



2023-2024 ANNUAL REPORT



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Introduction to the SMC

The Southern California Stormwater Monitoring Coalition (SMC) is a partnership of 18 stormwater management agencies working to develop solutions to regional challenges in stormwater management. Since its founding in 2001, the SMC has been pooling its members' resources and expertise to collaboratively conceptualize, develop and fund stormwater research and monitoring initiatives across coastal southern California. This collaborative approach to stormwater management has influenced the development of NPDES permits, 303(d) listings and TMDLs, watershed plans, and stormwater monitoring designs.

SMC mission statement

To solve stormwater management challenges across southern California by building regional consensus around best-in-class tools, methods and monitoring strategies

SMC member agencies

The SMC's 18 member agencies represent the region's largest stormwater management agencies and the regulatory agencies that oversee them. Indirectly, SMC members represent many additional co-permittees.

Stormwater regulated agencies

- City of Santa Barbara (*New member*)
- City of Los Angeles Watershed Protection Division
- City of Long Beach
- City of San Diego
- Orange County Public Works
- San Diego County Watershed Protection Program
- San Bernardino County Flood Control District
- Los Angeles County Flood Control District
- Riverside County Flood Control and Water Conservation District
- Ventura County Watershed Protection District
- State of California Department of Transportation (Caltrans)

Stormwater regulatory agencies

- Central Coast Regional Water Quality Control Board (*New member*)
- Los Angeles Regional Water Quality Control Board
- San Diego Regional Water Quality Control Board
- Santa Ana Regional Water Quality Control Board
- California State Water Resources Control Board
- (*collaborating organization*) U.S. Environmental Protection Agency Office of Research and Development

Non-regulatory/R&D

- Southern California Coastal Water Research Project (SCCWRP)

The SMC was founded in 2001 when a group of local stormwater management agencies decided they could more effectively pursue their stormwater management priorities by working together.

SMC projects use a co-funding model, where SMC member agencies voluntarily pay for just the work that the Steering Committee has agreed to fund for the fiscal year. This co-funding model enables SMC member agencies to directly select which projects they participate in.



A field crew for the SMC's Regional Watershed Monitoring Program collects data at a stream site in the Santa Monica Mountains. The cyclical stream monitoring program enables SMC member agencies to generate comparable data sets that paint a rich, encompassing portrait of regional ecosystem health.

SMC Master Agreement

The SMC is formally convened through a cooperative agreement known as the **SMC Master Agreement**. The latest five-year Master Agreement was renewed in summer 2024 and includes the addition of two member agencies – **City of Santa Barbara** and **Central Coast Regional Water Quality Control Board** – which has increased the number of SMC member agencies from 16 to 18.

SMC Progress Report

The SMC invests in high-quality science and engineering research to build a strong technical foundation upon which to optimize the effectiveness of stormwater management practices in coastal southern California. All of the SMC's work is guided by three main goals. The SMC uses multiple indicators to quantify its progress toward achieving these goals.

Fostering cooperation and collaboration

SMC Goal #1

Foster cooperation and collaboration among SMC member agencies to advance regional stormwater management

Progress Indicators

- » **46** external organizations that have partnered with the SMC on research and monitoring over the past five years
- » **11 out of 12** SMC projects over the past five years that have involved collaboration with partners external to the SMC
- » **40:1** projected average cost-leveraging ratio for each SMC member agency when all SMC 2019-2024 Research Agenda projects are completed

Advancing scientific knowledge

SMC Goal #2

Advance and expand understanding of the science and engineering behind stormwater management

Progress Indicators

- » **5 out of 5** SMC projects completed on time over the past five years
- » **4 out of 5** SMC projects completed on budget over the past five years
- » **5 out of 5** SMC projects over the past five years whose findings have been or will be published in technical reports and/or peer-reviewed scientific literature

Improving management practices

SMC Goal #3

Use SMC research and monitoring data to improve stormwater management practices across southern California

Progress Indicators

- » **69** presentations given last year to the staff, boards and co-permittees of SMC member agencies highlighting the SMC's work
- » **12 out of 12** SMC Research Agenda projects completed over the past decade that SMC member agencies report have influenced or are expected to influence the development of a management decision or program within their agency



A 10-member panel of independent technical experts meets at SCCWRP to collaboratively develop the SMC's 2019-2024 Research Agenda, a forward-looking document that lays out SMC research priorities over a five-year period. The SMC Research Agenda, which is being updated this fall for 2024-2029, serves as a guide that helps the SMC decide which research projects to prioritize and fund over the coming five years.

Outgoing Chair's Message



David Laak

As my second and final year as the SMC Steering Committee Chair wraps up, I feel a sense of gratitude and pride in what the SMC has been able to accomplish together over the past two years. Serving alongside such a dedicated group of professionals committed to improving stormwater quality and protecting our invaluable water resources has been a wonderful experience. The success of the SMC would not be possible without the participation, expertise, and enthusiasm of each member agency in support of our numerous collaborative projects.

It's been a very productive year, with many substantive accomplishments that have advanced the SMC's mission: "To solve stormwater management challenges across southern California by building regional consensus around best-in-class tools, methods, and monitoring strategies". A key highlight from last year was the approval of two new SMC member agencies: the City of Santa Barbara and the Central Coast Regional Board. Their inclusion underscores the growing recognition of the SMC's reach, relevance, and influence within the broader Southern California stormwater management community.

Another testament to the strength and commitment of the SMC is the re-signing of the SMC Master Agreement that extends our existence for another five years (2024-2029). All 16 existing member agencies, along with the two new agencies, are committed to remaining active members for the next five years. The future promises to be an exciting and productive time for the SMC as we also develop a new five-year project research plan to guide stormwater management projects throughout the region.

