WASTE CHARACTERIZATION STUDY

CITY OF SAN ANTONIO
SOLID WASTE MANAGEMENT DEPARTMENT

Highlights

SW-M00801a • 05-2020

Waste Characterization Study

Executive Summary

Introduction

The City of San Antonio's (The City) Solid Waste Management Department (SWMD) completed the City's first ever waste characterization study in December 2018. The study included hand-sorting through garbage to gather data on the composition of the City's single-family residential garbage stream. In addition, SWMD staff gathered data to provide the composition of the bulky curbside stream. Combined, these revealed how much recyclable and compostable material was being discarded as garbage. The study was completed on an ambitious scale with a thorough methodology to guide future programs in waste diversion.

The SWMD serves over 360,000 single-family residential households across San Antonio. Services include weekly curbside collection of recycling, organics, and garbage; twice per year curbside collection of brush and twice per year curbside collection of bulky materials; and drop-off facilities for brush, bulky, and household hazardous waste (HHW).

The data from this study and report will be used to develop future strategic plans and support Citywide sustainability efforts.

Project Overview

The study was designed in collaboration with MS Engineering, Cascadia Consulting Group, and MSW Consultants. It was conducted in two parts:

- **Single-Family Residential Garbage:** Garbage generated by single-family residences located within City limits and served by the SWMD. Material is collected from curbside carts on a weekly basis.
- **Bulky Curbside:** Bulky materials generated by SWMD customers. A limited range of waste materials are accepted in the bulky waste pile, which include materials such as fencing, furniture, mattresses, and toilets. Bulky piles are collected from households twice per year.

The garbage stream study was conducted over two weeks in December 2018. Samples were collected from each of the City's ten Council Districts, totaling 200 samples. A total of 24 tons were hand-sorted into 42 material types organized into seven major categories.[1]

The bulky stream study was conducted over a single bulky collection cycle from August to October 2018. A team of SWMD staff assessed the volume and composition of bulky piles set out in front of residents' homes throughout the City.

Study Results

Garbage stream and bulky stream results are presented separately. Results presented in tables and graphs are rounded to the nearest tenth or hundredth for percentages and whole numbers for tons. For example, the total garbage collected for FY 2019 is presented as 313,548 but the precise number is 313,547.77. Therefore, if the values as shown are used to replicate calculations, the resulting number may vary slightly from actual numbers.

[1] Major categories: organics, paper, plastic, metal, glass, HHW, and landfill.

Brown Cart Summary Results

Citywide study results of the garbage stream indicated approximately 33 percent of the material placed in the brown carts was actual garbage material and not accepted in the City's blue recycling cart or green organics cart programs. The remaining 67 percent were materials that could theoretically have been recycled (21.2 percent), composted (45.1 percent), or recovered from household hazardous waste (0.8 percent). However, that would require every resident to fully participate in the City's diversion programs without any mistakes.

Brown Cart Landfill Content

Citywide Results by Material

Material	%	Tons
Landfill	**32.8%**	**102,707**
Disposable Diapers	5.3%	16,635
Other Materials	4.9%	15,284
Non-Recyclable Plastic Film	4.9%	15,224
Animal Feces	2.8%	8,893
Textiles: Clothing	2.1%	6,460
Liquids	1.9%	5,856
Rigid Plastics	1.8%	5,532
Composite Paper	1.7%	5,332
Textiles: Non-Clothing	1.7%	5,229
Construction Debris	1.5%	4,727
Non-Recyclable Aluminum	0.9%	2,849
Wood: Treated/Processed	0.9%	2,792
Composite Glass	0.8%	2,389
Shoes/Rubber/Leather	0.7%	2,335
Small Appliances	0.4%	1,351
Medical	0.3%	928
Remainder/Composite Metal	0.2%	661
Explosives	0.1%	231
HHW (Landfill)	**0.2%**	**667**
Other HHW	0.2%	558
Pesticides	0.0%	110

Examples of Materials

Plastic Film: Chip bags, candy wrappers, dry cleaning bags, balloons, and Ziploc® bags.

Rigid Plastics: Lawn furniture, toys, flower pots, plastic car parts, plastic food storage containers, and plastic hangers.

