

# Recycling Accuracy and Contamination of the Blue and Green Refuse Districts in Binghamton, NY

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## Introduction

- Household curbside recyclable contamination has increased in Broome County, prompting hauler complaints and customer notifications (Broome County, 2018).
- Historically, a large portion of paper and plastic recyclables from the United States has been sold to China. However, China has recently created stricter standards for accepting recyclables from the US due to increased contamination from materials, most commonly plastic bags, Styrofoam and leftover food (Broome County, 2018).
- Contaminated recyclables result in increased costs for municipalities due to material processing and landfill fees (Broome County, 2018). These costs could impact residents through increased local taxes.
- The City of Binghamton mandates all residential garbage must be placed in Official City Garbage Bags at a cost of \$6.95 per (5) 30 gallon bags. Recycling is free for all City residents and is managed by the Broome County Solid Waste Management Division (Recycling, 2018).
- There is little research investigating the relationship between neighborhood characteristics and recycling accuracy at the district level.

## Hypothesis

- Recycling contamination will correlate with district characteristics including median age, household income and home value.
- Garbage will be the most common contaminant in recycle bins.

## Methods

- Used random sampling to collect contents of (10) residential 32 gallon Broome County recycling bins from each of the East and West Refuse Districts the night before collection
- Sampled districts based on differences in age, income, and home value
- Sampled locations with trash bag or trash can present to signify conscious resident choice in material disposal
- Measured findings by weight, material, contamination type, and quantity
- Compared findings between districts
- Analyzed findings with residential recycling resources, Broome County Recycling Brochure and Broome County Recycling website

