

## C-3.0 PLAN DEVELOPMENT

### C-3.1 Introduction

The DAMP sets forth an iterative management approach for urban stormwater quality protection and management by:

- Establishing a set of *Baseline Best Management Practices (BMPs)* that are applicable to all areas and that are proven and cost-effective;
- Monitoring water quality to assess progress and identify urban impacts on receiving waters, and
- Developing *Enhanced BMPs* for specific constituents of concern at a watershed or jurisdictional level, as appropriate.

#### C-3.1.1 Water Quality Planning

The purpose of **DAMP Section 3.0** is to present the iterative (also referred to as “adaptive management”) planning process that is used for urban stormwater management in Orange County. A defining feature of this process is the cycle of analysis, measurement and improvement which is illustrated in **Figure C-3.1**:

**Assessing:** Assessing environmental conditions and programmatic performance, establishing the goals and targets to be achieved, and determining the route to be taken and the measurements to track success;

**Planning:** Designing activities to achieve the goal, identifying the needed skills and expertise, and designating responsibility for achieving desired outcomes;

**Implementing:** Bringing the process into effect in an efficient and effective manner, and

**Monitoring:** Evaluating the effectiveness of the *Implementing* stage.

Following adoption of the Third Term Permits in 2002, the DAMP was substantially revised to incorporate greater individual accountability through jurisdictional Local Implementation Plans (LIPs) (see **DAMP Appendix A**). The LIPs provide a flexible jurisdiction-specific plan within the broader policy and model program framework of the DAMP.

With additional permit mandates to institute watershed-based activities, water quality planning in the context of the DAMP is now evident as two separate, but nonetheless similar and highly interdependent, processes targeting the control of pollutants in urban runoff. These processes (**Table C-3.1; Figure C-3.1**) are:

- DAMP/LIP - Directed by jurisdictional assessments completed individually by each Permittee and a countywide assessment through a Unified Annual Progress Report.; and

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- DAMP/Watershed Action Plan (WAP) (See **DAMP Appendix D**) – Directed by watershed scale assessments in WAP Reports.

### C-3.2 Accomplishments

#### C-3.2.1 Programmatic Enhancements

To assist the Permittees with reporting the status of LIP implementation and the performance of the individual jurisdictional stormwater quality management programs, a Program Effectiveness Assessment (PEA) reporting framework (**DAMP Appendix C**) was developed in 2002-03. The PEA:

- Facilitates the collection and compilation of specific stormwater program implementation and progress validation indicators;
  - A PEA template was created in 2003 and has been the basis of the 2002-03, 2003-04, 2004-05, 2005-06, 2006-07 and 2007-08 Annual Reports and this report. In July 2005, the template was converted into an internet-based reporting system.
- Provides for program effectiveness assessment by the individual Permittees and the Principal Permittee on a jurisdictional, watershed and/or countywide basis;
  - The PEA identifies specific programmatic and environmental performance metrics including specified validation indicators titled, “Headline Indicators” (See **Section C-1.2.2**).
- Ensures that an evaluation and improvement process is applied on a jurisdictional, watershed and/or countywide level to determine where modifications within the DAMP, LIP or WAP may be necessary; and
- Provides a mechanism for the Permittee to identify and report modifications that have or will be made to their LIP.

#### C-3.2.2 Enhancements in Environmental Assessment

The findings of the extensive water quality monitoring program during the reporting period are discussed in **Section C-11.0**.

#### C- 3.2.3 Enhancements in Assessment Methodologies

Concurrent with this data collection effort are a number of important initiatives, being supported by the Permittees, that are aimed at the development of assessment techniques and methodologies to support more informed and consistent decision making across Southern California. Notable amongst these initiatives are the collaborative studies being conducted by the Stormwater Monitoring Coalition (SMC), the development of the California Sustainable Watershed/Wetland Information

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Manager (CalSWIM) prototype database, and the work of CASQA's Program Effectiveness Assessment and Stormwater Monitoring & Science sub-committees.

