ANNUAL MONITORING REPORT 2004-2005

Stormwater Monitoring Coalition Of Southern California

September 26, 2005

INTRODUCTION

As a result of the increasing regulatory focus and the lack of scientific knowledge base, both stormwater regulators and municipal stormwater management agencies throughout southern California have developed a collaborative working relationship. 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, by all of the Phase I municipal stormwater NPDES lead permittees and the NPDES regulatory agencies in southern California to create the Stormwater Monitoring Coalition (SMC) (Table 1).

Table 1. List of member agencies in the Stormwater Monitoring Coalition.

California Regional Water Quality Control Board, Los Angeles Region
California Regional Water Quality Control Board, San Diego Region
California Regional Water Quality Control Board, Santa Ana Region
City of Long Beach
County of Orange, Public Facilities and Resources Dept.
County of San Diego Stormwater Management Program
Los Angeles County Department of Public Works
Riverside County Flood Control and Water Conservation District
San Bernardino County Flood Control District
Southern California Coastal Water Research Project
Ventura County Watershed Protection District

As a first step, a panel of experts was commissioned to help define a five-year research agenda for the SMC. The research agenda, published in 2001, consisted of 15 unique projects developed around three main foci: 1) developing a regional monitoring infrastructure; 2) understanding stormwater runoff mechanisms and processes; and 3) assessing receiving water impacts. Regional monitoring infrastructure included projects such as standardization of sampling and reporting programs. Stormwater runoff and mechanisms included projects such as peak flow impacts. Receiving water impacts included projects such as developing regional bioassessment protocols.

As the research agenda finishes its fourth year, the SMC has been a successful and positive resource to its member agencies. Five projects from the research agenda have been initiated, four of which have been completed. Several more are under serious consideration for implementation in the upcoming year. What's more, all of the completed projects have been on time and on (or under) budget. Not only does the collaborative nature of SMC projects represent tremendous value to the member agencies because project costs are split across multiple agencies, but the SMC has been successful in attracting outside resources and agency support. For example, all but a single project has attracted additional funds amounting to over $425,000. In addition, we have received in-kind assistance from inland wastewater dischargers, environmental groups, universities, and regulatory or stormwater agencies that are not currently SMC members. The power of collaboration should magnify as the SMC continues to be successful in accomplishing its goals. Below is a list of the project accomplishments during the 2004-05 Fiscal Year.

PROJECT ACCOMPLISHMENTS

Peak Flow Impacts

Status: 100% completed
budget $280,000

Watershed development increases imperviousness eventually leading to alterations in runoff flow regimes. This alteration in flow regime, particularly increased flows during high frequency events (i.e. 1-2 year storms), can result in downstream impacts such as increased erosion or habitat loss. The goal of this study was to assess relationships between stream channel type and resistance that will allow prediction of stream channel response under changed conditions associated with increased impervious cover. This project was fully funded by the Los Angeles County Department of Public Works (LACDPW) and supported by a technical subcommittee of the SMC.

Ten sites, located in Ventura, Los Angeles, and Orange Counties examined stream geomorphology and compared these results to historical geomorphologic data and changes in land use within in their respective catchments. This analysis resulted in four main conclusions:

- Southern California streams exhibit deterministic (predictable) relationships between bankfull discharge and measures of channel geometry such as cross sectional area. When the dominant discharge increased, so did channel area including channel width and/or depth (bank erosion, and/or downcutting)
- The ephemeral/intermittent streams in southern California appear to be more sensitive to changes in total impervious cover than streams in other areas. Enlargement curves for southern California were similar to enlargement curves for other North American streams, except for local streams appeared more sensitive to impervious cover. For example, the estimated threshold of response in southern California was approximately 2-3% impervious cover as compared to 7-10% impervious cover in other portions of the U.S.
- There is a natural background level of channel degradation that occurred in all stream channels studied, even in the absence of development within the drainage area. Control sites exhibited a state of dynamic equilibrium where downcutting was observed, but channel morphology did not change appreciable over time.
- Streams are sensitive to both peak discharge and duration of discharge.

In addition, a number management actions to stabilize at risk channels were described.

- Limit impervious area. Disconnecting impervious area from the drainage network and adjacent impervious areas can be one key to protecting channel stability.
- Control runoff. Hydrograph matching across a series of design storms with varying return periods (i.e. 1 year to 10 year) holds more promise (and challenge) than a single design storm concept.
- Stream channel movement. Allow the greatest freedom possible (i.e. buffer zones and setbacks) for natural stream channel activity enabling channel movement and adjustment to changes in energy.