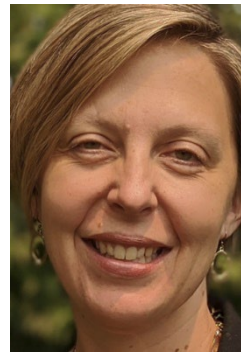
I am deeply grateful for all of the assistance from SMC members, project collaborators, and supporters, and I eagerly anticipate the continued growth and success of the SMC in the coming years.

David Laak

Chair, SMC Steering Committee, 2022-2024

Stormwater Resources Manager, Ventura County Watershed Protection District

Incoming Chair's Message



Amanda Magee

As the incoming Chair of the SMC, I am honored to address you in this year's annual report. We stand at an exciting moment, having just closed out the 2019-2024 Research Agenda with remarkable achievements and a clear path forward.

Our most recent five-year research cycle culminated in the successful completion of four key projects: the establishment of a BMP monitoring network, chemistry laboratory intercalibration, streamlined annual reporting processes, and a study on human fecal indicators. These accomplishments, summarized in a feature article in this report (**Page 4**), mark significant progress in our collective mission to solve stormwater management challenges across Southern California. I encourage you all to explore the article to fully appreciate the scope and impact of these projects.

Simultaneously, we initiated four new projects: research on non-structural BMPs, the launch of a new five-year regional stream monitoring cycle, development of a stream ecological potential framework, and a study on the mechanistic processes of structural BMPs. These efforts are all on track for completion during our next five-year research cycle.

Looking ahead, I am excited that the SMC has decided to reconvene a national panel of science and engineering experts this September. Their task will be to help shape our upcoming research agenda, ensuring that our work remains rigorous, ambitious, and regionally relevant. This decision underscores our ongoing commitment to leveraging independent technical expertise to guide our research priorities.

Finally, in our continuous effort to improve, we administered an effectiveness survey this summer to gauge how our member agencies perceive the SMC's reach and influence. Results indicate that all 12 of the SMC projects completed over the past decade have influenced or are expected to influence a management decision or program within the SMC's member agencies, demonstrating our commitment to refining our processes and maximizing our impact.

I look forward to working with all of you as we embark on this next chapter for the SMC.

Amanda Magee

Chair, SMC Steering Committee, 2024-2026

Senior Engineering Geologist, California State Water Resources Control Board

SMC completes 5-year research cycle, launches planning for next cycle

An independent panel of technical experts is developing a recommended five-year Research Agenda for the SMC this fall

Since its inception more than two decades ago, the SMC has been investing in research and monitoring projects that have pushed the boundaries for what is possible when stormwater management agencies work collaboratively to advance the field.

Through this unique regional research consortium, stormwater management agencies have completed more than 30 ambitious projects that have helped improve stormwater management practices across southern California and beyond. The SMC's accomplishments range from the development of bioassessment-based approaches for scoring ecosystem health, to standardized methods for evaluating BMP performance, to pollutant source tracking tools.

The SMC's ability to generate focused insights into among the most pressing issues in stormwater management is no coincidence.

All of the SMC's research and monitoring investments are guided by a visionary, strategic research planning process overseen by the SMC's 18-member Steering Committee.

SMC member agencies have consistently affirmed that the SMC's research planning process results in impactful technical products that inform thought processes and decisions within their agencies.

In a summer 2024 survey that the SMC administered to assess the SMC's effectiveness, Steering Committee members reported that all 12 of the SMC projects completed over the past decade have influenced or are expected to



A field crew installs monitoring instruments and engineered media in a bioretention BMP in Riverside County. The site is part of the SMC's new Regional BMP Monitoring Network, a network of southern California stormwater BMP sites completed in 2024 to generate high-quality, comparable data sets quantifying the performance effectiveness of structural BMPs.

influence the development of a management decision or program within one or more of their respective agencies.

Moreover, all 12 of the completed SMC projects have influenced or are expected to influence one or more of the SMC's regulated member agencies, while 10 of the 12 projects have influenced or are expected to influence one or more of the SMC's regulatory member agencies.

SMC member agencies also affirmed through the survey that the SMC's work has a spillover effect, extending beyond just the SMC's own member agencies to benefit a range of co-permittees and other agencies.

Transitioning from one research cycle to the next

The end of the last fiscal year in June marked the end of the SMC's 2019-2024

research planning cycle, and the start of the next.

As of the end of the 2019-2024 cycle, the SMC had completed its four highest-priority projects, and four other initiated projects are nearing completion. Other candidate SMC projects and concepts from the 2019-2024 planning cycle, meanwhile, have been incorporated into projects undertaken by individual SMC member agencies.

With the research cycle transition, the Steering Committee is convening an independent panel of technical experts in September 2024 to help the SMC identify the most technically rigorous, relevant projects possible for the SMC to consider over the coming five years; the panel's recommendations will be codified as the SMC's 2024-2029 Research Agenda. Then, the Steering

Committee will review the agenda and greenlight its top consensus project picks.

Significantly, the SMC’s expert panel – which is convened every five years – helps ensure that the SMC 2024-2029 research planning cycle is every bit as visionary, managerially relevant and technically rigorous as the ones that came before it.

What is the SMC’s Research Agenda?

SMC Research Agendas are the master research planning documents that the SMC uses to guide which projects to collaboratively fund. Each SMC Research Agenda covers a five-year period and is developed by an independent panel of technical experts from across the nation.

Research Agenda projects are as forward-looking as they are responsive to the issues and questions that stormwater managers most need answers to; the SMC’s goal is to ensure it is pursuing the most relevant, timely, ambitious regional-scale projects possible.

