

An aerial photograph of Los Angeles, California, showing the coastline, the city grid, and the surrounding mountains. The image is rotated 90 degrees clockwise. The left side of the image is a solid teal color, which serves as a background for the text.

# Street Sweeping Study

Scientific Studies Program

Fiscal Year 2024-2025

Watershed Areas: Central Santa Monica Bay, South Santa Monica Bay,

Upper Los Angeles River

Project Lead: City of Los Angeles (LASAN)

Presenter: Jon Ball



# Study Overview

The Street Sweeping Study will collect information that will be used to identify potential enhancements to the City of Los Angeles' street sweeping program that would result in greater removal of pollutants from street surfaces and increased benefit to downstream water quality.

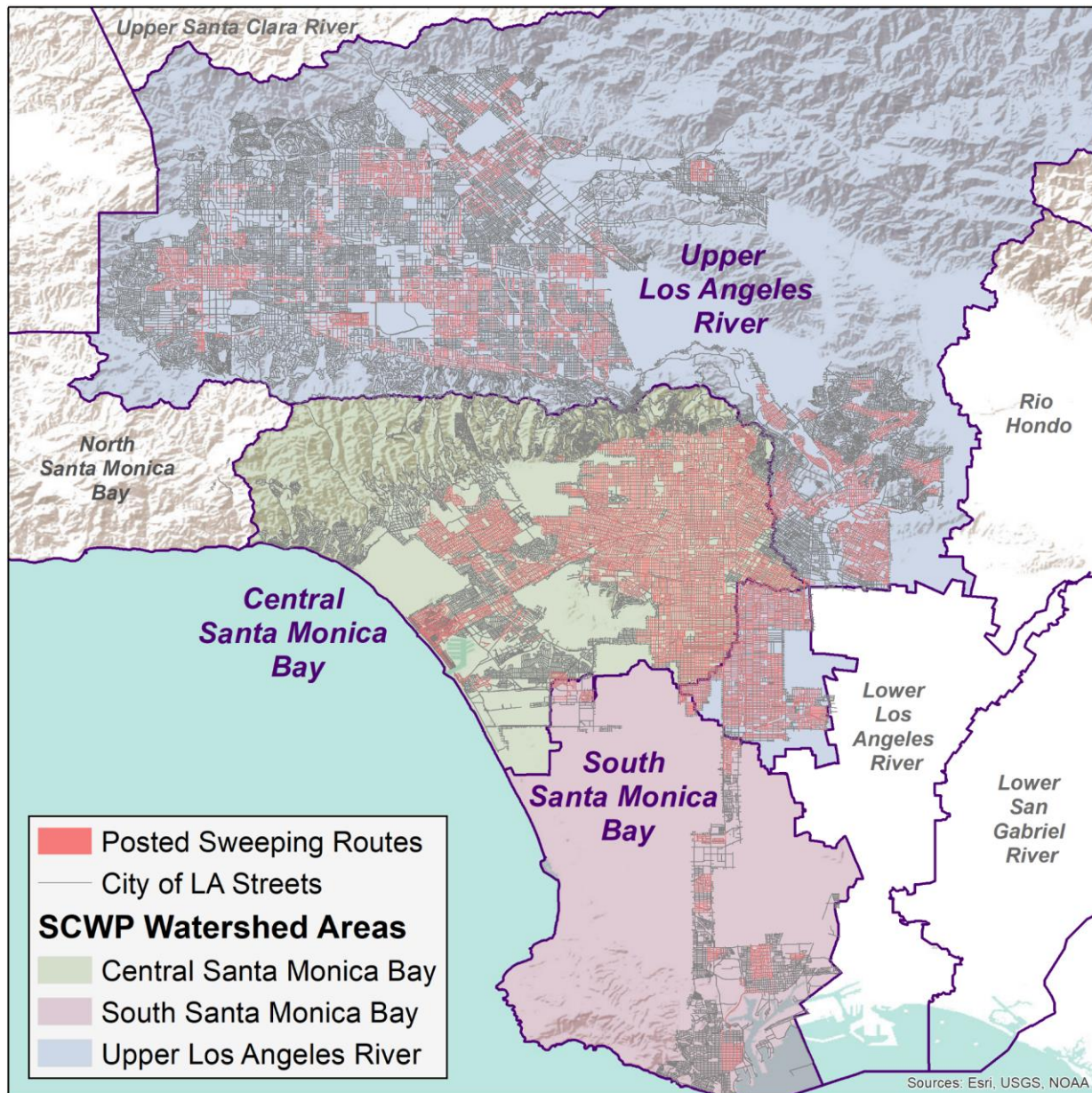
- Street sweeping is recognized as an effective water quality BMP
  - Removes a variety of priority pollutants from street surfaces (e.g., metals, organics)
- The Study will support improved pollutant removal via street sweeping by:
  - Evaluating new and more effective sweeping technologies and approaches
  - Identifying areas and conditions with the greatest pollutant accumulation where sweeping can be prioritized.







