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July 1, 2019

Ramana Kari, Chief Engineer

Solid Waste Authority

7501 N. Jog Road

West Palm Beach, FL 33412

Dear Ramana Kari,

The attached report entitled, *Waste Composition of Palm Beach County* documents the results of a one-week field study by your staff, temporary workers, and students and faculty of the University of Florida. The data from this study will be used to update the Florida Department of Environmental Protection's *WasteCalc* computer program. This work was essential to help update the Florida Department of Environmental Protection's tool WasteCalc. As Palm Beach County is a heavily populated area, we are thrilled to obtain waste contribution data from diverse set of demographics.

This waste composition study ran under a high level of efficiency, largely due to the tremendous efforts from the team at the Southwest County Transfer Station. The team provided us with a safe space to for working. Additionally, Steve Lukens was absolutely outstanding in helping to retrieve samples as well as disposing of materials post sampling. His efforts expedited the study and maintained an organized work area. Also, his level of professionalism and attentiveness to managing the movement of samples are appreciated. We would like to extend thanks to the employees in the scale house as they were helpful in providing further information regarding scale house tickets and hauler information.

All the efforts of the Solid Waste Authority and the Southwest County Transfer Station are greatly appreciated and have positively contributed to our research endeavors!

Sincerily,

Timothy Townsend, Ph.D., P.E.

Professor

WASTE COMPOSITION OF PALM BEACH COUNTY

June 2019

Prepared for:
Palm Beach County

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EXECUTIVE SUMMARY

The week of May 6th, 2019 through May 9th, 2019, the University of Florida Department of Environmental Engineering Sciences performed a waste composition study for the Solid Waste Authority of Palm Beach County (SWA) at their Southwest County Transfer Station. This study was funded by both Palm Beach County and the Florida Department of Environmental Protection (FDEP). The goals of this project were to: 1) provide Palm Beach County with a current evaluation of their municipal solid waste (MSW) composition; and 2) update FDEP's solid waste composition online tool called WasteCalc because it relies on current waste composition studies to calculate the material composition of MSW for each of Florida's 67 counties.

The first step in conducting this waste composition was to plan out a sampling method. This stage included determining the number of samples to be sorted (40 samples) and deciding upon which trucks to sample. A proportional mix of commercial and residential trucks were to be sampled. Incoming garbage trucks were randomly selected from each commercial and residential category until the desired number of samples were acquired. A 200 to 300 pound sample was obtained from each truck, and each sample was sorted into 39 different categories by researchers and a group of temporary workers and students. After the sample was sorted, each category bin was weighed and the contents were discarded.

After collecting the material weight data, the UF team calculated the mass fraction for every category in each individual sample. Then, the mass fractions for the category were averaged for all 40 samples. These ratios were then converted to percentages to find the greatest contributor of Palm Beach County's MSW stream. The results found "Food Waste" to be the largest component of this particular waste stream at 17.2%.

The results of this Palm Beach County waste composition study will be integrated into WasteCalc to provide more accurate and representative results for this county and other county's with similar population densities.

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ABBREVIATIONS AND ACRONYMS

C&D debris	Construction and demolition debris
EPA	U.S. Environmental Protection Agency
FDEP	Florida Department of Environmental Protection
MRF	Material recovery facility
MSW	Municipal solid waste
SMM	Sustainable materials management
YT	Yard trash

1 INTRODUCTION

1.1 Municipal Solid Waste in Palm Beach County

The Solid Waste Authority of Palm Beach County (SWA) has five municipal solid waste (MSW) collection zones as shown in Figure 1 below. Each zone is serviced by a different private solid waste collection hauler who is contracted by the SWA. Waste Pro USA Inc. works primarily in Zone 1, Advanced Disposal Services, Inc. operates in Zone 2, Republic Services Inc. works in Zone 3, and Waste Management Inc. operates in Zone 4 and Zone 5. Palm Beach County has multiple transfer stations, at least one in each zone, excluding Zone 5. The transfer stations have a diverse waste stream. There are densely populated areas along the coast and less populated, more rural areas further away from the coast. The densely populated areas contain many multi-family residential homes (i.e. apartment complexes, condominiums).

