Data Sprint

Advanced Data Science
Term 1
2019

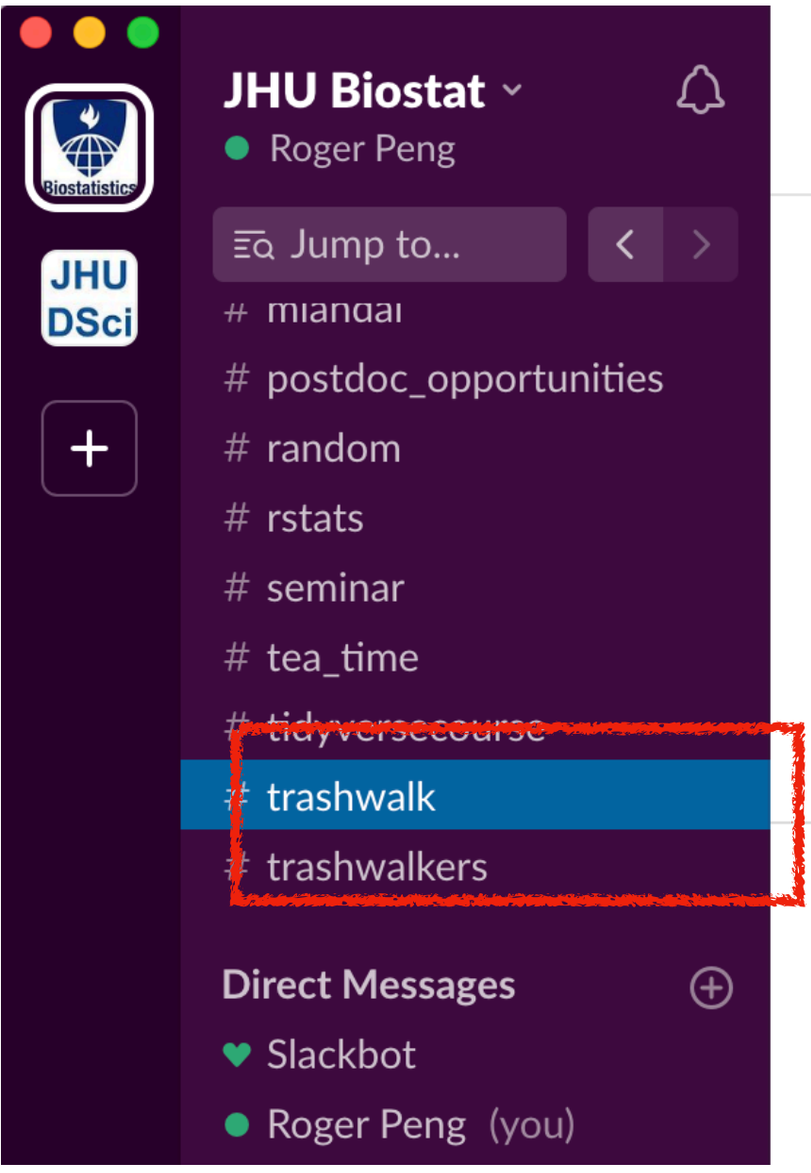
Reducing Litter in Baltimore City

Trump Tweets On 'Disgusting' Baltimore Bring Activist Trash Collectors To City

BRAKKTON BOOKER · AUGUST 15, 2019

Volunteers clear an alley strewn with trash near Fulton Avenue in Baltimore on Aug. 5. Another group was in the city Thursday doing similar cleanup. (Baltimore Sun/TNS via Getty Images)

Response!


JHU Biostat
Roger Peng
Jump to...
postdoc_opportunities
random
rstats
seminar
tea_time
trashwalk
trashwalkers
Direct Messages
Slackbot
Roger Peng (you)
#trashwalk
7 | 0 | Add a topic
#trashwalk
@Scott created this channel on July 19th. This is the very beginning of the #trashwal
health nuisance in Baltimore; walk the #trashwalk, don't talk the trashtalk. Get exercis
(edit)
+ Add an app
Add people to this channel
Friday, July 19th
Scott 4:31 PM
joined #trashwalk.
Scott 4:31 PM
set the channel description: Trash is a public health nuisance in Baltimore; walk the #trashwal