# Study Location

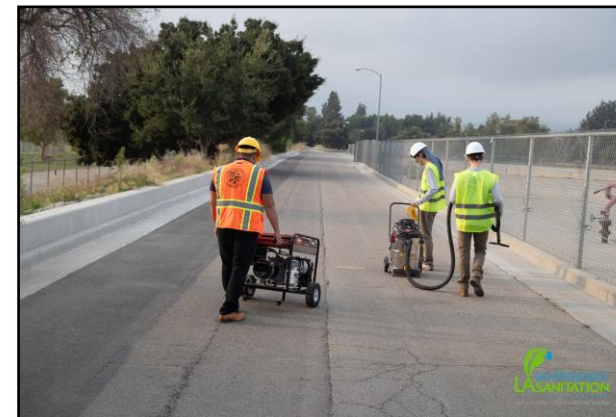


- SCW watershed areas:
  - Central Santa Monica Bay
  - South Santa Monica Bay
  - Upper Los Angeles River
- Study locations will include:
  - Posted street sweeping routes
  - Other City streets
  - Controlled environment testing locations



# Study Team

- Study Lead: LASAN Watershed Protection Division (WPD)
  - Jon Ball, Environmental Affairs Officer
  - Miller Zou, Environmental Supervisor II
  - Bryan Truong, Environmental Supervisor II
- Study Partner: StreetsLA
  - Coordinating with staff on work plan development, study implementation, and interpretation of results.
- Study Support: LWA
  - Prior experience in street sweeper testing
  - Currently supporting LASAN with implementation of first phase of Study





# Study Details: Problem Statement

- Urban streets accumulate “street dirt” containing a variety of pollutants
  - Metals, PAHs, PCBs, pesticides, and more
- Street sweeping can be highly effective and cost-efficient at removing pollutants, if conducted with pollutant removal in mind
- Pollutant removal by street sweeping can be improved by:
  - Sweeping with the best technologies and approaches
  - Sweeping streets with the highest pollutant loads
  - Sweeping at the right times and frequencies
- **Local data is needed to identify and support improved street sweeping pollutant removal**







# Study Details: Objectives and Outcomes

- Objective: Increase pollutant removal via street sweeping by addressing the following questions:

Study Questions		Expected Outcomes
<b>How to Sweep?</b>	<ul style="list-style-type: none"><li>• Which equipment is most effective?</li><li>• What is the most efficient operating speed?</li></ul>	<ul style="list-style-type: none"><li>• Inform sweeper selection</li><li>• Inform target operating speeds</li></ul>
<b>Where to Sweep?</b>	<ul style="list-style-type: none"><li>• Where is pollutant loading on street surfaces highest?</li></ul>	<ul style="list-style-type: none"><li>• Inform prioritization of areas with high pollutant load</li></ul>
<b>When to Sweep?</b>	<ul style="list-style-type: none"><li>• How frequently should streets be swept?</li><li>• When should streets be swept for greatest water quality benefit?</li></ul>	<ul style="list-style-type: none"><li>• Inform sweeping frequency for greater efficiency</li><li>• Inform targeted sweeping at particular times of year</li></ul>



# Study Details - Methodology

## Task 1: Compilation of Existing Data

- Inform design of subsequent tasks (e.g., site selection)
- Data Types: Sweeping routes, street conditions, land use, traffic volume

## Task 2: Sweeper Effectiveness Testing

- Evaluate pollutant removal efficiencies of existing mechanical sweepers and potential new sweepers (e.g., regenerative air, vacuum, electric)
- Controlled environment and real street testing

## Task 3: Street Dirt Characterization

- Sample sites representing varied land uses, traffic volumes, times of year
- Measure pollutant concentrations, loadings, and accumulation rates

## Task 4: Reporting

- Annual status memos and final report summarizing results
- Communication tools and data products to inform street sweeping implementation

## Task 5: Project Management

- Includes coordination w/ StreetsLA



# Study Details – Relationship to Other Studies

- Previous Studies
  - City of San Diego (2008-2014), Cities of Burbank and Glendale (2011)
  - Demonstrate potential for improved pollutant removal via street sweeping
  - Lacking current, site-specific data needed to inform City's program
- Ongoing Studies
  - SMC: Focused on quantifying impact of street sweeping on runoff quality
  - City of Santa Barbara: Focused on microplastics
  - Objectives of existing studies are complementary
  - City has reached out to discuss potential collaboration







# Cost & Schedule

Phase	Description	Cost	Completion Date
1	Work Plan Development	\$15,000	10/1/2024
1	Task 1: Compilation of Existing Data	\$15,000	10/1/2024
1	Task 2.1: Sweeper Effectiveness Testing – Controlled Environment	\$70,000	10/1/2024
2	Task 2.2: Sweeper Effectiveness Testing – Real Streets	\$400,000	11/1/2025
2	Task 3: Street Dirt Characterization	\$467,000	11/1/2026
2	Task 4: Reporting	\$93,000	9/30/2027
2	Task 5: Project Management	\$20,000	9/30/2027
<b>Total Study Cost</b>		<b>\$1,080,000</b>	
<b>Total SCWP Funding Requested</b>		<b>\$975,000</b>	

**Phase 1**  
*Funded by: City of LA*  
*Subtotal: \$105,000*

**Phase 2**  
*Funded by: SCWP*  
*Subtotal: \$975,000*



# Funding Request

WASC	Year 1	Year 2	Year 3	Total
CSMB	\$71,200	\$80,990	\$21,360	\$173,550
SSMB	\$46,400	\$52,780	\$13,920	\$113,100
ULAR	\$282,400	\$321,320	\$84,720	\$688,350
<b>TOTAL</b>	<b>\$400,000</b>	<b>\$455,000</b>	<b>\$120,000</b>	<b>\$975,000</b>



# Summary of Benefits

- Identification and support for potential enhancements to the City's street sweeping program
  - Potential to inform street sweeping by other agencies
- Greater recognition, support, and use of street sweeping as a tool for improving water quality, resulting in:
  - Greater pollutant removal, leading to improved water quality (and potentially air quality)
  - More cost-effective attainment of water quality priorities
- Data on pollutant loading from streets that can support other stormwater program elements:
  - Selection, design, and placement of BMPs
  - Water quality modeling





A person is seen in profile on the left, pointing towards a whiteboard covered in sticky notes. The room is dimly lit with blue light from a window with blinds. The sticky notes contain various handwritten notes and diagrams. A semi-transparent white banner is overlaid across the middle of the image.

**Questions?**

**Jon Ball**  
**e-mail**