



Southern California Stormwater Monitoring Coalition

Annual Report 2012-2013

**Prepared by:
AMEC Environment & Infrastructure, Inc.
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EXECUTIVE SUMMARY

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. SMC projects that were either ongoing during the previous reporting year or are planned during the next reporting year are described in this annual report. The SMC projects that were active during the 2012-2013 reporting year included:

- Stormwater Data Compilation
- Implementing a Regionally Consistent and Integrated Freshwater Stream Bioassessment Monitoring Program
- Hydromodification Assessment Tool Development
- Effects of Wildfires on Contaminant Runoff and Emissions
- Low Impact Development
- Barriers to Low Impact Development
- Development of Regional Approaches and Protocols for Trash Monitoring and Management
- Regional Stormwater Monitoring Comparison and Evaluation

During the 2013-2014 reporting year, in addition to the 2012-2013 projects not yet completed, the SMC plans to be active in several new projects including:

- Development of an updated SMC master agreement with an alternate funding approach
- Development of a new 5-year research agenda
- Implementation of a toxicity laboratory intercalibration exercise

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

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

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

Agency	Lead Representative^(a)
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	Mark Smythe
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

^(a) Listed current as of December 2013

2.0 ONGOING PROJECTS ACCOMPLISHMENTS

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.

2.1 STORMWATER DATA COMPILATION STUDY

Table 2-1. Stormwater Data Compilation Study Project Summary

Lead Agency	<i>SCCWRP</i>
Status	98% Complete
Initial Project Budget	\$75,000
\$75,000	<i>SCCWRP</i>
Amended Project Budget	\$185,000
\$110,000	<i>SCCWRP</i>
External Project Partners:	
Technical Lead	<i>Martha Sutula, SCCWRP</i>
Key Words: mass emissions, watersheds, nutrients, coastal ocean	

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). This project result is currently being written in technical reports and journal publications.

2.1.1 *Project Status Update*

The Stormwater Data Compilation Study is expected to be completed in December 2013. A Project Report has been completed associated with the Southern California Bight Regional Marine Monitoring Programs (Bight'08). A journal manuscript has also been drafted and is in review.

2.1.2 *Project Related Publications*

[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.

2.2 **IMPLEMENTING A REGIONALLY CONSISTENT AND INTEGRATED FRESHWATER STREAM BIOASSESSMENT MONITORING PROGRAM**

Table 2-2. Regional Freshwater Stream Bioassessment Monitoring Program Summary

Lead Agency	<i>SCCWRP</i>
Status	85% Complete
Initial Project Budget	\$375,000
\$75,000 per year	<i>All SMC Member Agencies</i>
Amended Project Budget	\$450,000
\$75,000 + in kind services	<i>SWRCB</i>
External Project Partners:	<i>Surface Water Ambient Monitoring Program California Dept. Fish & Wildlife</i>
Technical Lead	<i>Raphael Mazor, SCCWRP</i>
Key Words: bioassessment, freshwater stream biology, aquatic life stressors	

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?

This is the fifth and final year of sampling for this project. Thus far, approximately 500 sites have sampled between Ventura and San Diego counties for biological communities, water quality, toxicity, physical habitat, and riparian condition. Sampling for the fifth year is now finished and samples analyses are expected to be completed during the 2013-2014 reporting year.

The SMC regional watershed monitoring program is now serving as a model for other parts of the state. Regional watershed programs in the San Francisco Bay and the Central Valley are planning to use the SMC as a model for their design and implementation. Perhaps the biggest value of the SMC regional watershed monitoring, however, is its connection to the State Water Resources Control Board's (SWRCB) development of biological objectives. This new policy will set narrative and numeric objectives on biological conditions in streams statewide. Because of the unique collaboration in southern California, approximately one-third of the data used to develop the biological objectives will come from the SMC region.