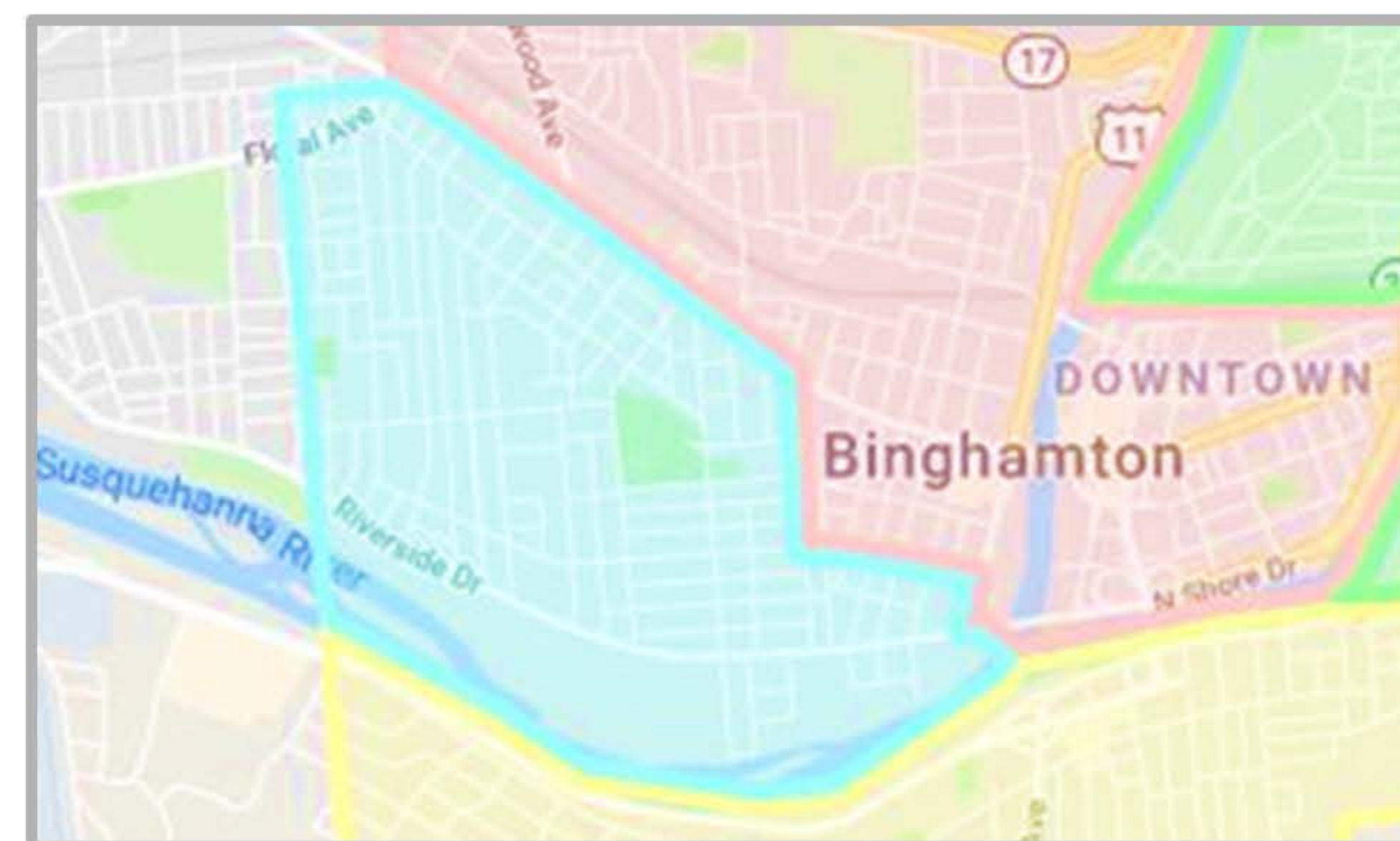


Bin sample example, Green District



Sample sorting, Blue District

## Blue Refuse District Attributes



Source: <http://www.binghamton-ny.gov/sanitation>

The Blue Refuse District is located directly south of Binghamton's North Side and borders the Downtown neighborhood. The 2013 estimated median household income is \$60,191 and a median age of 37.1. More residents in this district have Bachelor's or graduate degrees than in any other in Binghamton. The 2013 estimated ESRI median value of owner-occupied units in the neighborhood is \$134,752, the highest in the City (Blueprint Binghamton, 2014).