The research planning cycle that just ended was codified as the SMC’s [2019-2024 Research Agenda](#), published in fall 2019 by a nine-member, independent expert panel. Over the past five years, this document has served as the primary resource for Steering Committee decision-making about if, how and when to move forward with a range of candidate SMC projects. It incorporates extensive input from SMC member agencies about stormwater managers’ research needs and priorities, and is organized into six thematic areas:

- Microbiology and Human Health Risk
- BMP Monitoring, Implementation and Effectiveness

- Innovative Technology and Science Communication
- Expanding the Utility of Biomonitoring
- Improving Stormwater Monitoring Effectiveness
- Emerging Challenges

Based on this 2019-2024 Research Agenda, the Steering Committee identified and prioritized its highest-priority projects. Already, the SMC’s four highest-ranked projects that were greenlit from the 2019-2024 Research Agenda have been completed:

1. **Development of the SMC’s Regional BMP Monitoring Network (completed spring 2024):** During two wet-weather seasons, the SMC built a network of southern California stormwater BMP sites capable of generating high-quality, comparable data sets quantifying the performance effectiveness of structural BMPs, which are designed to remove contaminants from runoff. The [SMC Regional BMP Monitoring Network](#) spans four counties, multiple land uses, and multiple BMP types covering a spectrum of real-world operating conditions. Managers can use BMP performance data generated via the network to help close significant, persistent

knowledge gaps in understanding of how BMPs perform in southern California – gaps that have limited the region’s ability to optimize the operation and maintenance regimes for these increasingly ubiquitous stormwater management solutions.

2. **Relationship between human markers of fecal contamination and health risk (completed summer 2024):** This project investigated the relationship between pathogens in stormwater and the human genetic marker HF183, which can be used as a proxy for tracking human pathogens in fecal contamination. The study’s goal is to increase the management utility of HF183 by shedding light on how much HF183 is too much HF183 – that is, defining for managers at what level HF183 in wet-weather runoff corresponds to a public health risk for people swimming at beaches and in other contaminated receiving waters. The project will pave the way for stormwater managers to be able to interpret their HF183 measurements and use HF183 data to prioritize sites for cleanup and remediation. The study’s findings are expected to be released via publication in a peer-reviewed journal in the coming months.



During the SMC’s fourth chemistry laboratory intercalibration, completed in 2024, private and public laboratories analyzed stormwater samples and were scored on their accuracy and precision in measuring five different classes of contaminants. The periodic, voluntary SMC-facilitated exercises help SMC member agencies make decisions about which laboratories to contract with for their monitoring needs.

3. **Streamlining annual compliance reporting of stormwater data (completed winter 2023-2024):** Via a series of structured deliberations among SMC member agencies, the SMC reached consensus on a [proof-of-concept approach](#) through which the region’s stormwater dischargers could present more managerially relevant insights from the water-quality monitoring data that they spend millions of dollars compiling each year. The final product of the project is a web-based data reporting platform that enables municipal stormwater programs to input select high-value data from their monitoring and other management programs, then to generate easy-to-understand, graphical representations of the data for executive management and the broader community. The prototype reporting tool is designed to complement – not replace – regulatory reporting requirements. The SMC is exploring how to use the tool to more meaningfully communicate municipal stormwater programs’ progress each year in protecting watershed health.

4. **Laboratory intercalibration for chemistry testing (completed spring 2024):** The SMC has completed the [fourth cycle of a periodic intercalibration exercise](#) intended to ensure that laboratories that perform routine chemistry analyses of runoff samples across southern California and beyond are capable of generating consistently high-quality monitoring data. The three-year intercalibration evaluated eight laboratories’ accuracy and precision in measuring five different classes of chemical contaminants in wet- and dry-weather runoff. Overall, all but two laboratories that voluntarily opted not to participate in the final round of the intercalibration received passing grades for all five classes of chemicals. The findings have given SMC member agencies confidence that laboratories they



A field crew uses a custom-built rainfall generator to create controlled wet-weather conditions in a Long Beach parking lot – part of an SMC project to quantify street sweeping’s effectiveness in preventing roadway pollution from entering storm drains. Street sweeping is considered a type of non-structural BMP. Results are expected in 2025.

contract with for chemistry analyses are capable of producing comparable, high-quality data.

In addition to the four completed projects, the SMC Steering Committee also subsequently decided to move forward with four other priority projects from its 2019-2024 Research Agenda, bringing to eight the total number of projects that were greenlit from the 2019-2024 Research Agenda. The four other SMC projects, which will wrap up over the next two years, are:

1. **Effectiveness of non-structural BMPs (initiated 2023, to be completed 2025):** The SMC is working to determine if routine street sweeping can result in a measurable reduction in the levels and types of contamination in runoff – a proof-of-concept study that could help clarify the degree to which street sweeping removes stormwater pollutants that would otherwise enter storm drains and impair water quality. In addition to examining street sweeping’s ability to remove traditional pollutants from runoff, the SMC also

is investigating street sweeping’s effectiveness at removing microplastics from runoff. Already, researchers have constructed a custom-built rainfall generator that creates controlled rainfall patterns along two similar segments of streets – one that has been swept, and the other not swept.

2. **Improving modified streams (initiated 2022, to be completed 2025):** The SMC is working to identify environmental stressors in southern California’s modified streams that are potential contributors to the degradation of the streams’ biological communities. Candidate stressors being examined include eutrophication, salinization, habitat alteration, and water temperature. Researchers also are evaluating if routine channel maintenance activities that are intended to preserve a stream’s flood protection functions also could have an influence on the stream’s biological integrity. Finally, modified channels with relatively high biointegrity scores are being

investigated to identify factors that could influence scores at other sites.

3. **BMP mechanistic processes (initiated 2023, to be completed 2026):** The SMC is working to characterize the mechanistic inner processes by which biofiltration BMPs remove common types of stormwater pollutants as runoff flows through them. The investigation has the potential to open the “black box” that surrounds how these systems operate, providing critical insights that enable researchers to optimize their design and maintenance regimes going forward. Researchers are pairing a laboratory-based investigation with field validation to bridge the knowledge gap between what happens in a controlled laboratory setting vs. in highly dynamic environmental conditions in the real world.

