



**Southern California Stormwater Monitoring Coalition**

**Annual Report 2013-2014**

**Prepared by:  
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San Diego, California**

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## EXECUTIVE SUMMARY

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The goal of the Southern California Stormwater Monitoring Coalition (SMC) is to develop the technical information necessary to better understand stormwater mechanisms and impacts, and then develop the tools that will effectively and efficiently improve stormwater decision-making. The SMC develops and funds cooperative projects to improve the knowledge of stormwater quality management. Because the member agencies are involved in multiple projects, individual projects have different time periods for completion and are at various implementation stages. This annual report summarizes projects either recently completed, ongoing, or planned for the upcoming year. SMC member agencies completed several projects during the 2013-2014 reporting year including:

- Barriers to Low Impact Development
- Development of a 5-Year Research Agenda
- Stormwater Data Compilation
- Stormwater Monitoring Comparison and Evaluation : Survey, Workshop, and Research Priorities

The SMC projects that continued to be active during the 2013-2014 reporting year included:

- Implementing a Regionally Consistent and Integrated Freshwater Stream Bioassessment Monitoring Program
- Development of Regional Approaches and Protocols for Trash Monitoring and Management
- Low Impact Development

In addition to the 2013-2014 projects not yet completed, the member agencies plans to be active in several new projects during the 2014-2015 reporting year including:

- Development of an Updated SMC Master Agreement with an Alternate Funding Approach
- Implementation of a Toxicity Testing Laboratory Intercalibration Exercise
- Implementation of a New 5-Year Regionally Consistent and Integrated Freshwater Stream Bioassessment Monitoring Program

The value of the SMC to its member agencies is at least four-fold: 1) The ability to share costs for implementing projects. Cost reductions for SMC member agencies can be significant since collaborative projects can reduce costs by more than 90% relative to footing the bill alone. In addition, the majority of projects have nonmember agency cost-matching. Since its inception, non-member cost matching, totaling nearly \$3.5 million, amounts to a 2:1 match of member costs. 2) The ability to stretch member agency's skill base. Stormwater management requires a wide variety of knowledge including regulatory policy, engineering, hydrology, biology, chemistry, toxicity, and microbiology, to name a few. Many member agencies have limited staff and, by working together, garner the additional skills that are not sustainable within each agency. 3) The ability to communicate. Discussions among member agencies provide context and a richness of ideas for application to local issues back home. Similarly, discussion between regulatory and regulated agencies in an informal setting leads to more effective implementation of management

activities. Finally, 4) projects conducted under the SMC umbrella have nearly always resulted in some management action. Often, it is difficult for a single agency to affect the current course of regulatory management. Because SMC projects are initiated and vetted through all of the regulated and regulatory management agencies, the results are adopted quickly into the management framework including alterations to NPDES permits.

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## ACRONYMS AND ABBREVIATIONS

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LID	Low Impact Development
NPDES	National Pollutant Discharge Elimination System
SCCWRP	Southern California Coastal Water Research Project
SMC	Southern California Stormwater Monitoring Coalition

## 1.0 INTRODUCTION

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As a result of the increasing regulatory focus and the limited scientific knowledge base, both stormwater regulators and municipal stormwater management agencies throughout southern California have formed a collaborative working relationship to improve the science of stormwater management. The goal of this relationship is to develop the technical information necessary to better understand stormwater mechanisms and impacts, and then develop the tools that will effectively and efficiently improve stormwater decision-making. As individuals and agency representatives, there was early recognition that these issues are oftentimes not localized, but typically cross watershed and jurisdictional boundaries. This relationship culminated in a formal letter of agreement, signed in 2000 and again in 2009, by all of the Phase I municipal stormwater National Pollutant Discharge Elimination System (NPDES) lead permittees and the NPDES regulatory agencies in southern California to create the Stormwater Monitoring Coalition (SMC). The SMC is directed by a Steering Committee consisting of member agencies manager who are the lead representative for their respective organizations (Table 1-1).

Table 1-1. List of Member Agencies in the Stormwater Monitoring Coalition

<b>Agency</b>	<b>Lead Representative<sup>(a)</sup></b>
California Regional Water Quality Control Board, Los Angeles Region	Ivar Ridgeway
California Regional Water Quality Control Board, San Diego Region	Bruce Posthumus
California Regional Water Quality Control Board, Santa Ana Region	Milasol Gaslan
California Department of Transportation, Caltrans	Bhaskar Joshi
City of Long Beach	Anthony Arevalo
City of Los Angeles, Watershed Protection Division	Charlie Yu
County of Orange, OC Public Works	Chris Crompton, <i>Chair</i>
County of San Diego Stormwater Management Program	Jo Ann Weber
Los Angeles County Department of Public Works	Geremew Amenu
Riverside County Flood Control and Water Conservation District	Jason Uhley
San Bernardino County Flood Control District	Marc Rodabaugh
Southern California Coastal Water Research Project	Ken Schiff, <i>Vice-Chair</i>
State Water Resources Control Board	Greg Gearheart
US Environmental Protection Agency, Office of Research and Development	Mike Borst
Ventura County Watershed Protection District	Arne Anselm