### *Stormwater Monitoring Coalition Collaborative Projects*

The Stormwater Monitoring Coalition (SMC), initially comprising Phase I municipal stormwater NPDES lead permittees and the NPDES regulatory agencies in southern California, was created in 2000. The goal of the Stormwater Monitoring Coalition is to identify region-specific research needs to better understand stormwater mechanisms and impacts, and to collectively sponsor the development of assessment techniques and methodologies that will enable more informed and consistent stormwater management decision-making across the region.

During the 2007-08 reporting period, the SMC's founding agencies renewed their original letter of agreement for another five years. At the same time, membership was increased by the addition of four new member agencies; the California Department of Transportation (Caltrans), the City of Los Angeles, the State Water Resources Control Board, and the US Environmental Protection Agency.

The agencies currently participating as members in the SMC are:

- California Regional Water Quality Control Board, Los Angeles Region
- California Regional Water Quality Control Board, San Diego Region
- California Regional Water Quality Control Board, Santa Ana Region
- California Department of Transportation, Caltrans
- City of Long Beach
- City of Los Angeles, Water Protection Division
- County of Orange, OC Public Works.
- County of San Diego Stormwater Management Program
- Los Angeles County Department of Public Works
- Riverside County Flood Control and Water Conservation District
- San Bernardino County Flood Control District
- Southern California Coastal Water Research Project
- State Water Resources Control Board
- US Environmental Protection Agency, Office of Research and Development
- Ventura County Watershed Protection District

In its first year of formation (2001-2002), the SMC assembled a panel of nationally recognized experts in relevant technical discipline areas to assist them in the development of a five-year priority research agenda which would serve as the basis for activities by the SMC in the foreseeable future. The first project supported by the SMC was to develop a five-year Research Agenda. The research agenda, published in 2001, consisted of 15 unique projects that the SMC ranked, prioritized, and then funded on a voluntary basis. The SMC has since made tremendous progress implementing the Research Agenda.

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Project accomplishments during the reporting period include:

Project	Status in 2008-09
Post-Wildfire Monitoring Plan	100% complete
Stormwater Data Compilation Study	90% complete
Implementing A Regionally Consistent and Integrated Freshwater Stream Bioassessment Monitoring Program	50% complete
Laboratory Intercalibration Study	90% complete
Hydromodification Study	50% complete
Low Impact Development Study	70% complete

### *Development of California Sustainable Watershed/Wetland Information Manager (CalSWIM) – Prototype Database*

The County of Orange as Principal Permittee has joined with the University of California, Irvine (UCI) in developing and implementing a prototype database called the California Sustainable Watershed/Wetland Information Manager (CalSWIM). CalSWIM is a web-based expert system and database focused, initially, on Newport Bay and the Newport Bay watershed and can be viewed at [www.calswim.org](http://www.calswim.org). The technical objective of CalSWIM is to provide an interactive platform for coastal wetland and watershed managers, planners, and engineers to explore alternative wetland and watershed management strategies. Activities undertaken<sup>1</sup> during the reporting period include:

- Completion and public deployment of the CalSWIM wiki;
- Development and open source release of three software components;
- Water quality simulation tool for CalSWIM;
- Theoretical work on data integrity, and
- Empirical study of trust-related issues in Wikipedia.

These activities are considered key to understanding the dynamics of open collaborative information systems, and in systematically evaluating if and how Web 2.0 technologies can be used in the scientific domain, specifically that of water science and management.

### *CASQA Program Effectiveness Assessment White Paper*

The PEA strategy (see **Section C-1.0**) is based on the approach to program effectiveness assessment presented in *Municipal Stormwater Program Effectiveness Assessment Guidance* (CASQA, May 2007) was integrated into preparation of the Reports of Waste Discharge and the 2005-6, 2006-07, 2007-08 Annual Reports. It is also the basis of this report.