WINNER

2016 Abell Award in Urban Policy

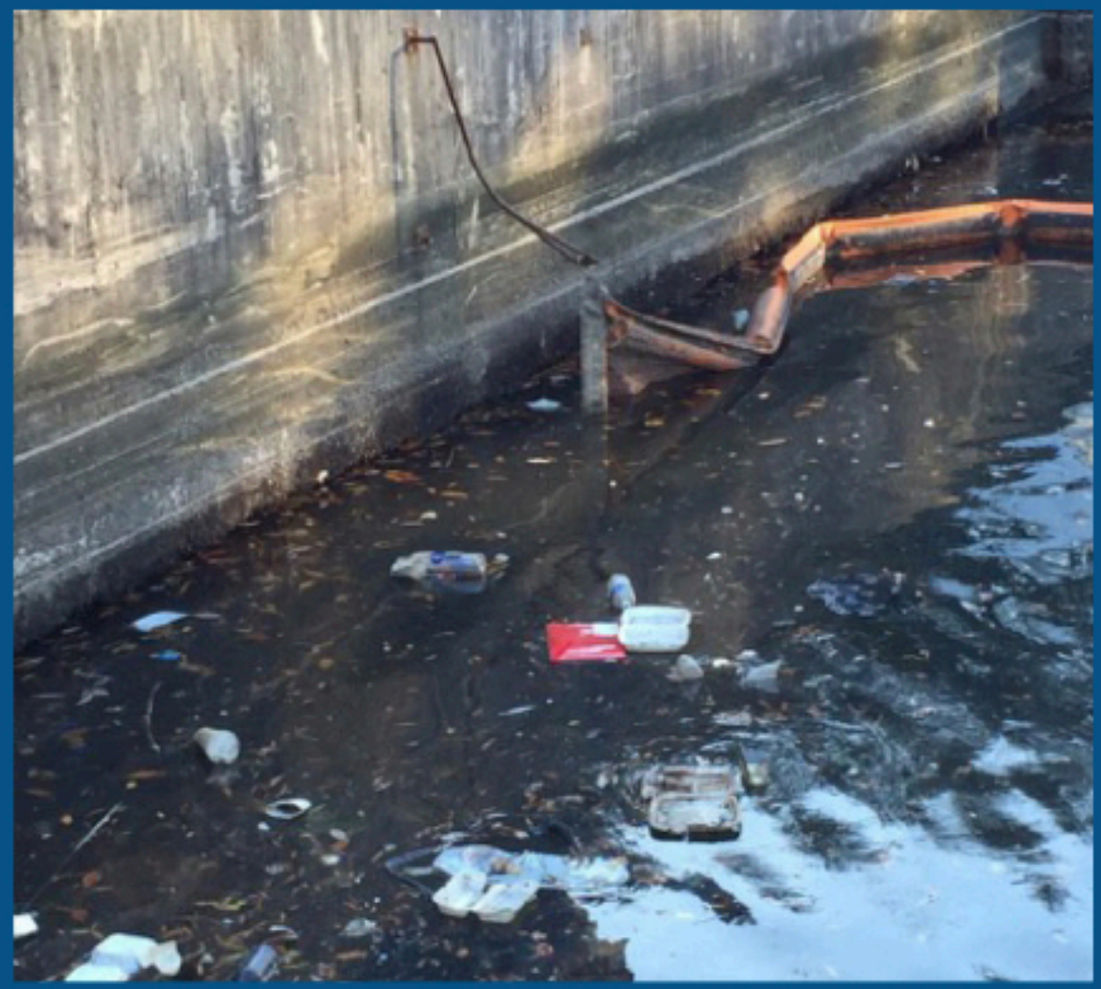
Litter-Free Baltimore:

A trash collection policy framework based on spatial analysis and social media

Christopher Kelley
Johns Hopkins University
PhD, Department of Geography & Environmental Engineering

Ramya Ambikapathi
Johns Hopkins Bloomberg School of Public Health
PhD, Program in Human Nutrition

August 2016



http://abell.org/publications/winner-2016-abell-award-urban-policy-1

Study Methods

- Spatial analysis of potential litter sources and 311 calls
- Transect surveys of street trash cans along four Baltimore street corridors
- Phone interviews with 7 stakeholder organizations
- Online survey of Baltimore City residents (319 respondents)