<sup>(a)</sup> Listed current as of December 2014

## 2.0 PROJECTS COMPLETED DURING REPORTING TERM

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This section provides an overview of the SMC member agencies projects that were completed during the reporting year. The projects listed in this section include a brief summary describing of each project, some of the key study questions, and a list of publications produced from the project efforts. While a brief overview is provided in this Annual Report, detailed information can be obtained from the list of technical publications provided at the end of each section or by contacting the member agency Technical Leads. Information on past annual project updates reported in the SMC Annual Report are available on the SMC website by following the provided link ([SMC annual reports](#))

### 2.1 BARRIERS TO LOW IMPACT DEVELOPMENT

Table 2-1. Barriers to Low Impact Development Project Summary

<b>Lead Agency</b>	<i>San Bernardino County Flood Control District/ County of Orange</i>
<b>Report Year Project Started</b>	2009-2010
<b>Status</b>	100% Complete
<b>Initial Project Budget</b>	\$32,000
\$27,000	<i>County of San Diego</i>
\$1,250	<i>Riverside County Flood Control &amp; Water Conservation District</i>
\$1,250	<i>County of Orange</i>
\$1,250	<i>San Bernardino County Flood Control District</i>
\$1,250	<i>Ventura County Watershed Protection District</i>
<b>External Project Partners:</b>	<i>Local Government Commission</i>
<b>Technical Lead</b>	<i>Laura Podolsky, Local Government Commission</i>
<b>Key Words: implementation barriers, wet weather runoff, BMP effectiveness</b>	

USEPA describes Low Impact Development (LID) as: “..an approach to land development (or re-development) that works with nature to manage stormwater as close to its source as possible. LID employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treat stormwater as a resource rather than a waste product. There are many practices that have been used to adhere to these principles such as

*bioretention facilities, rain gardens, vegetated rooftops, rain barrels, and permeable pavements. By implementing LID principles and practices, water can be managed in a way that reduces the impact of built areas and promotes the natural movement of water within an ecosystem or watershed. Applied on a broad scale, LID can maintain or restore a watershed's hydrologic and ecological functions."*

While many communities understand the benefits of LID, getting LID projects built has been difficult. In an effort to address the difficulties in LID implementation, the Stormwater Monitoring Coalition (SMC) commissioned the Local Government Commission (LGC) to investigate the barriers its members are facing and prioritize strategies to remove those barriers.

A literature review focusing on site design and approval processes and associated codes, processes and perceptions was completed as a first task. A comprehensive list of barriers taken from the literature review was then incorporated into an online survey that was distributed to local, regional, and state agencies which ranked the significance of each barrier as it applied to their jurisdiction. A total of 115 responses were received with the top barriers identified as:

- Technical infeasibility
- Lack of acceptable performance data for manufactured LID products
- Lack of municipal design guidelines and plans
- Conflicts with LID in the public right-of-way
- Conflicts with broader sustainable planning goals
- Lack of interdepartmental coordination and leadership at top levels of local government
- Challenges with operations and maintenance
- Inconsistent interpretation of permit requirements
- Lack of a definition, guidance, and examples of off-site and regional LID solutions
- Specific permit requirements but vague guidance

With the support of focus groups, the LGC identified three primary recommendations for removing the barriers to LID:

- Support the development of municipal LID design guidelines and plans recognized by the State and Regional Water Boards.
- Support the development of a clear definition and guidance of off-site and regional LID solutions.
- Support interdepartmental coordination and leadership at top levels of local government.

The study Local Government Commission generated a final report entitled Barriers to Low Impact Development (September 2012) summarizing the study process, findings, and recommendations for overcoming key LID barriers.

### 2.1.1 *Project Status Update*

The Barriers to Low Impact Development Project was completed in 2013.

### 2.1.2 Project Related Publications

L Podolsky. 2012. [Barriers to Low Impact Development](#). Prepared for the Stormwater Monitoring Coalition Executive Committee. Local Government Commission. Sacramento, CA.

## 2.2 DEVELOPMENT OF A NEW 5-YEAR SMC RESEARCH AGENDA

Table 2-2. SMC 5-Year Research Agenda

<b>Lead Agency</b>	<i>SCCWRP</i>
<b>Report Year Project Started</b>	2012-2013
<b>Status</b>	100% Complete
<b>Initial Project Budget</b>	\$65,000
<b>Technical Advisory Committee:</b>	
Eric Stein	<i>SCCWRP, Co-Chair</i>
Sara Aminzadeh	<i>California Coastkeeper Alliance</i>
Alexandria Boehm	<i>Stanford University</i>
Gary Hildebrand	<i>Los Angeles County Department of Public Works</i>
Larry Honeybourne	<i>Orange County Health Care Agency</i>
Iraj Nasserri	<i>University of Southern California</i>
Peter Ode	<i>California Department of Fish and Wildlife</i>
Scott Taylor	<i>RBF Consulting</i>
David Senn	<i>San Francisco Estuary Institute</i>
James Smith	<i>San Diego Regional Water Quality Control Board</i>
Chris Sommers	<i>EOA Inc.</i>
Eric Strecker	<i>Geosyntec Consultants</i>
<b>Technical Lead</b>	<i>Ken Schiff, SCCWRP, Chair</i>
<b>Key Words: stormwater research, technical advisory committee</b>	