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<sup>1</sup> NSF Annual Report - SDCI Data New: Collaborative Research: Trust Management for Open Collaborative Information Repositories: The CalSWIM Cyberinfrastructure. July 18, 2008

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### C-3.2.4 Enhancements in BMP Knowledge

During the reporting period, the Program applied the recommendations from the *Erosion Control BMP Effectiveness Study*, continued development and expansion of the *Countywide Area Spill Control (CASC) Program*, and completed the *Fullerton Creek Trash and Debris Demonstration Projects*.

#### *Erosion Control BMP Effectiveness Study*

An evaluation study of erosion control BMPs (*Erosion Control BMP Effectiveness Study*) was completed during the 2005-06 reporting period to provide information on (1) the effect of time and weathering on product condition; (2) the frequency a product must be applied to be effective; (3) the maximum slope on which a product will perform effectively; and (4) how product performance is affected by soil types. The study comprised an evaluation of two types of hydraulic mulch (paper and wood based), two types of polyacrylimide (low and high molecular weights) and wood mulch (without a binding agent). During the prior reporting period, the study was reviewed and approved by the TAC with its recommendations being endorsed as "Preferred Erosion Control BMPs" for Orange County. These BMPs were highlighted and discussed during pre-wet season construction site inspection training in 2008.

#### *CASC Program*

To address the various regulatory, technical and coordination issues associated with preventing and planning for SSOs, a pilot project - Tustin Area Spill Control (TASC) Demonstration Project - was initiated collaboratively by the County of Orange, on behalf of the Permittees, and Orange County Sanitation District.

The primary objectives of the project are to:

- Create broader awareness regarding the causes of SSOs and BMPs that can be implemented in order to prevent them;
- Improve the interagency coordination when responding to SSOs;
- Identify the resources needed when responding and mitigating impacts;
- Develop predictive tools for identifying potential impacts; and
- Protect the beneficial uses of the local water bodies.

Phase I was completed in mid 2003 and summarized in a report entitled "*Tustin Area Spill Control (TASC) Demonstration Project - Initial Case Study Report*", November 2003 (see **2002-03 Unified Annual Report**).

The second phase of TASC was the transition from development to the implementation and potential expansion of the project to other areas within the county. In Phase II, which was completed in the 2005-06 reporting period, the key technical, procedural and managerial aspects of SSO response from both the wastewater and stormwater agency perspectives were defined and clarified, including:

- Development of formal SSO response procedures;

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- Delivery of SSO hands-on field response training; and,
- Execution of a Memorandum of Understanding for delineating jurisdictional and financial responsibilities within the TASC project.

In 2006-07 the project expanded and was renamed the “*Countywide Area Spill Control (CASC)*” Program. The management of the CASC Program during the reporting period focused on:

- Development of a Memorandum of Understanding between the participating entities;
- Expansion of the CASC Program into the cities of Anaheim, Garden Grove, and Santa Ana, including identification of containment and recovery sites within these cities.
- Development of program expansion guidance documentation, and
- Field-based exercises for sewage spill response contractors held on July 1 and July 22, 2008.

### *Fullerton Creek Trash and Debris Demonstration Project*

Lower Fullerton Creek in Orange County, California, has been the focus of regulatory agency scrutiny for the accumulation of trash and debris within the creek and at its confluence with the San Gabriel River. In 2008, the Orange County Stormwater program partnered with a non-governmental organization – Earth Resource Foundation – to develop, implement, and evaluate the effectiveness of enhanced public education and outreach as a source control approach for watershed trash and debris control. The project is targeted schools, community centers, and businesses in proximity to Fullerton Creek. Information on trash and debris control is being provided to selected institutions and facilities to encourage and foster watershed stewardship. Concurrently, the Rapid Trash Assessment (RTA) Method is being used to monitor the condition of the creek over the period of the project. The project was completed in the reporting period.

