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Caltrans Division of Research, Innovation and System Information

Research Results

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.

Environmental

March 2022

Project Title:
Evaluating Roadway Trash and Migration to Receiving Water - TO1

Task Number: 3784

Start Date: January 2, 2021

Completion Date: December 31, 2023

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WHAT WAS THE NEED?

There is currently insufficient information on trash discharge loads from various types of Significant Trash Generating Areas (STGAs) and how these loads correlate with trash loads that are present in the Caltrans right-of-way (ROW). On-land visual trash assessment (OVTA) methods, which estimate trash loads based on visual assessments, have been proposed as a cost-effective way of demonstrating compliance. Additional information is required to determine the usefulness of OVTA for estimating trash loads present in the Caltrans ROW. OVTA may not be an appropriate measurement tool for every Caltrans STGA because of limitations to control and mitigate trash generation on the Caltrans landscape. 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 system equivalency (FCSE).

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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 FCSE at all STGAs with Track 2 implementation. To demonstrate FCSE, Caltrans will need to show 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 is to obtain information on trash generation and discharge from STGAs to determine the effectiveness of selected controls and demonstrate full trash capture efficiency. Specific objectives include:

- Establish average baseline trash discharge rates for various types of STGA sites and site characteristics
- Categorize trash levels at the STGAs through on-land visual trash assessments
- Correlate the results of on-land visual trash assessments with measurements of actual trash discharge rates
- Assess how much trash seen within the Caltrans ROW discharges
- Use monitoring information to improve the current approach for identifying STGA areas and sizing of full capture systems (e.g., GSRDs)

WHAT DID WE DO?

This Task involved the following activities:

- Identified potential monitoring sites representative of each STGA in Caltrans' Permit
- Installed temporary or permanent full capture systems at selected potential monitoring sites that do not have such systems
- Performed OVTAs prior to and following each targeted significant rainfall event (>0.5 inches in 24 h). Three storm events are monitored at each site.
- Determined average OVTA levels and trash discharge rates (gallons per acre per year) for each site and for the various STGAs.
- Compared trash generation results with existing IMMS data and MS4 trash generation data collected in San Francisco Bay area and literature

WHAT WAS THE OUTCOME?

The purpose of this study was to determine how much trash, as observed in various Caltrans ROW areas, is discharged with stormwater runoff. Due to the study timing, an initial dry weather monitoring effort was conducted during the summer of 2021 to establish baseline information about trash volumes and movement. The initial results indicate that wind transport and littering from passing vehicles were the primary contributing sources of trash on roadway areas. Also, wind or gusts created by passing vehicles were a prominent force in moving trash along roadways. Trash was observed in higher volumes on roadways with higher traffic volumes. In the non-roadway right of way areas, the primary factor contributing to higher trash volumes was dumping near homeless encampments.

Specific trash items and quantities were observed to move and change between field visits, but it was also common to see no movement of previously deposited trash items depending on the weight and entanglement in vegetation. These results are based on a four-month dry period. It is recommended that a longer-term dataset, that also includes wet weather monitoring, be developed to further assist in identifying and characterizing trends in trash generation and migration.

WHAT IS THE BENEFIT?

The results will be a scientific and defensible documentation on trash discharged from various types of STGAs within the Caltrans ROW. The study will allow Caltrans to justify to the Water Boards the extent of effort that should be acceptable for meeting the Trash Provisions. This will allow efficient use of limited funding available to comply with the NPDES permit. Caltrans will also be able to demonstrate that not all trash that is seen on our ROW has the potential to reach a receiving water or violate NPDES permit and conditions. The results will help Caltrans avoid enforcement actions and fines due to violation of the Trash Provisions. Comparison of trash generation data collected during this study with Maintenance trash control data will allow Caltrans to leverage data that maintenance already collects and use it for demonstrating compliance. This will help avoid having to implement other costlier measures for trash control.