The SMC is a powerful collaborative that has brought tremendous progress in how dischargers and regulators address the challenging issues of urban runoff. When the SMC was initially formed 10 years ago, its first project was to create a research agenda to identify foundational gaps in knowledge about how to improve stormwater management. The SMC has implemented this agenda comprised of 19 projects that have created an integrated monitoring

infrastructure, deciphered stormwater mechanisms and processes, assessed receiving water impacts. Virtually every completed project has led to a modification of how stormwater managers conduct their day-to-day activities. Despite the success of the SMC, numerous stormwater issues persist and unresolved problems stymie regulatory and regulated agencies. As the SMC renews its master agreement, there is a need to create a new Research Agenda that will guide the path for the next five to ten years.

The 2014 Research Agenda was conducted in a similar approach as the 2002 agenda. First, a panel of experts was created representing a broad array of scientific disciplines. The panelists were brought to southern California for three days to hear testimony from SMC member agencies about their biggest management issues, generate a long list of project ideas, then rank and prioritize the ideas into an agenda of well-conceived projects.

The 2014 Research Agenda consists of 21 research projects consolidated into four groups of studies: 1) Ecosystem Characterization and Assessment; 2) Method Development and Tool Evaluation; 3) Optimizing Management Effectiveness, and; 4) Foundational Scientific Understanding. Each project description is comprised of a problem statement, desired outcome (products), tasks, schedule, and necessary resources (expertise, costs, and potential collaborators). The SMC has already begun ranking and prioritizing projects for funding. The projects of greatest interest include Standardizing Monitoring Approaches for Wet and Dry Weather Monitoring, Optimizing Best Management Practices for Southern California, and Improving Storm Water Agency Reporting and Communication. The SMC is working towards funding these projects in the upcoming year.

### 2.2.1 *Project Status Update*

The SMC 5-Year Research Agenda was a one year effort completed in 2014.

### 2.2.2 *Project Related Publications*

[Southern California Stormwater Monitoring Coalition 2014 Research Agenda](#). 2014. K Schiff, ED Stein, S Aminzadeh, A Boehm, G Hildebrand, L Honeybourne, I Nasser, P Ode, S Taylor, D Senn, J Smith, C Sommers, E Strecker. Technical Report 828.

Bernstein, B. and Schiff, K. 2002. "[Stormwater Research Needs in Southern California.](#)" [Southern California Coastal Waters Research Project](#), Technical Report 358.

## 2.3 STORMWATER DATA COMPILATION STUDY

Table 2-3. Stormwater Data Compilation Study Project Summary

<b>Lead Agency</b>	SCCWRP
<b>Report Year Project Started</b>	2009-2010*
<b>Status</b>	100% Complete
<b>Initial Project Budget</b>	\$75,000
\$75,000	SCCWRP
<b>Amended Project Budget</b>	\$185,000
\$110,000	SCCWRP
<b>External Project Partners:</b>	
<i>OC Sanitation District</i>	<i>OC Public Works</i>
<i>University of Southern California</i>	<i>Remote Sensing Solutions Inc.</i>
<i>University of California Los Angeles</i>	
<b>Technical Lead</b>	<i>Martha Sutula, SCCWRP</i>
<b>Key Words: mass emissions, watersheds, nutrients, coastal ocean</b>	

\*Project scope was substantially revised in 2012.

Assessment and prioritization for mitigating water quality requires context. Knowledge of mean concentrations across watersheds, counties, and regulatory jurisdictions provides the perspective needed for managers to rank waterbodies for management action. Regional reference condition, frequency of water quality objective exceedances, extent and distribution of parameter concentrations all play a part in determining where a manager's priority problems occur.

To help managers gain the necessary perspective, the SMC described a project in its Research Agenda that compiles water quality monitoring information region-wide. For several years, the SMC has been building the necessary infrastructure to support such an effort. Data sharing protocols, inter-laboratory calibrations, and web-enabled interfaces all enhance the SMC's ability to share data. The goal of the Stormwater Data Compilation Study is to compile the existing water quality monitoring information from each of the member permit holder agencies. Initially starting with nutrients, the objective will be to make annual estimates of concentrations and mass emissions from 25 watersheds between Ventura and San Diego.

A dataset associated with nutrient concentrations was compiled, and then augmented with additional sampling during 2010. Almost 1 million data records were compiled among all SMC

agencies. The data were summarized to assess the relative mass contributions to the ocean from coastal watersheds compared to treated wastewater, atmospheric deposition, and oceanic upwelling. Results indicated that stormwater was a very minor source (natural upwelling dominates coastal nutrient inputs to the ocean). A final technical report was completed and journal article published:

### 2.3.1 *Project Status Update*

The Stormwater Data Compilation Study was completed in December 2013. A Project Report has been completed associated with the Southern California Bight Regional Marine Monitoring Programs (Bight'08) and a journal manuscript was published.