Composite Paper: Paper that is not recyclable or compostable such as pet food bags with plastic liner or photographs.

Treated Wood: Painted wood, plywood, strand board, particle board, shingles, fencing, siding, pallets, and crates.

Composite Glass: Windows, mirrors, lightbulbs, and ceramic products.

Composite Metal: Any remaining metal that is not in another category or is not recyclable.

Brown Cart Recycling Content

Citywide Results by Material

Material	%	Tons
Organics	**45.1%**	**141,412**
Food	25.2%	79,104
Food Soiled Paper	13.5%	42,472
Yard Debris	6.1%	19,047
Wood	0.3%	790
Plastic	**8.6%**	**27,092**
Styrofoam® Packaging	2.2%	6,920
Mixed Plastic	2.2%	6,837
Single-Use Plastic Bags	1.7%	5,397
#1 PET	1.4%	4,443
#2 HDPE	1.1%	3,496
Paper	**6.7%**	**20,198**
Mixed Paper	3.1%	9,855
Corrugated Cardboard	2.4%	7,642
Newspaper	1.1%	3,595
Glass Containers	**2.9%**	**9,106**
Metal	**2.9%**	**9,034**
Tin/Steel Cans	1.2%	3,678
Other Recyclable Metals	0.9%	2,846
Aluminum Cans	0.8%	2,511
HHW (Recoverable)	**0.8%**	**2,438**
Electronic Waste (E-Waste)	0.7%	2,110
Batteries	0.1%	213
Paint	0.0%	115

Examples of Materials

Food Soiled Paper: Paper plates, pizza boxes, napkins, and paper towels.

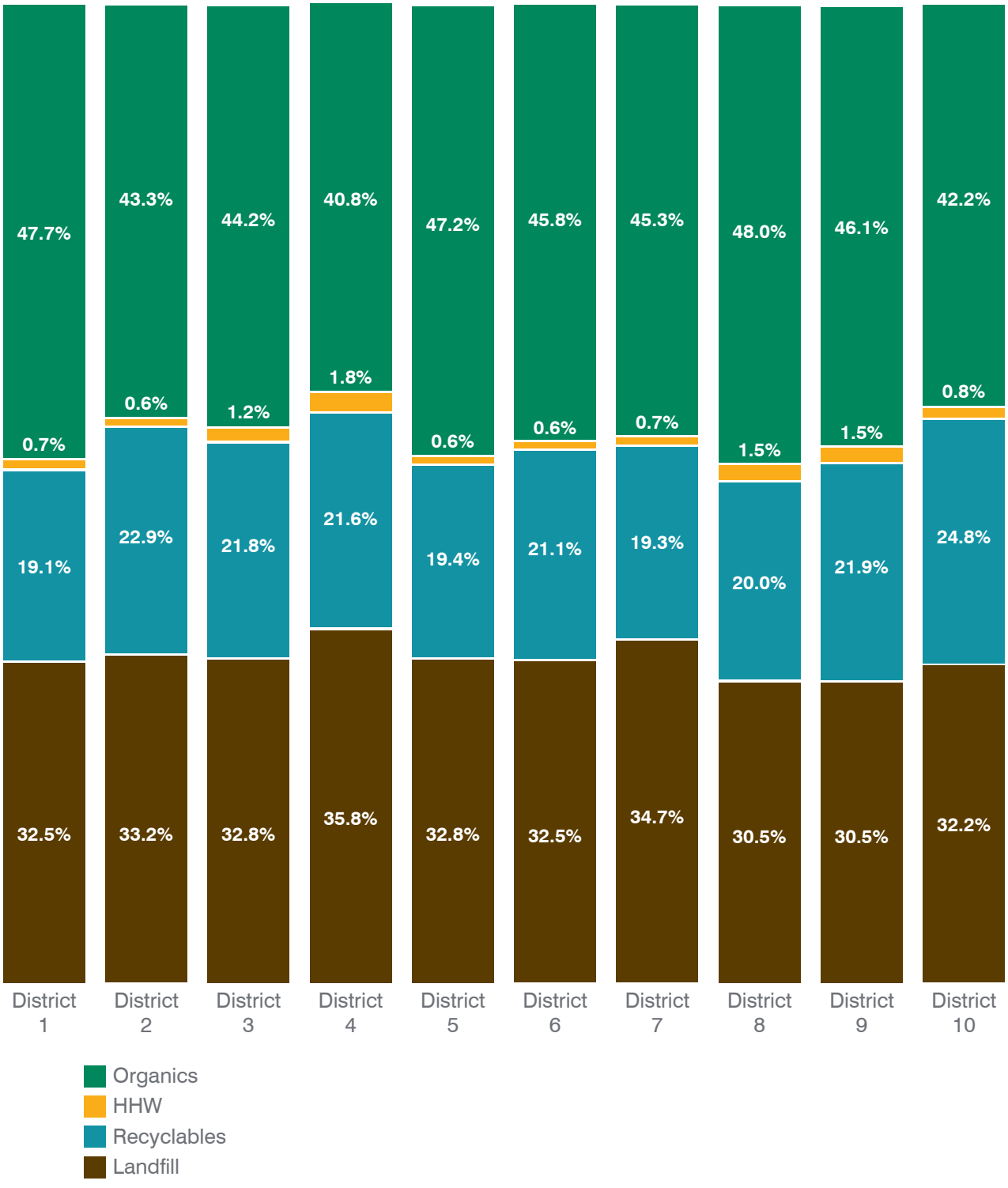
Wood: Lumber, fencing, pallets, and chopsticks.