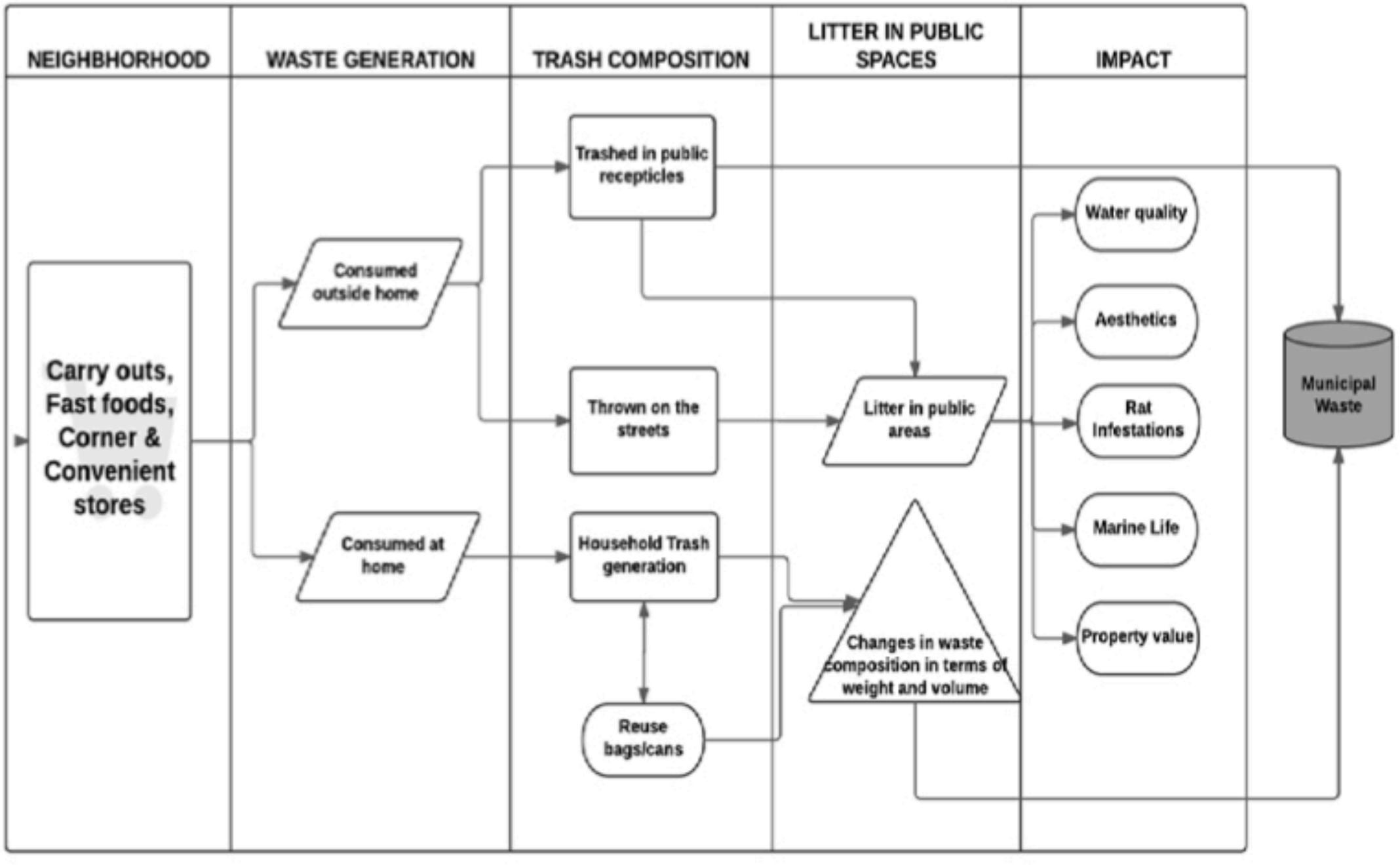
Trash vs. Litter

- **Trash** = any municipal solid waste
  - Residential
  - Non-residential
- **Litter** = trash that is improperly discarded

Sources of Litter

- Food deserts
- Carry-outs / corner stores / convenience stores
- Schools (middle / high)
- Illegal dumping
- Insufficient street trash cans

Trash and Litter Generation



http://abell.org/publications/winner-2016-abell-award-urban-policy-1

Some Consequences

- Property values
- Sewer blockage
- Chesapeake Bay pollution
- Rats

Baltimore 311 Call Data (District 4)