### 2.3.2 *Project Related Publications*

Anthropogenic nutrient sources rival natural sources on small scales in the coastal waters of the Southern California Bight. Request Only. 2014. MDA Howard, M Sutula, DA Caron, Y Chao, JD Farrara, H Frenzel, B Jones, G Robertson, K McLaughlin, A Sengupta. *Limnology and Oceanography* 59:285–297. doi:10.4319/lo.2014.59.1.0285.

[Terrestrial nutrient loads and fluxes to the Southern California Bight, USA.](#) 2013. A Sengupta, MA Sutula, K McLaughlin, M Howard, L Tiefenthaler, T Von Bitner. pp. 245-258 in: Kenneth C. Schiff and Karlene Miller (eds.), *Southern California Coastal Water Research Project 2013 Annual Report*. Southern California Coastal Water Research Project. Costa Mesa, CA.

[Southern California Bight 2008 Regional Monitoring Program: VII. Water Quality.](#) 2013. MDA Howard, G Robertson, M Sutula, BH Jones, NP Nezlin, Y Chao, H Frenzel, MJ Mengel, DA Caron, B Seegers, A Sengupta, E Seubert, DW Diehl, SB Weisberg. Technical Report 710. Southern California Coastal Water Research Project. Costa Mesa, CA.

## 2.4 STORMWATER MONITORING COMPARISON AND EVALUATION: SURVEY, WORKSHOP, AND RESEARCH PRIORITIES

Table 2-4. Stormwater Monitoring Comparison and Evaluation Project Summary

<b>Lead Agency</b>	<i>Ventura County Watershed Protection District</i>
<b>Report Year Project Started</b>	2011-2012
<b>Status</b>	100% Complete
<b>Initial Project Budget</b>	
In-kind services	<i>SMC member agencies</i>
<b>Technical Lead</b>	<i>Arne Anselm, Ventura County Watershed Protection District</i>
<b>Key Words: regional comparability, stormwater monitoring guidance</b>	

One of the goals in the SMC research agenda is to increase the efficiency of monitoring and improve data integration and interpretation. A survey of current monitoring indicated that tremendous effort is expended collecting both dry and wet weather information, but the current similarity among monitoring programs was small. Significant differences were found in program design, flow monitoring, sample collection, target constituents and analytical methods, quality assurance requirements, and data management requirements. This is due, in part, to differences among NPDES permit requirements. To identify the issues of greatest importance, and create a vision for a path forward, a workshop of regulated and regulatory agencies was held May 15, 2012. Sixteen recommendations were formulated that fell into one of four categories; management questions and permit requirements, sampling and flow measurements, analytical and quality assurance requirements, and data management. In order to bring these recommendations to fruition, the workshop participants supported an SMC project to create stormwater monitoring guidance that can be used by permit writers and monitoring programs, and will improve the comparability of the data and increase its value as a regional dataset.

A technical report was developed based on findings from the workshop as a resource guidance document for stormwater monitoring programs. There are many barriers to implementing changes in established monitoring programs. Agencies have limited resources, there are numerous practical considerations and there is a desire to continue existing trend monitoring. Therefore, developing an effective stormwater monitoring guidance document will require the collaboration and inputs from stormwater agencies region-wide and the Regional Water Quality Control Boards. The guidance document provides value as a resource for writing and renewing permits, planning or negotiation monitoring requirements during permit renewals, and providing a consistent technical foundation when planning special studies or TMDL monitoring programs.

#### 2.4.1 *Project Status Update*

Work on the monitoring comparability project during the 2013-2014 reporting year slowed down as the technical report including a series of next steps for creating an effective stormwater monitoring guidance manual had been completed, and the new 5-year research agenda was to be developed. The next steps include the SMC members endorsing several foundational management questions to serve as a starting point for creating greater regional comparability namely:

- 1) Identify and prioritize management questions.
- 2) Identify scales (regional, local) and runoff types (dry, wet) that apply to each management question.
- 3) Identify factors that impede addressing each of the management questions. This is likely where the survey and workshop outcomes described in this report will be most helpful.
- 4) Develop stormwater monitoring guidance that addresses the specific needs of each management question, including the concept of a minimum set of requirements that all SMC member agencies would hold in common.

In order to initiate this monitoring program development process, the SMC intends to develop a new research project which will be framed through the new 5-year research agenda (see Section 2.2). It is anticipated that a professional facilitator will be engaged who has a working knowledge of wet and dry weather monitoring programs, familiarity with MS4 NPDES monitoring requirements, a clear vision of the Guidance Manual level of detail, and independent of regulated or regulatory obligations. This interactive process will include both regulated and regulatory members of the SMC to ensure a balanced perspective and that the most important management questions are addressed. The estimated cost of such a project is \$75,000 - \$150,000 depending upon the complexity of the monitoring design and the level of effort to attain the appropriate design. The remaining project tasks are expected to take less than twenty-four (24) months to complete.

