

TRANSFORMING IDEAS INTO SOLUTIONS

Research Results

Environmental April 2025

> Project Title: Evaluating Roadway Trash and Migration to Receiving Water

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Task Manager:

Simon Bisrat Senior Environmental Planner simon.bisrat@dot.ca.gov



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Evaluating Roadway Trash and Migration to Receiving Water

This task will obtain information on trash generation and discharge from Significant Trash Generating Areas (STGAs) to determine the effectiveness of selected controls and demonstrate full trash capture efficiency.

WHAT WAS THE NEED?

Prior to this study, there was insufficient information on trash discharge loads from various types of STGAs and how these loads correlate with trash loads in the California Department of Transportation (Caltrans) right-of-way (ROW). On-land visual trash assessment methods, which estimate trash loads based on staff site-survey observations, were proposed as a cost-effective way of demonstrating monitoring-compliance. Additional information was required to determine the usefulness of on-land visual trash assessment for estimating trash loads in the Caltrans ROW. The State Water Board Resolution 2015-0019 amended the Water Quality Control Plan for Ocean Waters of California and the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California to include trash-related requirements, referred to as the Trash Provisions. Caltrans' National Pollutant Discharge Elimination System (NPDES) permit orders compliance with the requirements of these Trash Provisions. Caltrans' NPDES Permit requires Caltrans to implement trash control measures at all STGAs within its ROW. Caltrans may implement one of the following tracks at each STGAs with Track 1 designated as full capture systems and Track 2 as any combination of full trash capture systems, multi-benefit projects, other treatment controls, and/or institutional controls. The Trash Provisions do not require monitoring at Track 1 implementation sites. Monitoring is, however, required at Track 2 implementation sites to demonstrate full capture systems. However, experience in the San Francisco Bay Region suggests there are significant limitations to Track 1 implementation and, Track 2 implementation will need to be considered at many STGAs. Caltrans' Permit requires Caltrans to demonstrate full capture systems at all STGAs with Track 2 implementation. To demonstrate full capture systems, Caltrans needed to show

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Assessment of Paved Road Dust Emissions (Road Dust) Modeling



that the trash load that is reduced is equivalent to the trash load that would be reduced if full capture systems were installed, operated, and maintained.

WHAT WAS OUR GOAL?

The overall goal of this study was to obtain information on trash generation and discharge from STGAs to determine the effectiveness of selected controls and demonstrate full trash capture efficiency.

WHAT DID WE DO?

This study first involved identifying eight STGA monitoring sites under Caltrans Permit with implement one of the following tracks at each STGAs with Track 1 designated as full capture systems Track 2 management and then installing temporary trash capture netting in stormwater drainage. Secondly, the study performed on-land visual trash assessments prior to and following eleven significant rainfall events (>0.5 inches in 24h), over three years, as well as one summer for dry-weather monitoring. The study determined general trash accumulation levels and trash discharge rates (gallons per acre per year) in stormwater for each site. With this data, the study compared trash results with existing State Water Board trash monitoring data and trash generation data collected in San Francisco Bay area and literature.

WHAT WAS THE OUTCOME?

This study first demonstrated the efficacy of onland visual trash assessments, which may not be an appropriate measurement tool for every Caltrans STGA but may be utilized further for monitoringcompliance. Although the study observed some trash accumulation fluctuations due to factors such as stormwater flows, trash removal, littering, wind transport, trash buildup in roadside vegetation, rain events did not significantly impact trash accumulations. In other words, STGAs were not cleaner or dirtier, post precipitation. The results also showed that 54% of the STGAs scored B ratings, using an inverse letter-grading system (i.e. an A and D ratings associated with low and high trash presence, respectively) indicating a moderate level of trash presence. In addition, the study observed the effectiveness of trash pickup and street sweeping maintenance activities. On average, trash volume generated at a rate of 0.04 - 0.9 gal/ac per event, or a corresponding annual trash generation rate of 2.3 to 41.6 gal/ac/yr in stormwater drainage areas. These data are among the first documented for trash discharged from various types of SGTAs within the Caltrans rights of way.

WHAT IS THE BENEFIT?

These results constitute a scientific and defensible documentation of trash discharged from various types of STGAs within the Caltrans ROW. The study allows Caltrans to justify to the Water Boards the extent of effort that should be acceptable for meeting the Trash Provisions. This advances Caltrans efficient use of limited funding available to comply with the NPDES permit. The study further demonstrates that not all observed trash in the ROW accumulates in waterways or necessarily violates NPDES permit and conditions.

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https://dot.ca.gov/-/media/dot-media/programs/ research-innovation-system-information/documents/ final-reports/5task3-1-dor-guidance.pdf

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