Tobacco Product Waste in the Kendall-Frost Marsh Reserve Drainage Area



Michael Vingiello¹; Gunnar Wooldridge¹; Kris Tran¹; Lydia Greiner¹; Georg Matt¹ ¹Center for Tobacco and the Environment, San Diego State University, San Diego California

Introduction

- Tobacco product waste (TPW) is the discarded material from tobacco consumption including cigarette butts, cigar butts, cigarillos, tobacco packaging, electronic cigarettes, and multiple-use items.^{1,2}
- Previous research indicates that littered TPW has environmental consequences, including disintegration of microplastics and leaching of heavy metals, carcinogens, and nicotine into soil and water.^{3,4,5}
- This project aims to quantify TPW in the drainage area of Kendall-Frost Marsh Reserve between intermittent rain cycles which potentially contributes to the pollution from TPW of the Reserve and Mission Bay.⁶



Methods

Design

- GIS software was used first to map a stratified random sample (n=29) of 138 storm drains that flow into Mission Bay at the Kendall-Frost Marsh Reserve (Fig. 1) and then TPW (Fig. 2).
- Survey areas of interest were proximal to the storm drains with debris that is likely to be washed into the storm drain during a rain event.
- Survey areas adjacent to the storm drains were demarcated in the field from the middle of the street to the inside edge of the curb strip, from the left and right of the storm drain to the nearest intersection.
- We used a repeated measures design to collect 5 rounds of TPW data and 4 rounds of soil and water samples around 3 rain events (Fig. 3).

Soil and Water Testing

- We monitored forecasts for rain events ≥ 0.25 inch; after a rain event, a team collected soil and water samples at Noyes and Olney Street drainage outlets into Kendall-Frost.
- Samples were then analyzed at the environmental chemistry laboratory to measure nicotine and cotinine levels.

Continued Identification, Collection, and Mapping

• Trained research staff and student assistants to follow sampling protocol to record and collect TPW in street and gutter areas (Fig. 4).





- stormwater system during a 5-week period.
- are a prohibitively costly option.







Conclusion

• We project 22,957 TPW items in 5 weekly survey rounds in the drainage area, with each item containing between 0.1 to 0.3 mg of nicotine; that is a total of 2,295 to 6,887 mg of nicotine flushed into the

Clean-ups have clear short-term impacts that disappear after 3 weeks.

• After disrupting the initial steady state of TPW, weekly clean-ups may lead to a continued lowering of the amount of TPW in streets, but they

• To have a more permanent impact, upstream solutions need to be implemented such as a ban on plastic filters in cigarettes, denormalizing throwing away tobacco products, and requiring corporate social responsibility around prevention and removal of TPW.

This project is funded by funded by the Tobacco-Related Disease Research Program #T33PC6863