#### 2.4.2 *Project Related Publications*

Sercu, B., Anselm, A., Schiff, K. "Regional Stormwater Monitoring Coalition and Evaluation: Survey, Workshop, and Research Priorities." Southern California Stormwater Monitoring Coalition. January 2013.

### 3.0 ONGOING PROJECT ACCOMPLISHMENTS

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This section provides an overview of the SMC member agencies projects that are currently active along with a brief summary describing the intent of each project, some of the key study questions, and motivation behind the projects, and a list of publications produced from the project efforts. While a brief overview is provided in this Annual Report, detailed information can be obtained from the list of technical publications provided at the end of each section or by contacting the member agency Technical Leads.

#### 3.1 IMPLEMENTING A REGIONALLY CONSISTENT AND INTEGRATED FRESHWATER STREAM BIOASSESSMENT MONITORING PROGRAM

Table 3-1. Regional Freshwater Stream Bioassessment Monitoring Program Summary

<b>Lead Agency</b>	<i>SCCWRP</i>
<b>Report Year Project Started</b>	2008-2009
<b>Status</b>	95% Complete
<b>Initial Project Budget</b>	\$375,000
\$75,000 per year	<i>All SMC Member Agencies</i>
<b>Amended Project Budget</b>	\$450,000
\$75,000 + in kind services	<i>SWRCB</i>
<b>External Project Partners:</b>	
	<i>Surface Water Ambient Monitoring Program</i>
	<i>California Dept. Fish &amp; Wildlife</i>
<b>Technical Lead</b>	<i>Raphael Mazor, SCCWRP</i>
<b>Key Words: bioassessment, freshwater stream biology, aquatic life stressors</b>	

Assessment of freshwater biological communities represents a potentially powerful tool for evaluating the effects of discharges in southern California creeks and streams. Bioassessments integrate the effects of multiple stressors, including chemical pollutants and physical alterations in receiving waters. The value of biological assessments is that they are closer to many of the defined beneficial uses of receiving waters (aquatic life, warm water habitat, cold water habitat) than chemically-derived water quality objectives. As a result, virtually every SMC member agency has biological community monitoring in their respective NPDES permits.

The goal of this study is to implement a coordinated, integrated regional bioassessment monitoring program. Previously, the SMC had worked to design an optimal monitoring

program that satisfied both local needs and simultaneously provided information that could be combined to make region-wide assessments. Monitoring questions included: 1) What is the extent of impact in streams of southern California? 2) What are the stressors that impact southern California streams? 3) Is the extent of stream impacts changing over time?

Final sampling for this project occurred in 2013. Approximately 540 sites were sampled over the five years of sampling. This year was spent completing work on the first five year program and preparing for the next five years. Results from the 2009-2013 sampling were analyzed and the final monitoring report was prepared. In addition, the bioassessment workgroup prepared recommendations and a draft design document for the 2015-2019 sampling, including limited testing of new approaches during the 2014 sampling season. The 2015-2019 program will place additional emphasis on detecting trends, including non-perennial streams, and sampling sediment chemistry and toxicity.

In addition to being a model for other regions of the State, the SMC regional monitoring program has provided a critical foundation for development of statewide and regional programs. Development of the new statewide benthic invertebrate scoring tools (the California Stream Condition Index) and the southern California algae index of biotic integrity have relied heavily on data from the SMC regional monitoring program. Several watershed monitoring program are also relying on the SMC program to provide a foundation upon which to build additional assessment elements.

The SMC's main collaborators on this project are the California Department of Fish and Wildlife (CDFW) and SWRCB. The project is 50% funded by the SWRCB, whose main goal is to ensure integration with the Surface Water Ambient Monitoring Program (SWAMP).

### 3.1.1 *Project Status Update*

The Technical Subcommittee for the project finished its fifth and final year of sampling in the summer of 2013. A technical report summarizing the five year regional monitoring program from 2009 to 2013 will be prepared in 2014. In addition, during the 2014 season the SMC completed a pilot study of sampling non-perennial streams and repeat sampling to begin trend detection. A subsequent 5 year project is being planned to begin during the 2014-2015 reporting year (see Section 4.3).

### 3.1.2 *Project Related Publications*

RD Mazor, DJ Gillett, K Schiff, K Ritter, E Stein. 2011. [Ecological Condition of Watersheds in Coastal Southern California: Progress Report of the Stormwater Monitoring Coalition's Stream Monitoring Program First Year \(2009\)](#). Technical Report 639. Prepared for the Stormwater Monitoring Coalition Bioassessment Workgroup. Southern California Coastal Water Research Project. Costa Mesa, CA.