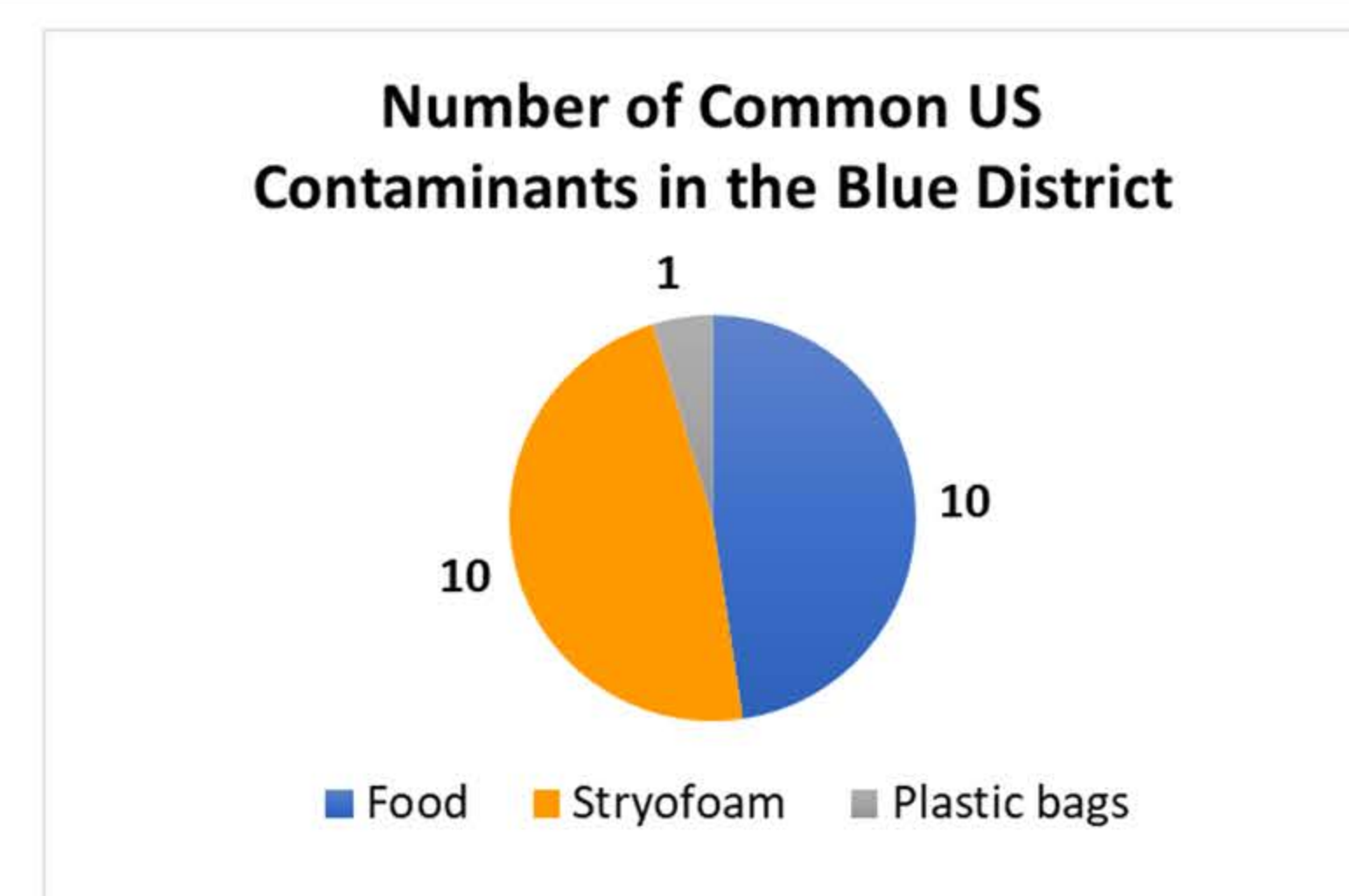
## Blue District Accuracy

**9 out of 10 recycle bins contained contaminants.**

Blue Recycle District	Weight in Pounds	% of total Weight	# of Bins	# of Pieces
<b>Recyclable</b>	<b>59.8</b>	<b>91.2%</b>	<b>10</b>	<b>132*</b>
Paper	32.4	49.4%	9	X
Plastic	8	12.2%	10	96