4. **Third cycle of the SMC Regional Watershed Monitoring Program (initiated 2021, to be completed 2025):** The SMC is investing in the third cycle of its SMC Regional Watershed Monitoring Program – a monitoring collaboration that will enable the SMC to paint a comprehensive five-year picture of regional stream health across southern California. For the program’s third cycle, program participants are both collecting core monitoring data to understand trends over time, as well as expanding the program into new frontiers. Among the new studies is a stream causal assessment investigation that will work to determine the specific stressors that are causing some stream sites to receive low stream bioassessment scores.



A panel of independent scientific experts deliberates at SCCWRP in fall 2019 to develop the SMC’s 2019-2024 Research Agenda. The SMC is convening another expert panel in September 2024 to develop the SMC’s 2024-2029 Research Agenda, which consists of a recommended roadmap guiding future SMC research investments.

Looking ahead to 2024-2029

In September 2024, the SMC is convening an independent panel of outside experts across a range of disciplines to work collectively to develop the SMC’s 2024-2029 Research Agenda, a set of recommendations that will guide all of the SMC’s research investments over the next five years.

The 12-member panel is made up of experts in hydrology, chemistry/toxicology, biology/ecology, public health, engineering (BMPs), climate change, data science, economics/social science, groundwater and environmental advocacy, plus one representative each from the stormwater regulated and regulatory communities.

Since 2001, this expert panel process has enabled the SMC to conceptualize, oversee and voluntarily co-fund an expansive portfolio of stormwater projects totaling \$46 million. These projects have informed the development of – and updates to – monitoring programs, guidance and policy documents, 303(d) listings and TMDLs, water quality objectives, thresholds,

basin plan amendments, and other actions.

As with prior expert panels, the 2024-2029 expert panel will be tasked with conceptualizing a series of recommended regional-scale projects and initiatives that no single agency would have the resources to pursue on its own, but that collectively will be possible by combining the expertise, funding, and in-kind contributions of the SMC’s 16 member agencies.

Leading up to the panel’s September 16-18, 2024 meeting, the SMC developed a white paper for the panel that highlights issues and concerns related to stormwater management and research in the region. SMC member agencies and others also will give presentations to the panel to provide more detail on these issues and concerns.

Once the panel has published the SMC’s 2024-2029 Research Agenda – expected in late 2024 – the SMC Steering Committee will discuss, prioritize and rank the projects, then greenlight the top-priority consensus projects.

SMC Project Portfolio

An overview of ongoing, planned and recently completed SMC projects

		SMC 2019-2024 Research Agenda (view)					
		2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
2019-2024 Projects	Human Fecal Indicators and Health Risk (Research Agenda Project 2.4)		ACCOMPLISHMENTS » Established technical workgroup » Developed project workplan	ACCOMPLISHMENTS » Refined pathogen measurement methods » Completed first year of measurements	ACCOMPLISHMENTS » Reviewed first-year data » Completed second year of measurements » Initiated health risk modeling	ACCOMPLISHMENTS » Developed health risk estimates » Prepared final report	
	BMP Regional Monitoring (Research Agenda Project 3.4)		ACCOMPLISHMENTS » Established technical workgroup » Identified monitoring questions	ACCOMPLISHMENTS » Developed workplan » Identified candidate sites » Built portal for metadata	ACCOMPLISHMENTS » Trained field crew » Built data portal » Piloted monitoring with 5 member agencies	ACCOMPLISHMENTS » Collected regional monitoring data » Prepared final report	PLANNED » Implement regional BMP monitoring network
	Chemistry Laboratory Intercalibration (Research Agenda Project 6.5)		ACCOMPLISHMENTS » Held kickoff meeting » Adopted 3-year schedule and scoring criteria	ACCOMPLISHMENTS » Completed first intercalibration round (TSS, nutrients, metals, chlorinated hydrocarbons, pyrethroids)	ACCOMPLISHMENTS » Completed second intercalibration round for all first-round analytes, plus polycyclic aromatic hydrocarbons	ACCOMPLISHMENTS » Completed third intercalibration round for problematic analytes » Published laboratory guidance manual	
	Streamlining Annual Reporting (Research Agenda Project 4.2)		ACCOMPLISHMENT » Created focus group » Reviewed existing reporting practices	ACCOMPLISHMENTS » Developed environmental-based and program-based metrics and indicators	ACCOMPLISHMENTS » Created data platform template » Pilot-tested new web interface	ACCOMPLISHMENTS » Published final recommendation for new reporting format	
	Effectiveness of Non-Structural BMPs (Research Agenda Project 3.5)			ACCOMPLISHMENTS » Completed literature review » Hosted workshop and developed report » Developed draft workplans for street sweeping and catch basin cleaning	ACCOMPLISHMENTS » Finalized workplan » Designed and built field-deployable rainfall generator for dry-weather testing	ACCOMPLISHMENTS » Collected and analyzed field data	PLANNED » Prepare final report
	Stream Ecological Potential Framework (Research Agenda Project 5.3)			ACCOMPLISHMENT » Developed workplan	ACCOMPLISHMENTS » Established technical workgroup » Identified classes of modified streams » Initiated pilot study	ACCOMPLISHMENTS » Evaluated likelihood of improving biological condition	PLANNED » Prepare final report
	BMP Mechanistic Processes (Research Agenda Project 3.1)					ACCOMPLISHMENTS » Developed workplan » Initiated laboratory testing	PLANNED » Continue laboratory testing » Initiate model development
Ongoing initiatives	SMC Regional Watershed Monitoring Program	ACCOMPLISHMENTS » Completed second monitoring cycle (2014-2019) » Published 2018-2019 Report on the SMC Regional Stream Survey	ACCOMPLISHMENTS » Developed Workplan 1.0 for third monitoring cycle (2021-2025) » Initiated field sampling	ACCOMPLISHMENTS » Completed first-year survey » Report on causal assessment	ACCOMPLISHMENTS » Completed second-year survey	ACCOMPLISHMENTS » Completed third-year survey	PLANNED » Prepare final report
	Communications Plan	ACCOMPLISHMENT » Developed implementation workplan	ACCOMPLISHMENTS » Adopted updated mission, vision, and goals/metrics » Updated SMC website » Launched quarterly newsletter	ACCOMPLISHMENT » Revamped SMC Annual Report	ACCOMPLISHMENTS » Developed SMC Speakers Bureau	ACCOMPLISHMENTS » Sustained communications investments	PLANNED » Examine effectiveness of investments to date