### *Other BMP Evaluations*

BMP evaluations conducted by the Permittees are reported in **Section C-3.0** of the jurisdictional PEAs. Over the reporting period, the findings from these evaluations have been provided to the Permittees through the program management framework.

### C-3.2.5 BMP Selection

The Permittees have historically conducted activities that provide ancillary water quality benefits (street sweeping, catch basin cleaning etc.). The program in 2008-09 continued to implement and recognize the importance of these *Baseline BMPs* (see **Section C-5.2**).

The Permittees recognize that the field of stormwater quality is highly dynamic and that the BMPs within the DAMP/LIP must be revised, deleted or added to in order for the program to remain effective. In addition, water quality problems caused by urban stormwater that are identified either through the water quality monitoring program or the water quality planning processes may elevate the need for additional or new BMPs

to be implemented in order to effectively address the problem.

New candidate BMPs can be prevention or removal oriented and are generally identified from one or more of the following:

- A review of technical literature (such as the ASCE/USEPA database);
- A review of existing control programs;
- Demonstration or research projects, and
- Input from consulting firms and municipalities already involved in new BMP implementation.

During the reporting period, several Permittees reported the selection and/or implementation of additional structural and/or non-structural BMPs to enhance their local efforts including hydrodynamic separators and drain inlet filters and screens for trash control and various devices targeting pathogens including constructed wetlands [see **Exhibits 1-11** (San Diego) and **Exhibits 1-27** (Santa Ana)].

### C-3.2.5.1 BMP Retrofitting Opportunities

In 2003-04, a countywide evaluation was initiated to identify opportunities within the existing storm drain infrastructure for configuring/reconfiguring storm drains or channel segments in order to improve the water quality and maintain the designated beneficial uses (see **DAMP Appendix E**). This study used a Geographical Information System (GIS) model to create a database with information about runoff volume, Constituents of Concern (COC), and BMP citing opportunities. The first step in the model development was to create a digital database of the region. A digital elevation model and digital ortho-photography were used to delineate stream networks. Land use information was obtained as a zoning overlay to identify publicly owned and undeveloped parcels.

The developed GIS model has been used to identify potential BMP retrofit sites that had drainage areas of 50 to 500 acres. Sites were initially identified on parcels that were publicly owned, in proximity to receiving waters, and where there appeared to be sufficient available space for a regional BMP. The model was subsequently used to investigate potential BMP retrofit opportunities within Caltrans, County of Orange and Orange County Transportation Authority highway projects, homeowner association parcels, and finally excess highway right-of-ways.

The latest report for the project - *Identification of Regional BMP retrofitting Opportunities: Phase II Draft Report* - was completed in March 2008. It currently identifies 163 locations throughout the county that can potentially be modified to enhance beneficial uses or provide a water quality (pollution control) function. These locations comprise 23 locations identified in the initial screening effort, 30 Natural Treatment System (NTS) sites, 22 locations identified by the Permittees during the study, 20 in-channel locations, 34 locations identified within Caltrans, County of Orange or OCTA transportation projects, 31 locations within HOA parcels, and 3 locations within excess highway ROW. In 2008-09, watershed modeling was undertaken to quantify the impact of BMP

implementation on receiving water quality in the Aliso Creek and Anaheim Bay – Huntington Harbor watersheds.

### **C-3.3 Assessment**

The Permittees recognize that knowledge in the field of stormwater quality is rapidly evolving and that the BMPs within the DAMP/LIP and DAMP/WAP must be revised, deleted or added to in order for the program to stay current. In addition, water quality problems caused by urban stormwater that are identified either through environmental monitoring or regulatory interventions will elevate the need for additional or new *Baseline BMPs* and *Enhanced BMPs* to be implemented.

#### C-3.3.1 Iterative Planning Processes

While preparing the ROWD it was recognized that the DAMP did not describe a definitive process for making programmatic change in response to improved knowledge of water quality controls and best management practices.