Glass	18	27.4%	3	14
Metal	1.2	1.6%	6	15
Aspetic			3	7
<b>Contamination</b>	<b>6.2</b>	<b>8.8%</b>	<b>9</b>	<b>58</b>
Recyclable, contaminated	0.4	0.6%	4	11
Garbage	5.4	8.2%	9	47
<b>Total Collected</b>	<b>65.6</b>			

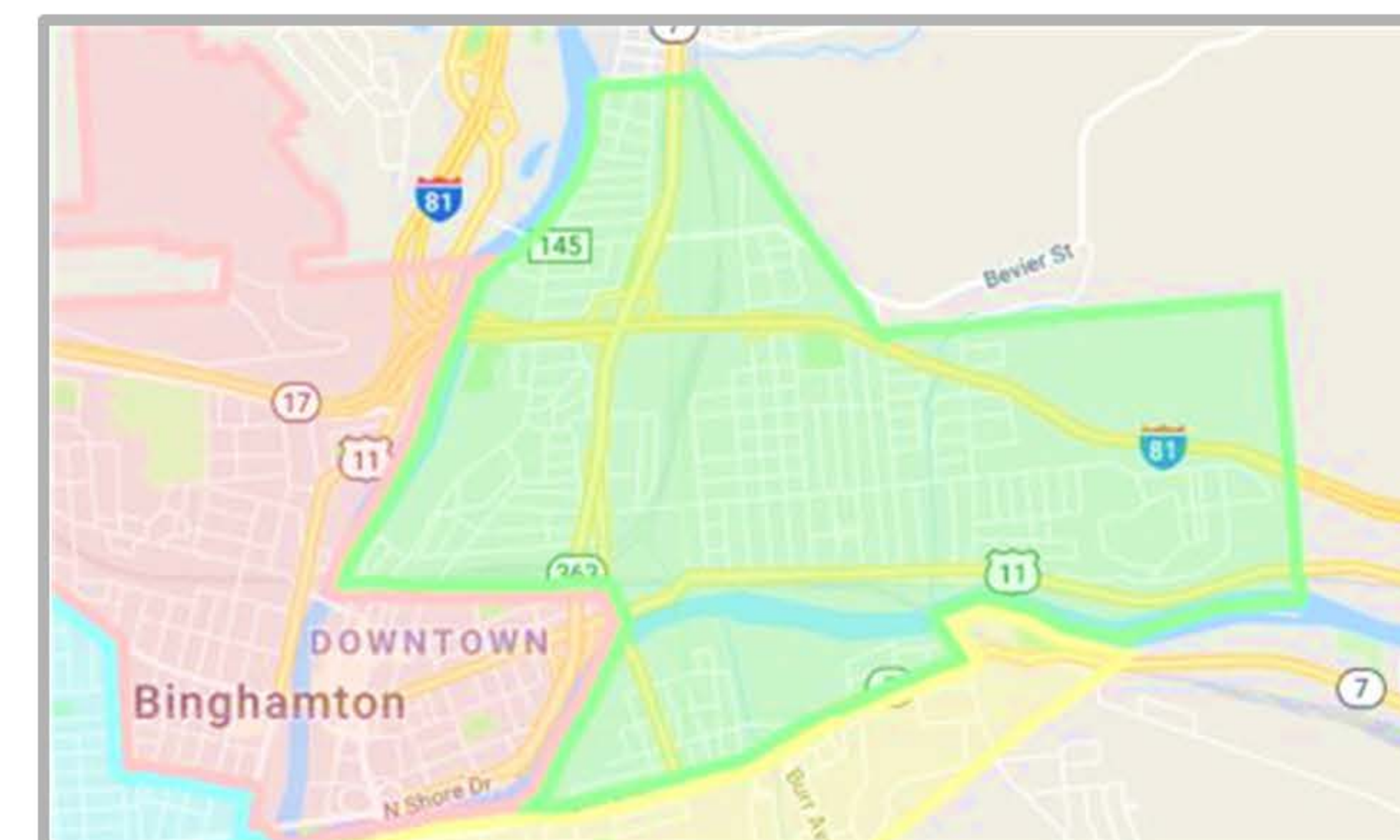
\*Does not include number of paper pieces.