### 3.2 DEVELOPMENT OF REGIONAL APPROACHES AND PROTOCOLS FOR TRASH MONITORING AND MANAGEMENT

Table 3-2. Regional Approaches to Trash Monitoring and Management Project Summary

<b>Lead Agency</b>	<i>County of Orange</i>
<b>Report Year Project Started</b>	2008-2009
<b>Status</b>	20% Complete
<b>Initial Project Budget</b>	\$342,000
\$342,000	<i>US Fish and Wildlife Services CIAP Grant</i>
In-kind services through Regional Freshwater Stream Bioassessment Monitoring Program	<i>SMC Member Agencies</i>
<b>Technical Lead</b>	<i>Chris Crompton, OC Public Works</i>
<b>Key Words: trash reduction strategies, BMP effectiveness, rapid trash assessment</b>	

Stormwater agencies throughout southern California share many similar issues regarding trash monitoring and management, but to date there has been no coordinated effort to develop a consistent method of estimating loadings, understand pathways into the environment, and identify and prioritize sources for remediation at a watershed scale. Public agencies spend considerable amounts of money each year managing waterways by removing trash and implementing practices that prevent trash from entering into the environment. However, most management efforts focus on the abatement process without the complimentary source prevention and monitoring efforts to determine if the actions are making a difference on receiving waters.

The goal of this project is to improve the SMC's understanding and ability to manage trash in the environment at both regional and local scales. In part one of this project, the focus was directed towards informing the SMC about the extent and magnitude of trash impacts on southern California streams. Over a three year period from 2011 to 2013, SMC member agencies, through in-kind services, conducted a snapshot trash survey across southern California with the probabilistic sampling approach implemented for the freshwater stream monitoring program (see Section 2.2). Trash data was collected at sites in open space, agricultural area, and urban streams following the State's Surface Water Ambient Monitoring Program (SWAMP) Rapid Trash Assessment protocol for the specific purpose of generating an assessment of regional conditions. This data has provided the SMC member agencies with an opportunity to examine common pathways and sources over a larger geographic scale across a range of trash levels.

Part two of this project will translate findings from the regional survey into a case study. Through a grant from the US Fish and Wildlife Services Coastal Impact Assessment Program, a case study in a model watershed will develop the monitoring and management tools on a watershed scale. The steps include:

- Developing a resource library of current regional efforts including up-to-date knowledge of structural and institutional Best Management Practices
- Examining the relationship between reliable structural and institutional Best Management Practice data and stream conditions
- Evaluating various rapid assessment monitoring protocols to provide management level information feedback.
- Developing approaches to identify and prioritize sources for remediation and a developing a system of weighting sources based on potential impacts.

### 3.2.1 *Project Status Update*

The project on the Development of Regional Approaches and Protocols for Trash Monitoring and Management initiated efforts in 2013. OC Public Works is currently developing the initial work products for a grant to address trash and debris. Coordination will take place with a similar grant in the Bay area. One vision of the project is to develop a web portal and a BMP manual for trash. The project is anticipated to be completed by the end of calendar year 2015.

### 3.2.2 *Project Related Publications*

Orange County Public Works. Evaluation of Current Literature: Trash Sources, Impacts, Monitoring and Management Practices. May 2014.

### 3.3 LOW IMPACT DEVELOPMENT PROJECT

Table 3-3. Low Impact Development Project Summary

<b>Lead Agency</b>	<i>San Bernardino County Flood Control District</i>
<b>Report Year Project Started</b>	2006-2007
<b>Status</b>	80% Complete
<b>Initial Project Budget</b>	\$1,100,000
\$441,176	<i>SMC Member Agencies (8)</i>
\$58,824	CASQA
\$600,000	<i>State Prop 40 Grant</i>
<b>External Project Partners:</b>	<i>California Storm Quality Association</i>
<b>Technical Lead</b>	<i>Marc Rodabaugh, San Bernardino County Flood Control District</i>
<b>Key Words: stormwater retention, wet weather runoff, BMP effectiveness</b>	

The Low Impact Development (LID) Project is being conducted with partial funding from the State Water Resource Control Board’s Consolidated Grants Program, under Proposition 40. The LID Project developed a comprehensive approach to incorporate LID strategies and techniques into the planning and design of public and private sector projects. The LID Project developed a model program for localities in California that are interested in or required to adopt LID strategies and techniques.

This project has attained the following goals:

- *Developing interim guidance and training for LID implementation.* Four training sessions were held throughout the Southern California region from 2007 through 2008.
- *Determining effectiveness of LID for reduction of pollutant loads and hydrologic changes in Southern California.* Monitoring results were used to assess the volume and concentration benefits to discharges, the percentage of runoff from various BMPs and LID systems measured, and a review of the soil type.
- *Developing guidelines on specifications and standards for Project design and review.* The SMC and CASQA finalized the LID Guidance Manual in April 2010 and it is now located on the CASQA web site ([www.casqa.org](http://www.casqa.org)).
- *Developing final guidance and training materials using field data.* This goal was partially met. The San Bernardino Flood Control District and the SMC have developed final guidance and training materials using the feedback from interim trainings, the literature review,

and using the final LID Guidance Manual. However, field data collected as part of this project has yet to be incorporated into the LID Guidance Manual.

- *Conducting training workshops in Southern California.* In addition to the interim training workshops, final training was provided by online web access to the Manual and presentations that provided manual content and access information.