District 4 Trash 2015 COMMUNITY

Based on 311 Customer Service Requests

(No description provided)

More Vie

ServiceRequestNum	SRType	Method...	CreatedDate	SRSta...	StatusD...	DueDate	LastA
15-00389156	SW-Dirty Street	Phone	2015 May 18 09:15:10 AM	Closed	05/19/2015	05/25/2015	
15-00314635	HCD-Illegal Dumping	API	2015 Apr 22 07:02:43 AM	Closed	04/24/2015	04/25/2015	
15-00316723	SW-Dirty Street Proactive	Internal	2015 Apr 22 01:47:29 PM	Closed	04/22/2015	04/29/2015	
19-00183060	SW-Dirty Alley	Phone	2019 Apr 01 04:24:15 PM	Closed	06/06/2019	04/08/2019	
15-00532706	SW-Dirty Street	Phone	2015 Jul 07 01:21:40 PM	Closed	07/10/2015	07/14/2015	
19-00251453	SW-Dirty Street	Phone	2019 May 01 05:39:53 PM	Closed	05/02/2019	05/08/2019	
17-00685980	SW-Dirty Alley	Phone	2017 Nov 05 03:17:37 PM	Closed	11/13/2017	11/12/2017	
15-00824921	SW-Dirty Alley	Phone	2015 Oct 26 07:22:38 AM	Closed	11/02/2015	11/02/2015	
15-00824904	SW-Dirty Alley	Phone	2015 Oct 26 07:21:14 AM	Closed	11/02/2015	11/02/2015	
17-00023515	SW-Dirty Alley	Phone	2017 Jan 12 05:22:17 AM	Closed	01/17/2017	01/19/2017	
17-00023511	SW-Dirty Alley	Phone	2017 Jan 12 05:21:45 AM	Closed	01/17/2017	01/19/2017	
17-00578729	SW-Dirty Alley	Phone	2017 Sep 18 07:34:44 AM	Closed	09/29/2017	09/25/2017	
16-00286032	SW-Dirty Street	Phone	2016 Apr 20 06:31:48 AM	Closed	04/25/2016	04/27/2016	
16-00468218	SW-Dirty Street	Phone	2016 Jun 27 11:13:17 AM	Closed	06/28/2016	07/04/2016	
16-00741302	SW-Dirty Street	Phone	2016 Oct 14 11:27:01 AM	Closed	10/25/2016	10/21/2016	
15-00554174	SW-Dirty Alley	Phone	2015 Jul 14 10:37:40 AM	Closed	07/25/2015	07/21/2015	
18-00333383	SW-Cleaning	API	2018 May 08 05:21:25 AM	Closed	05/16/2018	06/07/2018	

< Previous Next >

Showing rows 1-100 out of 7,820

Table 1: Spatial analysis of "Dirty Alley or Street" 311 calls in Baltimore

Location	Buffer Distance (feet)	Number of 311 Calls	Total Buffer Area (sq. mi.)	Fraction of 311 Calls within Buffer Space (%)	Fraction of Baltimore in Total Buffer Area (%)	Relative Ratio of 311 Calls in the Indicator Buffer Area
City of Baltimore	-	10025	80.9	-	-	-
Carry-outs	200	1694	2.0	16.9	2.5	7.95
	600	5633	11.7	56.2	14.4	7.59
Schools	600	1039	4.3	10.4	5.3	2.01
	1500	6216	22.2	62.0	27.4	4.31
Bus stops	200	2514	4.3	25.1	5.3	5.95
	600	5611	36.6	55.9	45.3	1.53
Corner stores and Convenience stores	200	2248	2.63	22.42	3.25	8.60
	600	6780	14.93	67.63	18.46	9.22
Grocery stores	200	36	0.21	0.36	0.26	1.40
	600	499	1.80	4.98	2.23	2.29
Food deserts	Pre-defined regions	2392	8.9	23.9	11.1	2.51

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Figure 2: Baltimore City projected litter hot spots