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

2.2.1 Project Status Update

The Technical Subcommittee for the project finished its fifth and final year of sampling in the summer of 2013. Since the laboratory analysis, data analysis, and reporting will not be completed for another 12-18 months, the SMC will maintain a base monitoring program at approximately 50% effort to continue trends assessment. With the remaining effort, the SMC Steering Committee is planning on a pilot study examining non-perennial streams. Non-perennial streams comprise approximately two-thirds of all stream miles in southern California. The Steering Committee has tasked the Technical Subcommittee with:

- Developing a map and estimate of stream miles for perennial vs. non-perennial systems based on reconnaissance data
- Sampling a wide array of non-perennial streams, including reference sites thought to have minimal to no influence
- At selected sites, resampling at periodic intervals to observe changes across the wetting and drying cycle.

2.2.2 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.

2.3 HYDROMODIFICATION STUDY

Table 2-3. Hydromodification Study Project Summary

Lead Agency	<i>SCCWRP</i>
Status	100% Complete
Initial Project Budget	\$1,137,440
Funding Source	<i>State Prop 50 Grant</i>
External Project Partners:	<i>Colorado State University</i>
Technical Lead	<i>Eric Stein, SCCWRP</i>
Key Words: stream channel alteration, erosion, physical habitat	

The process of urbanization has the potential to affect stream courses by altering watershed hydrology. Development and redevelopment can increase the amount of impervious surfaces on formerly undeveloped landscapes. This reduces the capacity of remaining pervious surfaces to capture and infiltrate rainfall and, as a result, a larger percentage of rainfall becomes runoff during any given storm. In addition, runoff reaches the stream channel much more efficiently, so peak discharge rates post-development are higher compared to predevelopment for an equivalent rainfall event. This process has been termed hydromodification.

Hydromodification can result in adverse effects to stream habitat, surface water quality, and water supply. The stream erosion that results from the increased peak flow can threaten infrastructure, homes, and businesses. Intermittent and ephemeral streams that possess riparian and wetland habitat are at particular risk from effects of hydromodification. Streams in semi-arid regions are especially vulnerable to urbanization due to a prevalence of sand bed channels, lack of vegetative reinforcement, and relatively large net changes in water and sediment supply

associated with stormwater runoff. Recent studies by the SMC have indicated that intermittent and ephemeral streams in southern California degrade at lower levels of watershed urbanization than streams in the eastern United States.

In response to the effects of hydromodification, state and local agencies are developing standards and management approaches to control and mitigate the effects of hydromodification on natural and semi-natural stream courses. Successful implementation of these regulatory programs requires development of tools to better assess hydromodification effects and develop appropriate mitigation and management strategies.

The goal of the hydromodification project was to develop a series of tools to support the implementation of hydromodification management measures that could be used to better protect the physical, chemical, and biological integrity of streams and their associated beneficial uses. This project provided tools to answer the following questions: 1) Which streams are at the greatest risk from the effects of hydromodification? 2) What are the anticipated effects in terms of increased erosion, sedimentation, or habitat loss, associated with increases in impervious cover? 3) What are some potential management measures that could be implemented to offset hydromodification effects and how effective are they likely to be?

This project was conducted in collaboration with researchers from Colorado State University, Fort Collins. The project was concluded during the 2012-2013 reporting year.

The project resulted in development of a series of tools intended to address the stated project goals. Specifically the following categories of tools were developed:

- Increasing understanding of controlling processes
 - Flow relationships
 - Land use relationships
 - Physical structure relationships
- Develop tools to support decisions
 - Screening tools to assess risk
 - Modeling and assessment tools to help predict effects
- Develop management and monitoring support tools
 - Monitoring framework
 - Matrices of management options and approaches
 - Relationship with biological endpoints (e.g. BMI and algae)

Details on the development and application of each tool are found in a series of technical reports and journal articles that are available for download from the SCCWRP website at www.sccwrp.org.

Use of these tools has been incorporated into several municipal stormwater permits. SCCWRP staff has provided training sessions on use of the tools and are working with the Water Board Training Academy to establish an ongoing training program. SCCWRP will continue to provide as-needed technical support as the Water Boards and stormwater agencies implement these tools.