PET: Soda, juice, and water bottles that are typically clear.

HDPE: Colored bottles such as laundry detergent and translucent bottles like milk jugs.

Results by Council District

Council District results show similar percentages to Citywide results, with organics as the largest and HHW as the smallest categories[2].



[2] District 4 has a slightly smaller proportion of organic material due to a low percentage of yard waste across samples. This may be due to brush collection being conducted in area two weeks prior to study.

Bulky Stream Composition

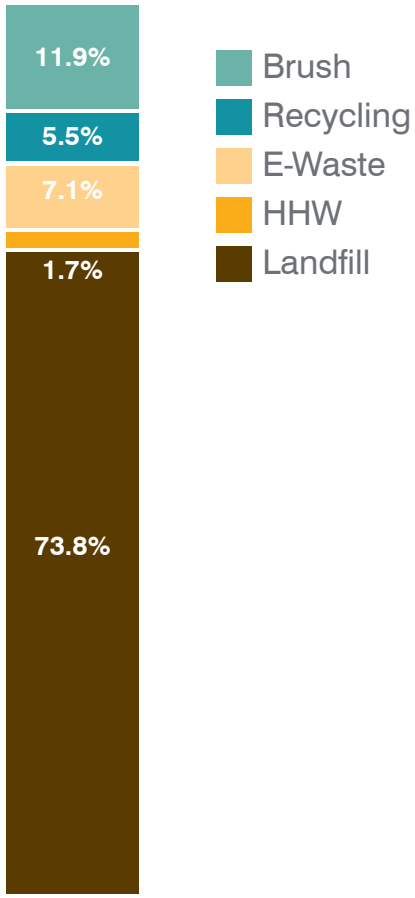
Citywide

These results are based on 3,318 samples totaling an estimated 726 tons.

Brush is not accepted during the bulky collection cycle. When brush is placed in bulky material, these piles are marked as out of compliance. If the brush is separated out by the resident, the SWMD will collect the material as an out-of-cycle collection, where residents are charged a fee.

During the study, much of the scrap metal, appliances, and appliance parts were removed from piles by scrap collectors between when the sample was first recorded and then later collected.

HHW is not accepted as part of bulky collection.



Bulky Stream Results by Material

Below is a detailed look at the results by material type, ordered from largest to smallest.

Material	%	%
Landfill	**73.8%**	**24,852**
Fencing	23.5%	7,931
Furniture	15.1%	5,091
Household Trash	7.6%	2,551
Mattresses	5.0%	1,678
Toilets	3.6%	1,223
Construction Material	3.6%	1,216
Plastics	3.5%	1,186
Carpeting	3.3%	1,095
Clothing	2.9%	975
Other Bulky	1.5%	512
Wooden Pallets	1.3%	445
Glass	1.2%	401
Soil and Rocks	0.7%	243
Roofing Material	0.5%	179
Concrete	0.3%	101
Commercial Tires	0.1%	27
Brush	**11.9%**	**3,993**
E-Waste	**7.1%**	**2,396**
Recycling	**5.5%**	**1,863**
Scrap Metal	2.5%	825
Passenger Car Tires	1.7%	576
Appliances	1.4%	462
HHW	**1.7%**	**586**

The five most abundant materials by weight were fencing (23.5 percent), furniture (15.1 percent), brush (11.9 percent), household trash (7.6 percent), and televisions (7.1 percent).