SMC Project Descriptions

Research Agenda Project 2.4: Human Health Indicators and Health Risk

Existing regulatory thresholds designed to protect body-contact recreation in southern California focus on fecal indicator bacteria – primarily enterococci and *E. coli*, which may not be relevant to actual health risk for multiple reasons. More recently, numerous alternative indicators of fecal pollution, including human-specific indicators, have been developed. To effectively protect public health, stormwater managers need to better understand the relationship between these newer indicators of fecal pollution in southern California recreational waters and the degrees of human health risk that they correlate to. Then, prediction of human health risk from a given level of existing or new indicators can be achieved by using risk assessment models such as quantitative microbial risk assessment (QMRA).

This project will identify and evaluate indicators that can be used to reliably and accurately assess human health risk posed by fecal contamination during wet weather, paving the way for stormwater managers to answer the fundamental question of “how much of these indicators is too much” from the perspective of protecting beach recreational beneficial uses. This project will also provide identification of potential indicators; test indicators from human sources and non-sources; measurement of pathogens in human sources; and the development of health risk estimates using QMRA.

Research Agenda Project 3.4: BMP Regional Monitoring

Thousands of BMPs have been installed across southern California, and thousands more will be installed over the next 20 years for regulatory compliance, even as little is known about their long-term performance for improving water quality and managing runoff. Despite the growing investment in BMPs, there is a dearth of field data documenting BMP performance for water quality treatment, hydromodification mitigation, operations and maintenance requirements, and other potential benefits. This project will develop a regional BMP monitoring program to generate robust, statistically relevant data sets covering a range of BMP types, serving multiple land uses, across a spectrum of operating conditions. These data will be used to improve BMP selection guidance, streamline annual reporting, develop cost-effective asset management programs, and support Reasonable Assurance Analysis and Alternative Compliance. In addition, this project will inventory existing and planned structural BMPs, create a study design, establish a field technical support team; revise or expand California BMP database and/or SMC Data Portal as repository for field monitoring data; and conduct a pilot regional survey to test the monitoring program.

Research Agenda Project 6.5: Chemistry Laboratory Intercalibration

As part of the SMC’s Model Monitoring Program, 11 analytical laboratories previously completed two intercalibration studies to assess interlaboratory variability and enhance comparability for chemical analysis of runoff samples for SMC member agencies. The intercalibration and resulting guidelines/protocols were documented in a Laboratory Guidance Manual for SMC member agency laboratories and supported with draft contract language for member agencies. The Laboratory Guidance Manual and intercalibration efforts, however, were incomplete in two respects, necessitating a follow-up study that will intercalibrate on additional constituents. The original laboratory intercalibrations focused on suspended solids (TSS), nutrients, trace metals, and organic constituents such as chlorinated hydrocarbons (CHC) and pyrethroid pesticides. This round of studies will also include the above constituents and other organic constituents, including organophosphorus pesticides (OP) and polycyclic aromatic hydrocarbons (PAH), that were not part of the original intercalibrations. This follow-up intercalibration also will provide an opportunity to repeat the intercalibration – which needs to be done periodically anyway – and to involve new laboratories and new personnel that were not part of the previous intercalibrations.

Research Agenda Project 4.2: Streamlining Annual Reporting

Although SMC member agencies spend hundreds to thousands of person-hours each year to produce “annual reports” as a compliance requirement, there is little guidance for reporting these compliance requirements. As a result, annual reports are difficult to read and understand, are almost always comprised of non-machine-readable data, and rarely get used beyond their one-time specific application. Both regulated and regulatory agencies are left with a feeling of wasted effort, incomplete outcomes, and lost opportunities to glean more information and insight. Because both regulated and regulatory agencies are members of the SMC, they will work together to dramatically streamline guidance for annual reporting, focusing on performance metrics that provide the key information for decision-making and that facilitate the reports’ production using an automated, seamless, and transparent process. This project will accomplish three objectives: 1) identify key metrics that are the essence of program effectiveness, 2) create a data platform for incorporating the data necessary to track and calculate the key metrics, and 3) generate a user interface for quickly and efficiently automating the Annual Report.

Research Agenda Project 3.5: Effectiveness of Non-Structural BMPs

The efficacy of non-structural stormwater BMPs can vary widely and is difficult to accurately quantify, even as all SMC members rely on non-structural BMPs as a first option for

pollutant removal. Non-structural BMPs consist of programmatic activities, including street sweeping, public education, and source control (e.g., plastic bag bans). Virtually no quantitative effectiveness data exist for non-structural BMPs like street sweeping. This project will determine if routine street sweeping can result in a measurable reduction in the levels and types of contamination in runoff. In addition to examining street sweeping's ability to remove traditional pollutants from runoff, the study also will investigate street sweeping's effectiveness at removing microplastics from runoff.