2.3.1 *Project Status Update*

The Hydromodification study was completed in 2012.

2.3.2 *Project Related Publications*

- 1) Bledsoe B.P, R.J. Hawley, E.D. Stein, D.B. Booth. 2010. [Hydromodification Screening Tools: Technical basis for development of a field screening tool for assessing channel susceptibility to hydromodification.](#) Southern California Coastal Water Research Project Technical Report #607.
- 2) Bledsoe B.P, R.J. Hawley, E.D. Stein, D.B. Booth. 2010. [Hydromodification Screening Tools: Field manual for assessing channel susceptibility.](#) Southern California Coastal Water Research Project Technical Report #606.
- 3) Booth D.B., S.R. Dusterhoff, E.D. Stein, B.P. Bledsoe. 2010. [Hydromodification Screening Tools: GIS-based catchment analyses of potential changes in runoff and sediment discharge.](#) Southern California Coastal Water Research Project Technical Report #605.
- 4) Hawley, R.J., B.P. Bledsoe and E.D. Stein 2011. [Hydromodification Effects on Flow Peaks and Durations in Southern California Urbanizing Watersheds.](#) Southern California Coastal Water Research Project Technical Report # 654.
- 5) Stein, E.D., F. Federico, D.B. Booth, B.P. Bledsoe, C. Bowles, Z. Rubin, G.M. Kondolf, and A. Sengupta. 2012. *Hydromodification Assessment and Management in California.* Southern California Coastal Water Research Project Technical Report #667.
- 6) Stein E.D. and B.P. Bledsoe. 2013. *Framework for Developing Hydromodification Monitoring Programs.* Southern California Coastal Water Research Project Technical Report #752.
- 7) Stein E.D. and B.P. Bledsoe. 2013. *Modeling and Managing Hydromodification Effects: Summary of Available Tools and Decision-Making Approach.* Southern California Coastal Water Research Project Technical Report #753.

2.4 EFFECTS OF WILDFIRES ON CONTAMINANT RUNOFF AND EMISSIONS

Table 2-4. Effect of Wildfire on Contaminant Runoff Project Summary

Lead Agency	<i>SCCWRP</i>
Status	100% Complete
Initial Project Budget	\$100,000
\$75,000	<i>County of San Diego</i>
\$25,000	<i>California Regional Water Quality Control Board, Los Angeles Region</i>
In-kind Services	<i>Los Angeles County Flood Control District</i>
External Project Partners	<i>University of California Los Angeles</i>
Technical Lead	<i>Eric Stein, SCCWRP</i>
Key Words: indirect effects, direct effects, post-fire runoff, atmospheric deposition	

Fire is a natural component of Mediterranean ecosystems, such as those found in southern California. Due to loss of plant cover, severe burns have been shown to increase runoff and sediment generation to downstream areas. Constituents associated with the increased runoff have the potential to affect water quality in downstream receiving waters and the near-shore coastal environment. This may be especially problematic for streams that are already impaired. Most research on post-fire water quality has focused on nutrient and sediment enrichment in relatively natural areas. However, post-fire runoff also has the potential to increase loadings of carbon, organic compounds such as PAHs, and metals. Constituent loadings may occur by several mechanisms over a range of spatial and temporal scales. Potential loading mechanisms include direct runoff, debris flows, or atmospheric deposition of ash followed by storm runoff. Investigating the magnitude and duration of fire effects in downstream and adjacent watersheds is critical to accounting for wildfire influence on cumulative water quality impacts and ability to attain water quality standards.

This goal of this project was to investigate the fate of water quality constituents resulting from southern California wildfires in order to quantify the effects of post-fire runoff on downstream metals and organic constituent concentrations and loads. Contaminant loading and effects on instream biota were investigated as part of this project.