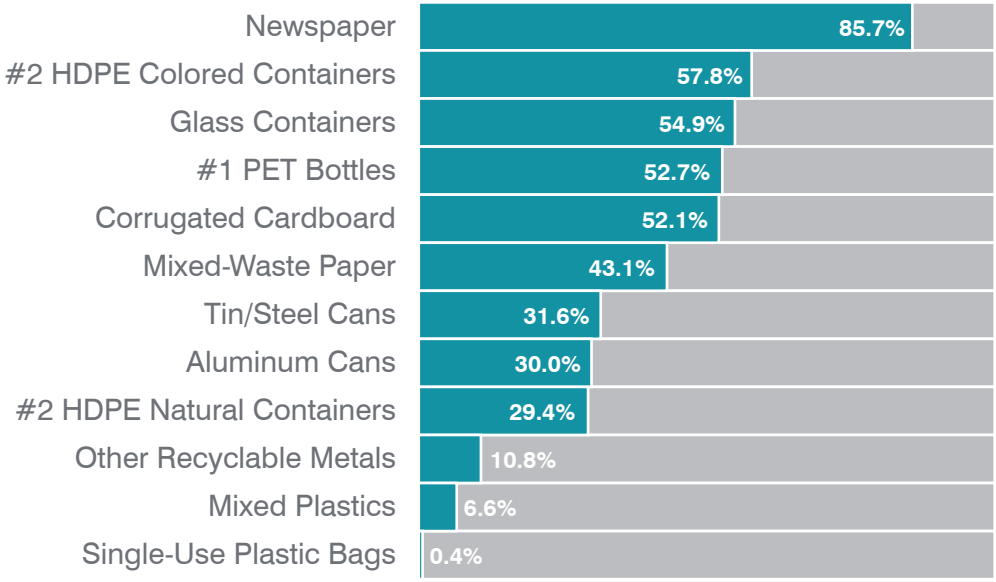
Capture Rate

The capture rate measures how much of a material is being recovered. This rate is calculated by dividing the tons recovered by the total tons collected for each material. For example, if residents dispose of 100 tons of aluminum cans but only 60 tons are captured in the recycling, then the capture rate for aluminum cans would be 60 percent.

In FY 2019, the capture rate was 22.5 percent for total organics and 46.4 percent for total recycling.

Measuring the capture rate for recycling by material uses the total recyclables in the garbage and recycling streams. The composition of the recycling stream by material is based on quarterly audits conducted by the SWMD at a local recycling facility. Calculating each recycling material's capture rate shows:

- Most newspaper was captured.
- Over half of cardboard, glass, #1 PET bottles, and #2 HDPE colored containers was captured.
- About a third of mixed-waste paper, tin/steel cans, and aluminum cans was captured.