#### **Proposed Program Modification:**

- **Section 3.0** of the proposed **2007 DAMP** presents a revised conception of the plan improvement process.

#### C-3.3.2 Programmatic Assessment

The PEA template created in 2003, which has been used as the basis of the 2002-03 through 2008-09 Annual Reports, has been helpful in establishing a series of metrics for spatial (i.e. jurisdictional comparisons) and temporal (i.e. year-to-year comparisons) assessments of program effectiveness. However, as noted in the prior annual report, the reporting has highlighted significant inconsistencies in metric interpretation across the jurisdictions of the Orange County Stormwater Program. This issue was addressed in June 2006 with the publication of metric definitions and guidance. In 2006-07 further guidance (*Technical Memorandum: Implementation of Preferred Options for Fiscal Reporting*) was developed to improve the accuracy of the fiscal element of the annual report. For the current reporting period, the report preparation schedule was advanced and a formal presentation of the performance data, compiled to facilitate jurisdictional comparison, was provided to the Permittees (on October 28, 2009) as an additional quality control step in the report preparation process. While these efforts have contributed to better data quality, jurisdictional comparisons continue to show marked variability in performance across key program elements which suggest that additional effort is needed to continue to improve metric reliability.

**Program Modification:**

- Fiscal reporting guidance was prepared to improve accuracy of the program cost information in advance of this report.

C-3.3.3 BMP Assessment

Over the course of the Third Term Permits a number of BMP evaluations have been undertaken. The recommendations arising from these studies, which were presented in either the ROWD as “ROWD commitments” or in the proposed 2007 DAMP, are the basis of the “Proposed Program Modifications” in the subsequent sections of this report. In many cases, these recommendations have been incorporated into the Fourth Term Permit – Board (Order R8-2009-0030) as regulatory requirements with specified compliance schedules. The “Proposed Program Modifications” that are now regulatory requirements are noted in this report with the appropriate regulatory citation.

**C-3.4 Summary**

**DAMP Section 3.0** describes the iterative planning processes that are the basis of the DAMP. Based upon an evaluation of these processes for the ROWD in 2006, the language of **DAMP Section 3.0** was revised in the proposed 2007 DAMP to better define these processes.

Fiscal data and programmatic metric reporting guidance documentation has been developed and was used in the preparation of this report. With the anticipation that the Fourth Term Permits will present the opportunity to re-evaluate the collection and reporting of the Program’s performance metrics, effectiveness assessment will continue to be a key area of program development for the Permittees.

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**Table C-3.1: Comparison of Water Quality Planning Processes**

	<b>DAMP/LIP</b>	<b>DAMP/WAP</b>
Geographic Area Covered by Plan	Defined by political (city/County) boundaries	Defined by hydrologic boundaries
Planning Process	Focused on reducing discharges of pollutants in urban runoff and stormwater pollution on a uniform countywide basis. Directed by DAMP/LIP in conformance with NPDES permits requirements	Focused on improving local receiving water quality where it is adversely impacted by urban runoff and stormwater pollution. Directed by NPDES permits and 303(d) list
Framework	Directed by Stormwater Program committee structure and Regional Board review. Public consultation principally through CEQA process/Regional Board review	Directed by municipal and public agency stakeholders. Characterized by public participation.
Assessment	Based on countywide municipal and regional cooperative investigations of stormwater and receiving water quality. Assessments are undertaken annually (LIP) and every 5 year (DAMP).	Based on information from watershed specific investigations. Assessments are undertaken on an annual basis.
Planning	Broad based approach with emphasis on well established pollution prevention and source control measures	Pollutant specific approach with emphasis on treatment controls and consideration of innovative regional solutions
Implementation	Individually by Permittees	Individually and collaboratively by Watershed Permittees and other agencies
Monitoring	Considers pollutant load reduction	Considers beneficial use attainment

**Figure C-3.1: Water Quality Planning Process**