A regional post-fire monitoring strategy was completed in 2009 that describes an agreed-upon approach for post-fire sampling. This plan was implemented for the first time following the 2010 Station Fire, which burned portions of the Los Angeles and San Gabriel River watersheds. Two

sites were sampled for solids, metals, and PAHs over six storms following the 2010 fires; Tujunga Wash and Arroyo Seco. Results showed dramatic increases in concentrations and loads of all constituents sampled following storms, but returned to near pre-fire levels by the end of the storm season.

The results of this analysis along with additional analysis of post-fire pollutant concentration data for storms dating back to 2003 was accepted for publication in the journal Environmental Toxicology and Chemistry.

Future implementation of the regional monitoring plan will be at the discretion of the stormwater agencies and regional and state water boards.

2.4.1 *Project Status Update*

The study on Effect of Wildfire Contaminant Runoff and Emissions was completed in 2012.

2.4.2 *Project Related Publications*

- 1) ED Stein, J Brown. 2009. [Effects of post-fire runoff on surface water quality: Development of a southern California regional monitoring program with management questions and implementation recommendations.](#) Technical Report 598. Southern California Coastal Water Research Project. Costa Mesa, CA.
- 2) Stein, E.D., Brown, J.S., Hogue, T.S., Burke, M.P., Kinoshita, A.Y., Stormwater Contaminant Loading Following Southern California Wildfires. Environ. Tox. Chem. 31(11) 2012, 2625-2638.

2.5 LOW IMPACT DEVELOPMENT PROJECT

Table 2-5. Low Impact Development Project Summary

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

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).
- *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.

2.5.1 *Project Status Update*

The Low Impact Development Project made little progress this year due to staff turnover at the sponsoring agency. While all of the Prop 50 grant requirements have been completed, additional work to monitor effectiveness of LID technologies has yet to be completed. Data from two years of monitoring at multiple facilities were reported in a 2011 by the San Bernardino County Flood Control District. Additional funding has been allocated for the project to continue the monitoring and assessment effort and the SMC Steering Committee plans to develop a work plan to finalize the scoping details in 2013-2014 to address remaining data gaps.

2.5.2 *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.

2.6 BARRIERS TO LOW IMPACT DEVELOPMENT

Table 2-6. Barriers to Low Impact Development Project Summary

Lead Agency	<i>San Bernardino County Flood Control District/ County of Orange</i>
Status	100% Complete
Initial Project Budget	\$32,000
\$27,000	<i>County of San Diego</i>
\$1,250	<i>Riverside County Flood Control & 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>
External Project Partners:	<i>Local Government Commission</i>
Technical Lead	<i>Laura Podolsky, Local Government Commission</i>
Key Words: implementation barriers, wet weather runoff, BMP effectiveness	

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 SMC commissioned the Local Government Commission (LGC) to investigate the barriers its members are facing, and to prioritize strategies to remove those barriers.

A literature review focusing on the site design and approval processes and associated codes, processes and perceptions was completed as a first task. Barriers gleaned from the literature review were then compiled and shared with SMC members for review and comment. A comprehensive list of barriers taken from the literature review and from SMC member comments were then incorporated into an online survey that was distributed to local, regional, and state agencies where they were asked to rank the significance of each barrier as it applied to their jurisdiction. Another online survey was created for, and distributed to, the development community to gather feedback from the private sector.

In September 2012, the Local Government Commission generated a final report summarizing research process, research findings, and recommended strategies for overcoming key barriers to LID implementation.

2.6.1 *Project Status Update*

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

2.6.2 *Project Related Publications*

No project related publications are currently available.

2.7 DEVELOPMENT OF REGIONAL APPROACHES AND PROTOCOLS FOR TRASH MONITORING AND MANAGEMENT

Table 2-7. Regional Approaches to Trash Monitoring and Management Project Summary

Lead Agency	<i>County of Orange</i>
Status	10% Complete
Initial Project Budget	\$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>
Technical Lead	<i>Chris Crompton, OC Public Works</i>
Key Words: trash reduction strategies, BMP effectiveness, rapid trash assessment	

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.