## Blue District Contamination



Three bins contained food contamination, three bins contained Styrofoam, and one bin contained a plastic bag. Styrofoam was labelled recyclable #6. Hazardous contamination included a container of medication and a partially-full aerosol can.

## Green Refuse District Attributes



Source: <http://www.binghamton-ny.gov/sanitation>

The Green Refuse District is located directly east of Binghamton's North Side and borders the Downtown neighborhood. The 2013 estimated median household income is \$35,685 and the estimated median age is 42.5, the highest in the City. Since 2000, the occupied housing unit rate has declined and vacancy rates have increased to 11.5 percent. ESRI's 2013 estimate of median value of owner-occupied home is \$92,761 (Blueprint Binghamton, 2014).

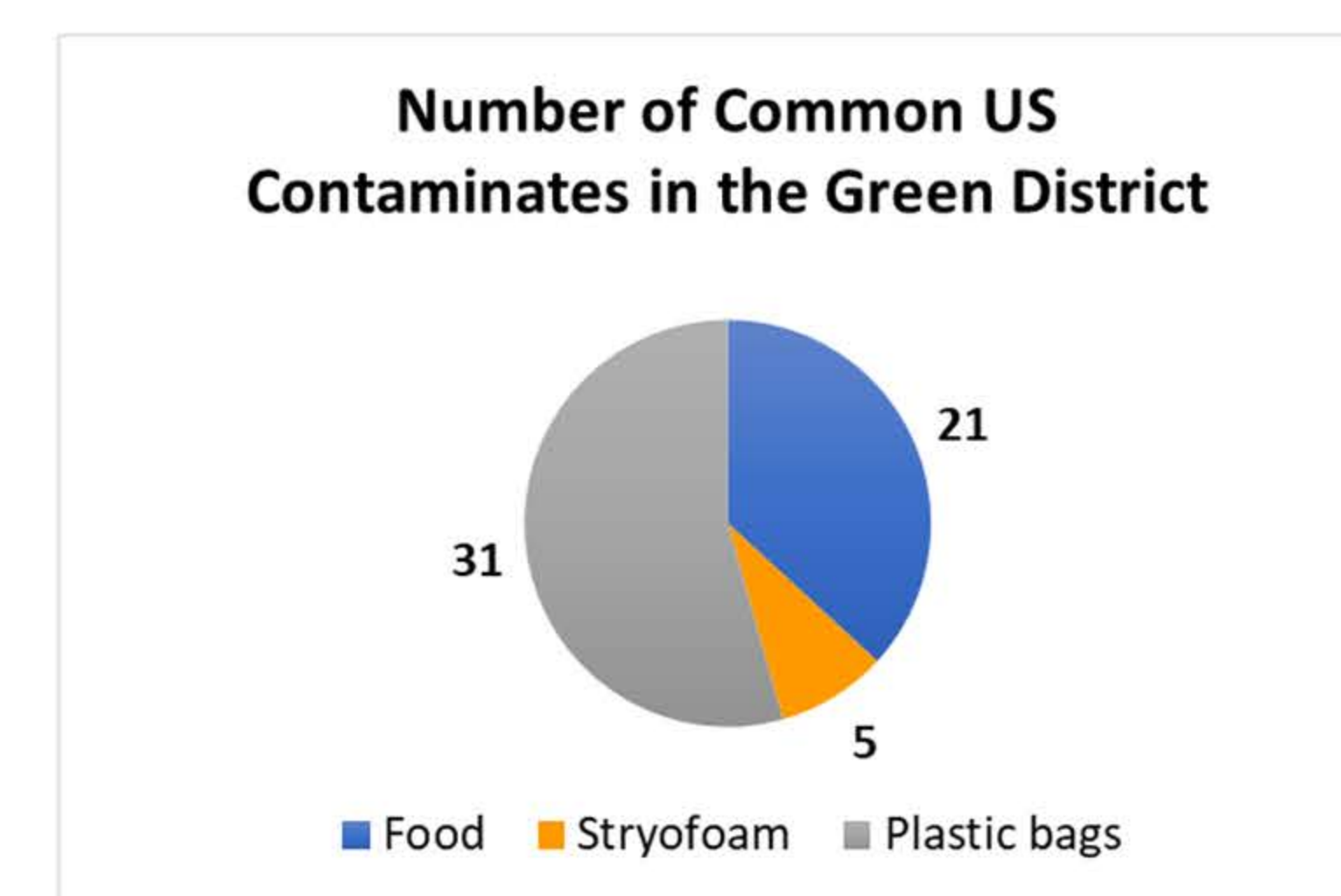
## Green District Accuracy

**8 out of 10 recycle bins contained contaminants.**

Green Recycle District	Weight in Pounds	% of total Weight	# of Bins	# of Pieces
<b>Recyclable</b>	<b>63.8</b>	<b>92.7%</b>	<b>10</b>	<b>115*</b>
Paper	41.8	60.8%	9	X
Plastic	7	10.2%	10	68
Glass	13.8	20.1%	5	9
Metal	1.2	1.7%	7	35
Aspetic			1	3
<b>Contamination</b>	<b>5</b>	<b>7.3%</b>	<b>8</b>	<b>142</b>
Recyclable, contaminated	1.8	2.6%	6	52
Garbage	3.2	4.7%	7	90
<b>Total Collected</b>	<b>68.8</b>			

\*Does not include number of paper pieces.

## Green District Contamination



Six bins contained food contamination, two bins contained Styrofoam, and six bins contained plastic bags. Styrofoam and some plastic bags were labelled recyclable #6. Hazardous contamination included nine batteries, three used bandages, and eight razors.

## Analysis

**Part I:** Findings show the majority of both district samples erroneously recycle. No correlation was found between district characteristics and the frequency of accurate bin recycling. Although the Blue Refuse District had fewer instances in pieces of contamination, it exceeded the Green Refuse District in contamination weight. Garbage was the most common contaminator; however, economic incentive of pay-per-use garbage bags could be theorized.

**Part II:** Analyzing the Broome County Recycling Guide and website revealed that residential recycling guidance put out by the County is not clear, specific, and leaves too much room for resident interpretation. For example, some Styrofoam trays were labelled recyclable #6, however, are not accepted by the County. Common contamination issues are not emphasized. There is no County guide to plastic bag recycling locations.

*Terms like "heavily soiled" and "wax covered, can scrape off with your fingernail" are open to interpretation, potentially leading to recycling error.*



Source: <http://www.gobroomecounty.com/solidwasterecycling>

## Discussion

- There are District differences in contamination behavior, however motivation remains unclear
- Broome County needs more studies on resident recycling knowledge, equity, and relationship to refuse behavior
- Broome County needs to enhance residential resources and communication for more accurate recycling
- Benefits of accurate recycling should be highlighted

## Volunteer Acknowledgement

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## Literature Cited

Blueprint Binghamton: Moving Forward. (2014). Retrieved from [http://www.binghamton-ny.gov/sites/default/files/u119/01\\_Executive\\_Summary\\_BlueprintBinghamton.pdf](http://www.binghamton-ny.gov/sites/default/files/u119/01_Executive_Summary_BlueprintBinghamton.pdf)

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