The report was finalized and is now available online at ftp://ftp.sccwrp.org/pub/download/PDFs/450_peak_flow.pdf.

This project represented the first step in a multi-year, multi-targeted research program. The data collected and interpreted in this project provided a good overview of potential impacts and categorized the types of channels most susceptible to stream bed and bank erosion. It did not, however, provide specific numerical guidance and still needs to be validated in all types of watersheds found in southern California. To help accomplish these challenges, the SMC in collaboration with USC SeaGrant are cosponsoring a Hydromodification Workshop at the California Stormwater Quality Association (CASQA) meeting to be held in October 2005. At this workshop, experts on peak flow impacts throughout the state and across the country will convene to impart their experience and knowledge, as well as identify the key data gaps needed for management and regulatory response to this emerging issue.

Building A Regionally Consistent and Integrated Freshwater Stream Bioassessment Monitoring Program

status: 33% complete
proposed budget $280,000

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 (i.e. aquatic life, warm water habitat, cold water habitat) than chemically-derived water quality objectives.

The goal of this study is to build a regionally consistent bioassessment monitoring program. This project will be completed in three phases including: 1) methods standardization; 2) calibrating and validating a regional assessment tool; and 3) designing an integrated, coordinated regional monitoring program. The first phase focuses on creating a monitoring infrastructure so that multiple agencies are properly trained, data are collected in comparable manners, and data can be efficiently shared. The second phase focuses on developing an assessment tool that is robust enough to be used by all agencies across the region. This will enable a consistent approach for evaluating the status of freshwater biological communities and provide the answers regarding community impacts to managers in meaningful and understandable terms. The third phase focuses on creating a study design that most efficiently answers specific questions of interest at large regional scales. Addressing some questions at regional scales can provide cost efficiency for addressing reference condition, cumulative impacts, and when nested within a local sampling design, provides unparalleled information for providing context to local monitoring data.

Our main collaborator on this project is the California Department of Fish and Game (CDF&G). The project is 50% funded by the SWRCB, whose main desire is to ensure integration with the Surface Water Ambient Monitoring Program (SWAMP). This will provide further value to SMC member agencies. To help accomplish this project, an SMC Technical Subcommittee has been formed.

The SMC has successfully begun implementing all three phases of the project. Four training sessions have been held to address the first phase of the study. The training sessions were attended by all but one of the SMC member agencies and/or representative contractors, including both regulatory and regulated entities. Training topics covered study design, field sampling, laboratory analysis, data analysis, and quality assurance. The second phase of the study tests the southern California Index of Biological Integrity (IBI) in two new, but spatially important habitats. The IBI grades stream health based on benthic macroinvertebrate assemblages and was developed largely in high gradient perennial streams. The first habitat to be examined will be low gradient streams that comprise the majority of unlined stream bottoms in flood plains of the southern California region. The second habitat will be in non-perennial streams that comprise a large proportion of our foothill and mountainous regions. The Technical Subcommittee has already designed and mobilized for the low gradient study and sampling is scheduled for September-October 2005. In addition, the SMC Technical Subcommittee has identified statewide partners for participating in the low gradient study including RWQCBs 2, 3, and 5. The regional monitoring design is only beginning, but SCCWRP and CDF&G are preparing the fundamental structures for creating such a design. One important building block being created is a GIS layer depicting streams, stream order, and watershed delineation based on digital elevation, storm drain system, and newly acquired remote sensing (satellite) data.

SCCWRP and CDF&G, in collaboration with the SMC Technical Subcommittee, have identified a process to complete the monitoring infrastructure development, IBI evaluation, and creation of a regional monitoring design over the next two years. The final steps for building a monitoring infrastructure will include creating a regional standard operating procedure (SOP) and creating standardized data transfer protocols for sharing information. The final steps for testing the IBI in low gradient streams will include assessing both within reach and among reach variability for sites that span a series of impacts, including unimpacted reference sites and highly modified channels. Part of this evaluation will include potential modifications to the sampling methodology to enhance IBI responses to detect stressor gradients. Creation of a regional monitoring design will require a dedicated five -step effort including: 1) derivation of the monitoring questions; 2) monitoring design including sample site selection; 3) selection of indicators and measurement methods; 4) quality assurance plans; and 5) create a workplan document.