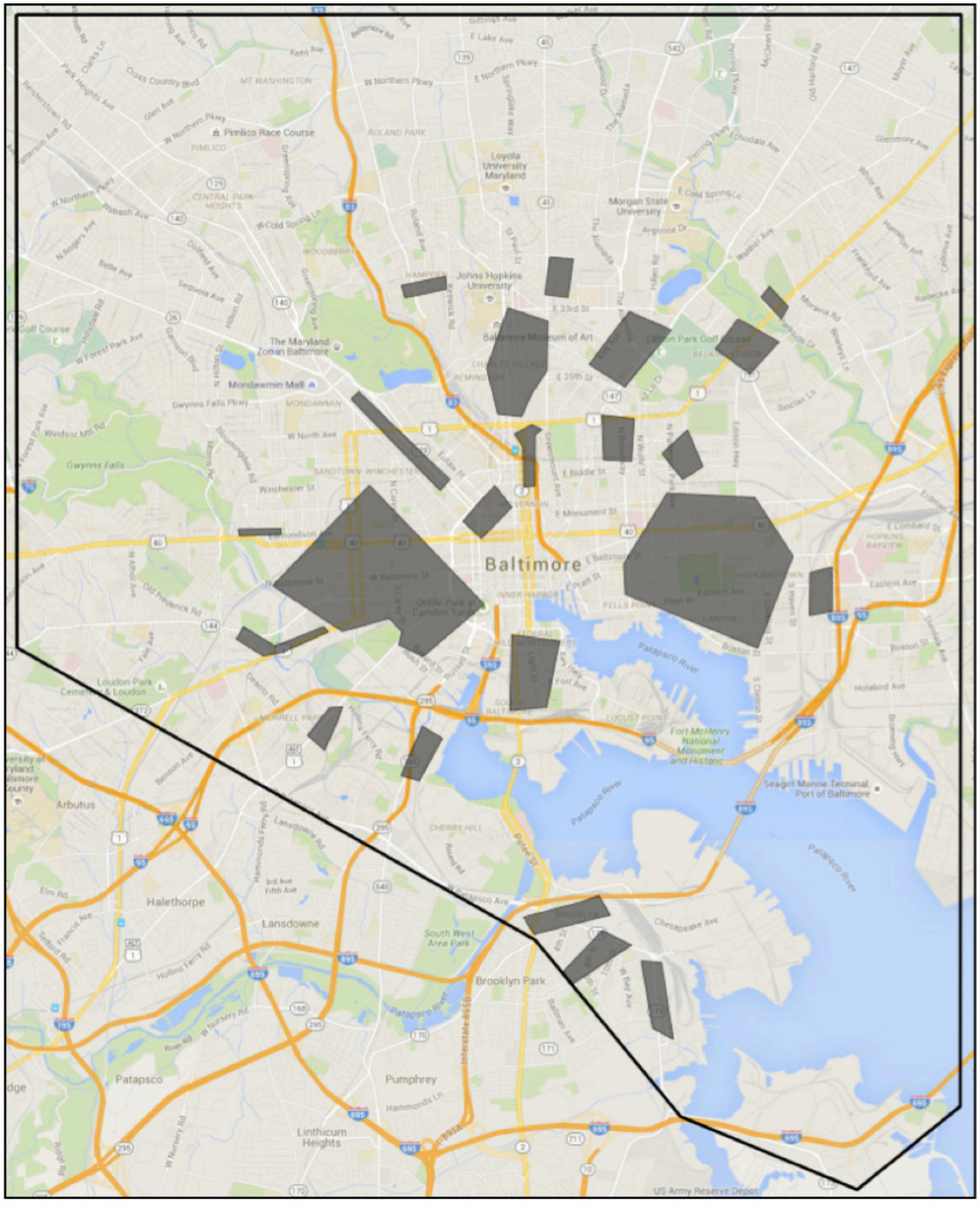


Table 2: Responses to "What could Baltimore do (better) to keep streets litter-free?"

Broad themes	% of responses	Illustrative Quote*
More trash receptacles and/ or more frequent pickups	44	"There are no trash cans anywhere in my neighborhood. My first thought would be to provide receptacles so people don't need to litter. They should be maintained by the city and emptied often. "
Target individual behavior	28	"Have a monetary fine or mandatory work service (no jail) for folks caught littering. Dramatically increase the fines so more folks choose work service. The fines go directly to efforts to clean up the city."
Education/Outreach/ Partnership	26	"HS students in Baltimore have a community service requirement for graduation (75 hours). I think at least 1 event should be required to be litter cleanup. "
Trash can with lids	10	"One major issue I see is that my neighbors do NOT secure their trash properly in bags and cans when they leave them in the alleys and sides/fronts of buildings and it ends up flying away with wind and all over the alley."
Enforce plastic bag ban	8	"Banning plastic carrying bags from grocery and liquor stores would be good."
More street cleaning	7	"Sweep more effectively and frequently with a different equipment that can reach (maybe sweepers have target weights)? Sweep on recycling days if it's windy."