Research Agenda Project 5.3: Stream Ecological Potential Framework

Data from the SMC Regional Watershed Monitoring Program suggest that fully and partially engineered channels can have significantly lower bioassessment index scores compared to natural streams. At the same time, data from the SMC and other studies have observed high index scores in certain partially engineered channels. But it is unclear what sets the biological condition in some engineered channels apart from other engineered channels, and what attributes can contribute to this biological potential. The aim of this project is to inform decision-making that maintains healthy biological conditions as well as flood control goals in modified streams. Ultimately, this project's goal is to provide SMC managers with the tools they need to identify sites with the greatest potential for biological restoration, and what restoration efforts – physical habitat, flow, or water quality either alone or in combination – are expected to be most effective. This outcome should provide SMC members with the tools they need to support healthy streams (as required under stream biointegrity policies), and to target their restoration, water quality improvement, and flow management activities in locations with the greatest likelihood of success.

Research Agenda Project 3.1: BMP Mechanistic Processes

The mechanistic processes by which structural BMPs remove contaminants is a “black box” – with researchers routinely measuring the properties of the runoff entering and exiting the BMP, but not fully understanding what happens to this runoff while it is being treated inside the BMP. This project will characterize the mechanistic inner processes by which biofiltration BMPs remove common types of stormwater pollutants as runoff flows through them – an investigation that has the potential to open the “black box” for how these systems work and how managers can optimize their long-term performance. The project will work to link the physicochemical and biological processes by which pollution removal occurs – including sedimentation, sorption, chemical transformation, and biological degradation – to measurable biofiltration BMP properties.

SMC Regional Watershed Monitoring Program

Comprising more than 7,000 stream-kilometers, southern California's coastal watersheds are diverse, ecologically and economically important habitats. Despite devoting extensive local resources to monitoring their condition, SMC member agencies historically could not draw conclusions about overall regional health until the 2009 establishment of the cyclical SMC Regional Watershed Monitoring Program. In addition to providing critical contextual information for interpreting all other stream monitoring in the region, the SMC regional monitoring program produces data that support numerous local watershed management programs and that inform development of statewide policy. The program also serves to promote data quality and comparability and consistency in field and laboratory data collection efforts. The third cycle of SMC regional monitoring is scheduled to be completed in 2025.

Communications Plan

As the SMC was approaching its 20th anniversary in 2021, the SMC recognized it had grown and matured to a point where it needed to develop a strategic communications vision and action plan for more effectively and consistently publicizing SMC goals, progress and accomplishments. The resulting Communications Plan is the SMC's first formal plan for maximizing the effectiveness and reach of SMC communications among both internal and external audiences. The plan's goals are to get executive management and co-permittees more invested in the SMC, improve the Steering Committee onboarding process (including continuity during transitions), and bring new project partners into the SMC fold. Through the Communications Plan, the SMC has updated its mission and vision statements, developed and reported on strategic goals and organizational performance metrics, introduced a quarterly newsletter and written orientation guide for new Steering Committee members, and revamped existing communications products, including the website and Annual Report.



An update from the
SOUTHERN CALIFORNIA STORMWATER MONITORING COALITION

SMC regional monitoring network being leveraged to evaluate BMPs' ability to capture microplastics in runoff

The SMC will investigate the extent to which structural stormwater BMPs across southern California can capture microplastic contamination in runoff as part of a two-year study leveraging the SMC's new Regional BMP Monitoring Network.

The microplastics investigation, launched in fall 2023, represents a significant expansion of the SMC's regional monitoring program for BMPs, which was originally developed to evaluate BMPs' effectiveness at removing nutrients, heavy metals, sediments and fecal contamination in runoff, as well as evaluate how maintenance influences BMP functioning.

After just one year of collecting BMP performance data, the SMC monitoring network is being used to study a priority contaminant of emerging concern, underscoring the confidence that the microplastics project's funders – the California Ocean Protection Council and California Sea Grant – have in the ability of the SMC's network to collect high-quality microplastics data.



A field crew installs monitoring instruments and engineered media in a bioretention BMP in Riverside County. Microplastics researchers are using an SMC-developed network of BMP monitoring sites across southern California, including the one above, to investigate the degree to which BMPs can remove microplastic contamination in runoff. Photo credit: Adrian Montoya, Riverside County Flood Control and Watershed Protection District

The leveraged effort also enables nearly 100% of project funding to go toward collecting and analyzing BMP microplastics data, as the SMC already has invested in setting up and managing the network of BMP monitoring sites.

Microplastics pollution has emerged in recent years as a management priority for California, with extensive resources being invested into understand where it's coming from, how it's affecting

aquatic life and humans, and how managers can effectively curb and combat its spread in aquatic systems.

During the 2023-2024 wet-weather season, researchers are planning to study microplastics capture efficacy at up to six bioretention and biofiltration BMP sites that are part of the SMC's monitoring network. Researchers also will investigate how specific characteristics of different types of engineered media influence the removal of microplastics from runoff.

The study is being performed collaboratively by California State University, Long Beach; California State University, Los Angeles; and the Southern California Coastal Water Research Project (SCCWRP). SCCWRP has been leading the SMC in building its Regional BMP Monitoring Network over the past few years.

SMC member agencies are expected to play a direct role in supporting the microplastics project, taking responsibility for collecting and filtering runoff samples in the field in preparation for microplastics analysis.

During the SMC's pilot BMP monitoring season in 2022-2023, SMC member agencies set up and collected water-quality monitoring data at six BMPs across four locations in southern California; the number of monitoring sites is expected to approximately double during the 2023-2024 monitoring season.

For more information, contact [Dr. Elizabeth Fassman-Beck](#) with the Southern California Coastal Water Research Project (SCCWRP).

