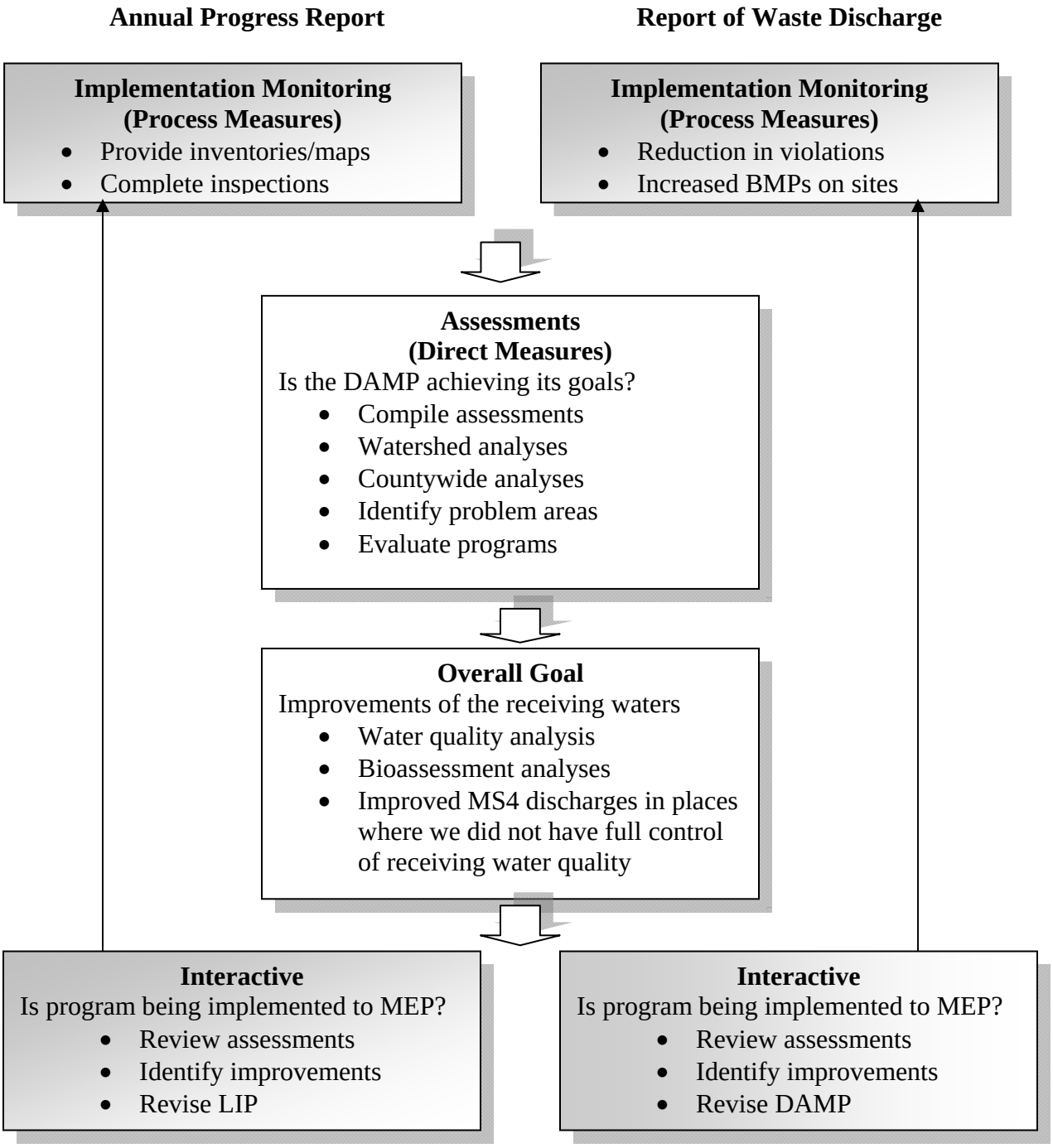


Figure C-1.2: Program Effectiveness Assessment Flow Chart



Shaded boxes are explicitly within the Permittee program effectiveness assessments.
Unshaded boxes are within Principal Permittee program effectiveness assessments.