*Comments that pertained to multiple themes were counted for each theme separately.

Report Recommendations

- Inventory street trash cans to identify distances between them (and add cans to reduce distance)

- Give street cans unique IDs for easier reporting via 311

- Integrate 311 with social media platforms (e.g. via hashtags)

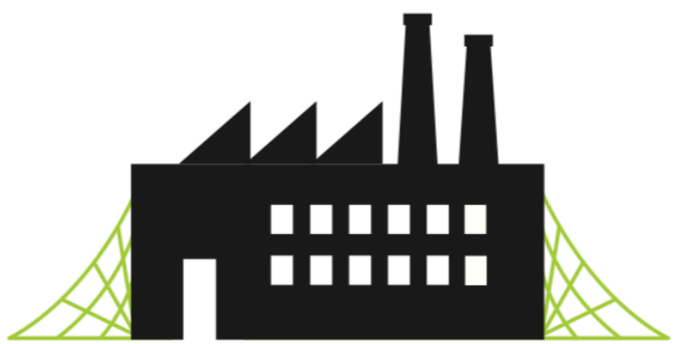
- Study trash composition to better understand sources

- Better designed street cans with narrow mouthed lids

Baltimore Master Plan ("Less Waste, Better Baltimore")

Landfill

The City-owned Quarantine Road Landfill—the only solid waste landfill in Baltimore City—is rapidly reaching its permitted capacity, with **approximately seven years remaining** at the current rate of disposal.



Waste-to-energy

The privately-owned Baltimore Refuse Energy Systems Co. (BRESCO) waste-to-energy (WTE) plant, where about 75% of the City's waste is currently handled, is aging and **may not be a viable long-term option**.

Recycling

While the City does provide a variety of recycling options, the City's **recycling rates are among the lowest in Maryland**.

https://publicworks.baltimorecity.gov/lesswaste

Benchmarking Study

- Compared to Austin TX, Charlotte NC, Charleston SC, Boston MA, Portland OR

- Policy/Regulatory Recommendations

  - Ban certain materials from landfills

  - Ban/restrict use of single-use plastics (e.g. bags, food containers)

  - Increase data collection/reporting requirements to track trash flow

https://publicworks.baltimorecity.gov/lesswaste

Data Sprint

What is a Data Sprint?

- Based on Design Sprint methodology developed by Google Ventures
- Formalized approach to converting ideas into products
- 5-day (Monday-Friday) event designed to facilitate "failing fast" by developing prototypes and testing them out
- Implementation of design thinking ideas

Data Sprint Task

- **Question**: How can we use data to reduce litter in Baltimore City?

- **Goal**: Design a product / system that can be used by people to engage in reducing litter in the City

- What existing data can we use to address this problem?

- What new data could we collect?

- Data analysis should play a role but is not the ultimate product

Data Sprint: Day 1

- Discussion of the problem / challenge
- Organization of the team and roles
- Set a long-term goal / Imagine the future
- Choose a target (Who is the critical audience/customer?)

Data Sprint: Day 2

- Present 3 potential ideas / solutions / products
- Feedback from the the group (other teams)
- Each group decides on an ultimate solution to pursue

Data Sprint: Day 3

- Pitch the final solution (10 minutes) w/special guest
- Provide a description of how a user would use the product
- What infrastructure would be required to build?
- How it would sustain itself?
- Draft budget for building prototype and running it for a year
- Detailed description of datasets to be used and how they would be incorporated and provide value

Day 1: Today!

- Organization of the team and roles: **Decider**, **Presenter**
- Discussion (20 minutes):
    - Set a long-term goal to achieve using your product / system
    - Describe / imagine the future
    - What would the impact of the product be in 6 months to 5 years?
    - How might failure occur?
    - Describe the critical audience/customer
- Presentation (5 minutes each)

Preparation for Day 2

- Find solutions from other places (with or without data)
- Develops sketches of products / systems that you propose
    - How would the user interact with the product?
    - What would the flow of their experience be?
    - How would the product collect / present data?
- Bring 3 sketches to class on Monday (each on 8x11 inch paper)