Dive deeper

- [Why managers want to know if BMPs can remove microplastics](#)
- [Announcement about decision to fund the microplastics BMP removal study](#) (External link)
- [SMC Regional BMP Monitoring Network Work Plan](#) (PDF)
- [SMC Regional BMP Monitoring Network begins Year 2 of monitoring BMP performance](#)
- [How stormwater managers are using calculator tools to streamline analysis of BMP performance data](#)

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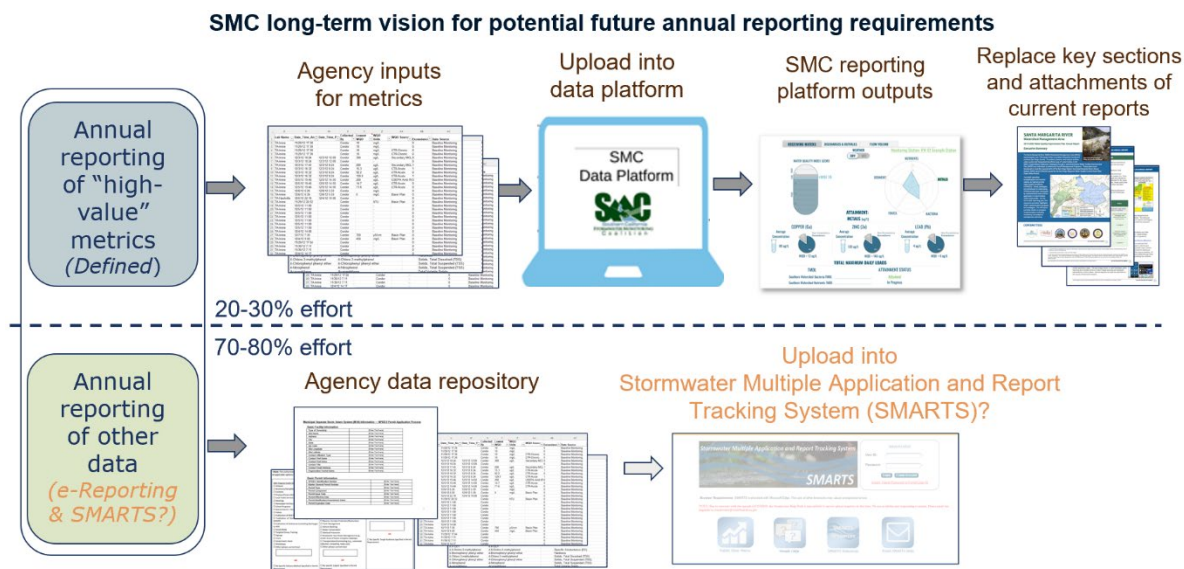
SMC develops regional approach and web-based user interface for streamlining, enhancing how dischargers present annual reporting data

The SMC has developed a proof-of-concept regional approach and web-based data platform to illustrate how Southern California’s stormwater management community could extract more managerially relevant insights from the water quality monitoring data that dischargers spend millions of dollars compiling each year under their stormwater permit reporting requirements.

The approach and interface, which was finalized in late 2023, enables municipal stormwater programs to input select data for identified “high-value metrics” from their routine monitoring and management activities via a web-based data platform. The monitoring results for the area are then compiled and presented in easy-to-understand, graphical formats.

Municipal stormwater programs can include the data compilations and visualizations in their annual reports to regulators, as well as share the data analyses with the public and civic leaders.

This type of proposed streamlining of the annual reporting requirements – along with development of regionally coordinated metrics for presenting insights about the health of water resources – is the first of its kind. The new data analyses are designed to complement – not replace – regulatory reporting requirements.



The SMC has developed a long-term vision for a new data reporting workflow, above, that would help Southern California stormwater dischargers generate easy-to-understand, accessible insights about the effectiveness of their management activities. The proposed workflow is designed to replace some but not all of dischargers’ existing data reporting workflows required under regulatory compliance permits.

The goal of the SMC’s three-year Streamlining Annual Reporting project was to reach broad, regional consensus on how to more meaningfully communicate municipal stormwater programs’ progress each year in managing wet- and dry-weather runoff to protect water resources. Although stormwater dischargers are required under their National Pollution Discharge Elimination System

(NPDES) permits to collect voluminous data sets, it can be difficult to identify key accomplishments and challenges from these data.

In developing the streamlined annual reporting approach, the SMC focused on an initial subset of “high-value” environmental-based and related program-based metrics that both regulated and regulatory parties agreed communicates relevant, insightful information about the health of regional water resources. The three categories of performance metrics that the SMC agreed to standardize and incorporate into its new data platform and user interface are: receiving water assessments, discharge assessments, and flow/volume assessments.

Already, some of the SMC member agencies have begun using the data platform to generate the data compilations and visualizations for use in their annual compliance reports. The data platform is currently only accessible to SMC member agencies while the agencies continue to gain experience using the platform.

The SMC views the data analyses and visualizations generated by the platform as a valuable complement to existing data reporting requirements that may be able to replace some permit-mandated reporting requirements in the future.

Dive deeper

- [Executive summary of the SMC Streamlining Annual Reporting project](#) (PDF)
- [Why the SMC developed streamlined annual reporting tools](#)
- [Regulated and regulatory agencies that served on the project’s focus group](#)
- [Overview slides from a December 2023 project update](#) (PowerPoint slides)

Originally published in the SMC Spring 2024 Newsletter

SMC chemistry intercalibration completed to ensure stormwater monitoring data are comparable, high quality

The SMC has completed the fourth iteration of a periodic intercalibration exercise to ensure laboratories performing routine chemistry analyses of Southern California stormwater samples are capable of generating comparable, high-quality monitoring data.

The chemistry laboratory intercalibration, described in a [technical report](#) published in June, evaluated eight laboratories' accuracy and precision in measuring five different classes of contaminants in wet- and dry-weather runoff: trace metals, nutrients, current-use and legacy pesticides, general chemistry such as total suspended solids, and polynuclear aromatic hydrocarbons (PAHs).

Participating laboratories worked through three rounds of analysis over a three-year period, from 2022 to 2024.

Overall, all but two laboratories that voluntarily opted not to participate in the final round of the intercalibration received passing grades for all five classes of chemicals.