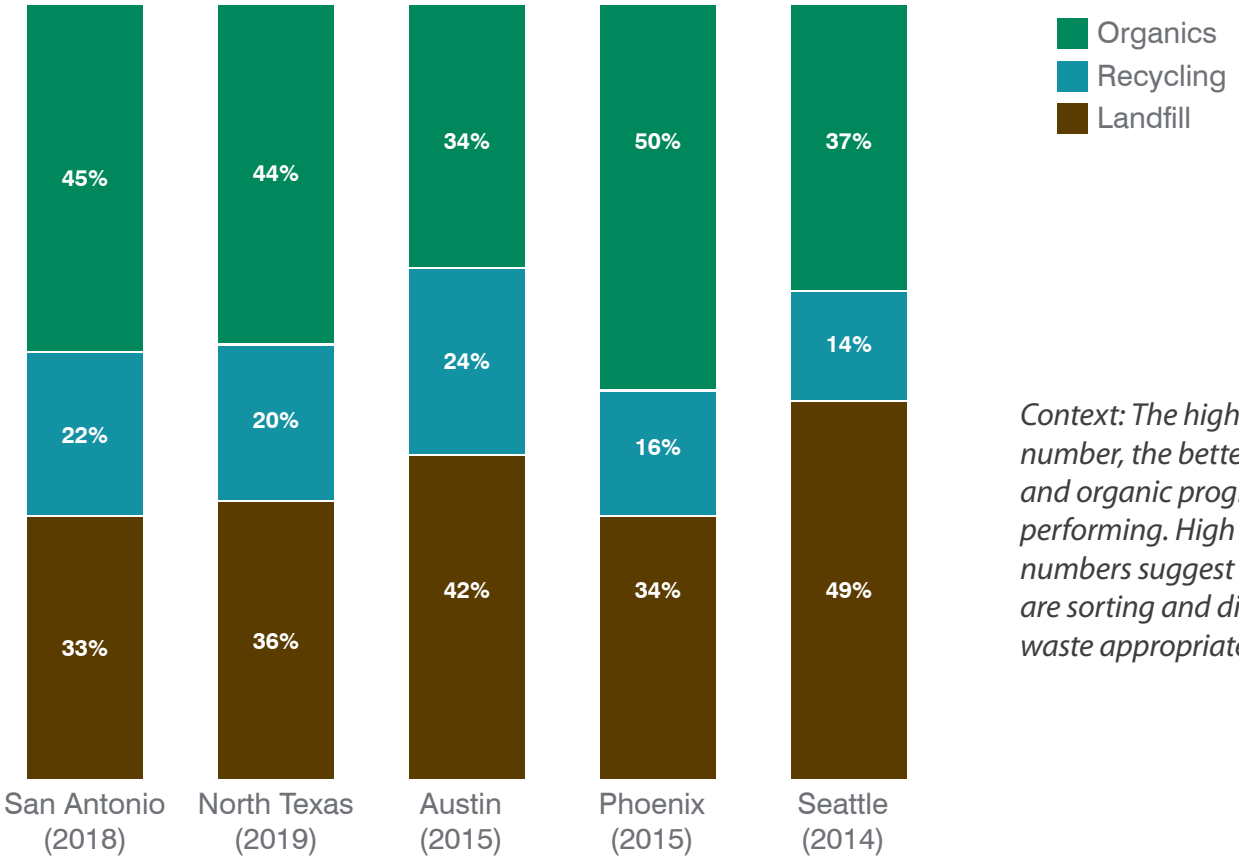
The recycling stream composition is based on quarterly recycling audits conducted at Republic Services, the contracted recycling processing facility. The recycling facility is currently sorting some mixed paper into the newspaper category, which may be inflating the capture rate. Mixed plastics and plastic bags are the source of much confusion among residents regarding what is and what is not acceptable. They also pose many operational difficulties for the processors. Some cities are eliminating mixed plastics from their programs. San Antonio is the only major U.S. city currently accepting plastic bags in the cart.

Comparison to Other Cities

It is difficult to compare San Antonio results to other cities because each region has its own method for classifying waste. For example, a plastic chair is not accepted in the SWMD blue cart recycling program and thus it is categorized as a landfill item. But that same chair may be classified as 'plastic' in other cities' waste characterization studies. To facilitate comparison, the reported results from other cities have been adjusted to match the Department's definitions.

- The North Texas study included Dallas, Fort Worth, and eight other cities. These recycling programs and results are very similar to San Antonio.
- Austin created its recycling plan five years prior to SWMD. The results are 9% better.
- Phoenix established recycling goals three years after SWMD. The results are similar.
- Seattle started curbside recycling in 1988. The results are 15% better than the SWMD.

Composition of the Garbage Can



Context: The higher the landfill number, the better the recycling and organic programs are performing. High landfill numbers suggest that residents are sorting and diverting their waste appropriately.

Study-Driven Strategies

Based on the study's findings that organic materials have the greatest potential for diversion, the SWMD has begun to incorporate messaging about the organics program to a larger degree in marketing campaigns.

Education and Outreach

Website Content

Cart Downsizing

New Cart Sticker