The San Bernardino Flood Control District coordinated with various regional and statewide efforts that involved LID training, including San Diego County, the California Water and Land Use Partnership, the California Coastal Commission, the Local Government Commission, and the Chino Basin Landscape Alliance. The collaborative regional effort was a critical networking tool that provided additional funding, technical support, and LID monitoring opportunities. Partner agencies also helped support the project when grant funding was frozen mid-project by the State of California.

SMC and CASQA plan to continue updating the LID Guidance Manual and provide training sessions. An updated monitoring program is currently being developed for the remaining portion of the project. Monitoring reports are expected to be provided upon completion of data analysis and reporting.

### 3.3.1 *Project Status Update*

In 2006 the SMC began the project: “LID Guidance and Training for Southern California” (LID Project). The LID Project was funded from Prop 40 with matching and additional monitoring funds provided by the SMC. The original scope of the LID project included:

<b>LID Guidance and Training for Southern California</b>	
<b>Completed Tasks</b>	Define LID for Southern California
	Compile literature review and perform gap analysis
	Conduct pre and post manual training
	Develop the LID Manual
<b>Remaining Tasks</b>	Monitor to evaluate LID BMP effectiveness
	Feedback and update the manual based on monitoring findings

To date, the literature review, pre-and post-manual training, and the guidance manual have been completed, and field monitoring was conducted at two sites. The guidance manual has been posted on the SMC and CASQA websites. CASQA has developed a LID web portal featuring the manual, which will be incorporated into the CASQA New and Redevelopment handbook. Field monitoring data from sites in southern California are needed to evaluate

whether existing design and performance guidance are appropriate for development project acceptance by local jurisdictions. The LID Project was designed to conduct field monitoring for up to five years, and monitoring results would be evaluated and used to revise the guidance manual as appropriate.

The current project will conduct monitoring and/or collaborate to obtain shared data to evaluate LID BMP effectiveness, and review and update the LID Manual to incorporate the findings of the Project, including a scalable (by project size and type) monitoring methodology,, and recommendations for inspection methods and frequency. The Project will evaluate the SMC Research Agenda to identify how this Project aligns with selected priorities and possibly coordinates with other priority projects.

This project will review and revise the LID effectiveness monitoring program to incorporate new information or procedures, and to initiate the feedback and update process for the LID Manual and training materials (highlighted tasks, above, which include portions of Tasks 1, 4, 5, 6, and 7 in SMC Agreement D06-051.

### 3.3.2 *Project Related Publications*

- 1) LID Guidance Manual available on the California Storm Quality Association website at [California LID Portal](#)
- 2) San Bernardino County Flood Control District LID Guidance Manual and Training Program. Monitoring Technical Memorandum. October 2009.

## **4.0 PROJECTS PLANNED FOR 2014-2015**

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The summaries reported in this section represent strategic planning efforts or new projects that have been identified as having a SMC interest and have received member agency support to be implemented during the 2014-2015 reporting year.

### **4.1 APPROVAL OF SMC MASTER AGREEMENT WITH ALTERNATE PROGRAM FUNDING APPROACH**

The Steering Committee received a first draft of the next Master SMC Agreement in February 2013. The current SMC Master Agreement expired June 4, 2013. The new agreement mimics the previous one with two new additions: i) insertion of a budget and workplan process for SMC projects (proposed to be capped at \$300K) to expedite projects that currently require implementation agreements; and, ii) establishment of a budget manager from the SMC members to collect and distribute annual budget funds.

The budget and workplan process is meant to increase the efficiency and timeliness of the SMC in order to build upon the successful projects already completed. However, the agreement still contains the provision for each agency to pay only for the projects in which they choose to participate. Therefore, the budget will not necessarily be split evenly among agencies and participation in a given projects is not mandatory for any member agency. One goal is to fund the smaller, ongoing projects (i.e., intercalibrations, regional monitoring coordination, etc.) without constantly having to create new agreements. The agreement will still contain language for supplemental implementation agreements to fund larger, one-time, partnered projects based on need and the upcoming research agenda.

Based on the proposed agreement structure, with multiple parties committing to an annual budget, there will be a need for a treasurer to receive and disburse funds, issue invoices, and manage the budget. SCCWRP was supported as the candidate for treasurer and a percentage of the annual budget will be allocated to SCCWP for administrative support. Also, to promote the rotation of the Chair position the SMC intends to budget support for the Chair (likely a contractor) to organize between meetings, write minutes and Annual Reports, write agreements, follow up on items, etc.

The new SMC Master Agreement is expected to be approved in 2014-2015.