2.7.1 *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.

2.7.2 Project Related Publications

No project related publications are currently available.

2.8 STORMWATER MONITORING COMPARISON AND EVALUATION: SURVEY, WORKSHOP, AND RESEARCH PRIORITIES

Table 2-8. Stormwater Monitoring Comparison and Evaluation Project Summary

Lead Agency	<i>Ventura County Watershed Protection District</i>
Status	90% Complete
Initial Project Budget	
In-kind services	<i>SMC member agencies</i>
Technical Lead	<i>Arne Anselm, Ventura County Watershed Protection District</i>
Key Words: regional comparability, stormwater monitoring guidance	

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.

2.8.1 *Project Status Update*

Work on the monitoring comparability project continued during the 2012-2013 reporting year and focused on preparation of the technical report and a series of next steps for creating an effective stormwater monitoring guidance manual. 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 3.3). 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.

2.8.2 *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 PROJECTS PLANNED FOR 2013-2014

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 2013-2014 reporting year.

3.1 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 2013-2014.

3.2 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.

3.2.1 *Project Related Publications*

- 1) Gossett, R. and Schiff, K. 2010. "Stormwater Monitoring Coalition Laboratory Guidance Document, 3rd Edition. Southern California Coastal Waters Research Project, Technical Report 615.
- 2) Gossett, R. and Schiff, K. 2006 "Stormwater Monitoring Coalition Laboratory Guidance Document, 2nd 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, 1st Edition. Southern California Coastal Waters Research Project, Technical Report 420.

3.3 Development of a new 5-Year SMC Research Agenda

The 2013-2014 reporting year represents a key milestone in the SMC's strategic planning effort to establish a new 5-year research agenda. The first project completed by the SMC in February 2002 was an assessment of which research projects should be undertaken. The SMC developed a three-step process to identify these projects. The process included:

1. Creation of a white paper outlining the technical issues and management questions of interest (SCCWRP 2002, Appendix 2)

2. Conduct a workshop to develop an agenda of research projects using experts in a variety of scientific disciplines (SCCWRP 2002, Appendix 3)
3. Establish a 5-year research plan for implementation based upon the workshop proceedings

More than 50 project ideas were generated in the research agenda workshop. These were combined, clarified, and prioritized leading to 15 research projects. Each project was then developed in terms of a problem statement, desired outcome (products), tasks, schedule, and necessary resources (expertise, costs, and potential collaborators).

The 15 research projects fell into one of three categories.

1. Developing a regional stormwater monitoring infrastructure.
Monitoring infrastructure includes projects that find ways to integrate, standardize or maintain comparability among programs throughout southern California. These projects include mining existing data, sampling and analysis, data management and sharing, and testing BMPs.
2. Improving the fundamental understanding of stormwater mechanisms and process.
Research projects that improve the fundamental understanding of stormwater mechanisms and processes begin with creating a conceptual model of the existing understanding of these processes. This helps to identify knowledge gaps. It is expected that there will be at least three gaps in the conceptual model. These include an evaluation of reference conditions, an evaluation of beneficial uses, and identifying relative contributions of nonpoint sources to stormwater discharges.
3. Identifying stormwater impacts in receiving waters.
This research theme has the greatest number of projects, reflecting how little is known about this subject despite multiple decades of monitoring. Five research projects were geared specifically towards developing tools for assessing conditions in receiving waters. These tools include freshwater bioassessments, toxicity testing, faster and more specific methods for identifying microbial contamination, and identifying indicators of impacts resulting from increased peak flows.

In 2013, the SMC Steering Committee will establish a new 5-year research agenda for projects that represent priority regional issues. The Project will again use an expert panel to help create an updated 5-year research agenda for the SMC that will serve as the technical foundation for prioritizing project selection and funding. The workshop is scheduled for October 1-3, 2013.

3.3.1 *Project Related Publications*

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