Participating laboratories in the SMC's fourth chemistry laboratory intercalibration analyzed stormwater samples and were scored on their accuracy and precision in measuring five different classes of contaminants. The voluntary intercalibration exercises help SMC member agencies make decisions about which laboratories to contract with for their monitoring needs.

The intercalibration exercises provide laboratories with the opportunity to work together to reduce variability and increase comparability in chemistry measurements.

SMC member agencies use the intercalibration exercises to help decide which laboratories to contract with for their ongoing monitoring needs. Through the intercalibrations, SMC member

agencies can ensure that the laboratories they are using are producing high-quality, comparable data. Significantly, the SMC can then compile data sets to address regional-scale questions, including through the cyclical SMC Regional BMP Monitoring Network.

The SMC previously hosted chemistry laboratory intercalibrations in [2004](#), [2007](#), and [2010](#). The SMC also hosted a toxicity laboratory intercalibration in [2016](#). The SMC's intercalibration work for bioassessment and physical habitat assessments, meanwhile, takes place through annual field audits.

For more information, contact Dr. [Charles Wong](#) with the Southern California Coastal Water Research Project (SCCWRP).

Dive deeper

- [Scope of the SMC's chemistry laboratory intercalibration](#)
- [List of the eight laboratories that participated in the chemistry laboratory intercalibration](#)
- [Read the final report from the SMC's newly completed chemistry laboratory intercalibration \(June 2024\) \(PDF\)](#)
- [Read the final report from the SMC's previous chemistry laboratory intercalibration \(2010\) \(PDF\)](#)
- [Read the final report from the SMC's first toxicity laboratory intercalibration \(2016\) \(PDF\)](#)

Originally published in the SMC Summer 2024 Newsletter

Contributors to Success

The SMC's success is rooted in the talents, dedication and collaboration of the many individuals and organizations that generously give their time, expertise and funding to support the SMC.

SMC Steering Committee Members

	Agency	Lead Member		Alternate Member	
		Name	Job Title	Name	Job Title
Regulated Agencies	City of Long Beach	Vacant		Cecilia Salazar	Environmental Specialist Associate
	City of Los Angeles Watershed Protection Division	Charlie Yu	Senior Chemist	Zora Baharians	Senior Water Biologist
	City of San Diego	Andre Sonksen	Program Manager, Transportation & Storm Water	Eric Gwynn	Storm Water Environmental Specialist III
	Los Angeles County Flood Control District	Melissa Turcotte	Head Environmental Engineering Specialist	Geremew Amenu	Civil Engineer
	Orange County Public Works	James Fortuna	Manager, North OC Watershed Management Area	Grant Sharp	Manager, South OC Watershed Management Area
	Riverside County Flood Control and Water Conservation District	Rebekah Guill	Senior Flood Control Planner	Richard Boon	Chief of Watershed Protection
	San Bernardino County Flood Control District	Christopher Bland	Stormwater Program Manager	Arlene Chun	Division Chief
	San Diego County Stormwater Management Program	Dr. Joanna Wisniewska	Landuse Environmental Planner III	Neil Searing	Water Resources Manager
	Ventura County Watershed Protection District	David Laak	Stormwater Resource Manager	Arne Anselm	Deputy Director
	California Department of Transportation (Caltrans)	Bhaskar Joshi	Chief, Office of Stormwater Program Development	Hamzeh Ramadan	Senior Transportation Engineer
	Southern California Coastal Water Research Project	Ken Schiff	Deputy Director	Elizabeth Fassman-Beck	Department Head, Engineering
Regulatory Agencies	California Regional Water Quality Control Board, Los Angeles Region	Ivar Ridgeway	Senior Environmental Scientist	Vacant	
	California Regional Water Quality Control Board, San Diego Region	Chad Loflen	Senior Environmental Scientist	Wayne Chiu	Senior WRC Engineer Specialist
	California Regional Water Quality Control Board, Santa Ana Region	Adam Fischer	Supervisor, Municipal Stormwater Unit	Vacant	
	California State Water Resources Control Board	Nicholas Martorano	Executive Director, Water Quality Monitoring Council	Amanda Magee	STORMS Unit Chief, Division of Water Quality
	U.S. Environmental Protection Agency Office of Research and Development	Michael Borst	Engineer	Vacant	

External partners in the SMC's success

Dozens of organizations contribute to the SMC's success every year by offering their technical expertise, counsel, resources and perspective. The following is a list of every organization external to the SMC that has partnered on SMC projects over the past five years.

- AECOM
- Aquatic Bioassay & Consulting
- Babcock Laboratories
- Building Industry Association
- Caltest Analytical Laboratory
- California Department of Fish and Wildlife
- California State University, Long Beach
- California State University, Sacramento
- California Stormwater Quality Association
- City of Santa Barbara
- CloudCompli
- Colorado School of Mines
- Contech Engineered Solutions
- Council for Watershed Health
- County of San Diego Department of Public Health
- County of Orange Health Care Agency
- Enthalpy Laboratory
- Eurofins Laboratory
- Frog Environmental
- Heal the Bay
- Larry Walker & Associates
- Marine Pollution Studies Laboratory at Granite Canyon
- MBC Aquatic Sciences
- Michael Baker International
- Moss Landing Marine Laboratories
- National Park Service
- Nautilus Environmental
- Olaunu
- Oregon State University
- Pacific EcoRisk
- Paradigm Environmental
- Physis Laboratory
- San Francisco Estuary Institute
- Sanitation Districts of Los Angeles County
- State Water Resources Control Board Surface Water Ambient Monitoring Program
- Tetra Tech
- Truesdail Laboratory
- U.S. Army Corps of Engineers
- University of Maryland, College Park
- University of California Extension
- University of South Florida
- Ventura Regional Sanitation District
- Vista Analytical Laboratory
- Weck Laboratory
- Weston Solutions
- WSP