### **4.2 TOXICITY TESTING LABORATORY INTERCALIBRATION**

The SMC has established a continuing goal to compile local monitoring data to make region-wide assessments (SCCWRP 2004, 2007, 2010). In order to compile local monitoring programs into regional assessments, the SMC has expended considerable effort to design monitoring programs with similar goals and objectives, integrated sampling efforts, establish standardized data protocols, and provide focused training opportunities. However, none of the SMC agencies have their own laboratories, and a review of regional contract laboratories indicated differences

in laboratory methods and levels of quality control including internal requirements for accuracy and precision. Therefore, the SMC has established periodic laboratory intercalibration studies to ensure comparability in laboratory measurements. In 2003, 2006, and 2009 the SMC launched their first laboratory intercalibration study to help ensure comparability for chemistry measurements. The 2003 intercalibration study established common reporting levels and target analytes, and utilized iterative round robin exercises to minimize interlaboratory variation. The success of the 2003 exercise was primarily due to three factors: 1) communication and commitment among laboratory personnel; 2) setting performance-based criteria for establishing standards of success; and 3) using locally derived reference materials including using a stormwater matrix. The outcome was a performance-based chemistry guidance manual to be used for SMC monitoring programs. The SMC's second laboratory intercalibration in 2006 focused on the same constituents (total suspended solids, nutrients, total trace metals) and included more laboratories (Gossett and Schiff 2007). The success of the 2006 intercalibration rivaled the 2003 intercalibration, which indicated consistent performance by laboratories participating in the study and reinforced the confidence of the SMC member agencies that laboratory performance would result in consistently high quality data during the intervening years.

The toxicity laboratory intercalibration exercise is the first time SMC member agencies will undertake an effort to evaluate toxicity testing results. Given the successes and benefits derived from the chemistry laboratory intercalibration, the toxicity laboratory intercalibration provides an important first step towards improve data quality and data comparability on a regional basis that will directly support the management efforts of both the primary regulated and regulatory stormwater agencies.

#### 4.2.1 *Project Related Publications*

- 1) Gossett, R. and Schiff, K. 2010. [Stormwater Monitoring Coalition Laboratory Guidance Document](#) , 3<sup>rd</sup> Edition. Southern California Coastal Waters Research Project, Technical Report 615.
- 2) Gossett, R. and Schiff, K. 2006 Stormwater Monitoring Coalition Laboratory Guidance Document, 2<sup>nd</sup> Edition. Southern California Coastal Waters Research Project, Technical Report 521.
- 3) Gossett, R. Renfrew, D. and Schiff, K. 2004 [Stormwater Monitoring Coalition Laboratory Guidance Document](#), 1<sup>st</sup> Edition. Southern California Coastal Waters Research Project, Technical Report 420.

### **4.3 IMPLEMENTING A NEW 5-YEAR REGIONALLY CONSISTENT AND INTEGRATED FRESHWATER STREAM BIOASSESSMENT MONITORING PROGRAM**

Assessment of freshwater biological communities represents a potentially powerful tool for evaluating the effects of discharges in southern California creeks and streams. Bioassessments integrate the effects of multiple stressors, including chemical pollutants and physical alterations in receiving waters. The value of biological assessments is that they are closer to many of the defined beneficial uses of receiving waters (aquatic life, warm water habitat, cold water habitat) than chemically-derived water quality objectives. As a result, virtually every SMC member agency has biological community monitoring in their respective NPDES permits.

#### *4.3.1 Project Status Update*

The Technical Subcommittee for the project finished its fifth and final year of sampling in the summer of 2013. During the 2014 season, the SMC completed a pilot study of sampling non-perennial streams and repeat sampling to begin trend detection. Both these efforts were successful and will be incorporated into a new 5 year program over the 2015-2019 time period. The next five year cycle will include the following design modifications:

- Include non-perennial streams in the target population of streams
- Allocate approximately 30% of sampling effort to resampling previously sampled sites in order to help detect trends in condition
- Reduce sampling of water column metals and pyrethroids and add the following new indicators:
  - Collect information on modified channels during field surveys
  - Record presence of key invasive vertebrate species during field surveys
  - Hydromodification indicators
  - Sediment pyrethroids
- Cost permitting, the 5 year program will consider inclusion of the following indicators
  - Bioanalytical screens for contaminants of emerging concern
  - Sediment toxicity
  - Trash assessments

## 5.0 PROJECTS COMPLETED DURING 2012-2013 REPORTING TERM

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The SMC annual report summarizes member agencies projects at various stages of implementation. Member agencies may be active in ongoing projects or may have completed a project during the reporting term. SMC projects by their very design requires an investment of time and resources by the member agencies over multiple years. In order to not lose sight of member agencies project recently completed, this section provides a brief summary of projects that were completed during the 2012-2013 reporting term and will no longer appear in the annual report.

Table 5-1. SMC Projects Completed During the Previous Annual Report Term

<b>Project Title</b>	<b>Lead Agency</b>	<b>Year Started</b>
Hydromodification Study	SCCWRP	2007-2008
Effects of Wildfires on Contaminant Runoff and Emissions	SCCWRP	2005-2006

For additional information on projects completed during the previous reporting period, updates and a list of project related publications reported in the SMC Annual Report are available on the SMC website by following the provided link ([SMC 2012-2013 Annual Report.](#))

The SMC member agencies have completed a number of studies and projects since the coalition began in 2001. And while, the projects no longer appear in the annual report information on past studies and projects are available in the annual reports. Summaries of the projects completed prior to the 2012-2013 reporting year including technical reports, and publications prepared are available on the SMC website ([SoCalSMC.org](#))