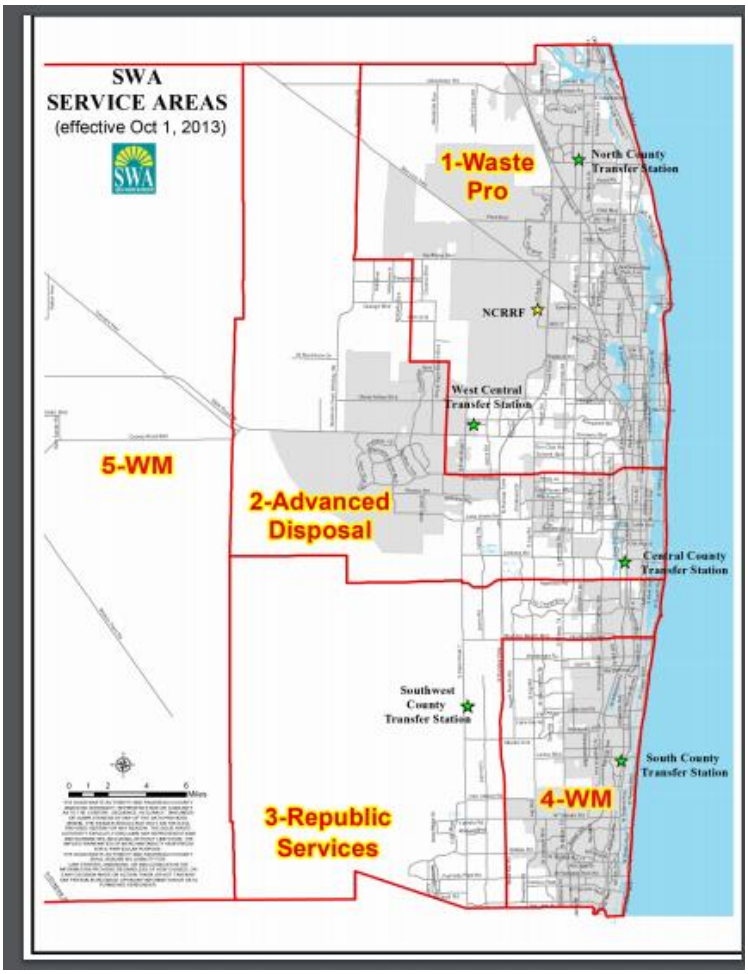


Figure 1. Solid Waste Zones of Palm Beach County.

1.2 Location of Study

As seen in Figure 1, the Southwest County Transfer Station is located in Zone 3 in close proximity to Zone 4. The surrounding areas of the transfer station are representative of the county. There are many suburban areas, as well as very densely

populated areas. Due to the proximity to Zone 4, some Waste Management collection trucks discharge MSW at the Southwest County Transfer Station. This allowed more areas of the county to be represented in this study. This transfer station is a newly constructed facility with plenty of space to accommodate the study, so it was the most fitting location to conduct the research.

2 METHODOLOGY

2.1 Preparation

It was determined for logistical reasons that 40 samples was the most reasonable number of samples that could be collected in the week-long study. Many of the previous waste composition studies reviewed for this study were performed using 40 samples per week. A study by the Luled University of Technology in Sweden suggests the minimum number of samples that are necessary to achieve statistical significance is 10 and states it is not realistic to take more than 40 samples for a weeklong sampling period[1].

Once 40 samples were agreed upon, the level of confidence and precision were calculated using the sample calculation equation, as seen below in Equation 1, written in the ASTM D5231 method (Standard Test Method for Determination of the Composition of Unprocessed Municipal Solid Waste, ASTM International, 2016). To find the estimated mean and standard deviation, the annual MSW tonnages reported in 2017 to FDEP by each county were inputted into the 2018 version of WasteCalc. WasteCalc generated the most prevalent component of the waste stream, which was used to estimate the standard deviation and the mean by using the tables in the ASTM method (see section 5.1. ASTM Tables for Calculating sample size). WasteCalc reported “Other Paper” as the largest component of the waste stream for 2017 in Palm Beach County. Since ASTM D5231 method does not have an “Other Paper” category, the estimated standard deviation and mean were the average of “Newspaper” and “Corrugated Cardboard”.

$$n = \left(\frac{t * s}{e * x}\right)^2 \quad (1)$$

Where:

n=number of calculated samples

t=student t statistic corresponding to the desired level of confidence

s=estimated standard deviation

e=desired level of precision

x=estimated mean

After the largest component was identified, it was determined that a sample size of 40 would result in an 85% confidence level and precision level (e) of 0.15.

To divide the samples between commercial and residential MSW, Equation 2 was used for each of the studies. For this study's purpose, commercial included any standard commercial facility and any multifamily residential facility (e.g., apartment complexes, condominiums). Residential strictly included single-family residential curbside pick-up. This study required 28 commercial samples and 12 residential samples, calculated by Equation 2 below.

$$Number\ of\ Samples = 40 * \frac{Annual\ Tonnage\ of Residential\ or\ Commercial}{Total\ Annual\ Tonnage} \quad (2)$$

After identifying the number of samples, the researchers coordinated efforts with Palm Beach County Southwest Transfer Station. First, the UF team went to the Southwest County Transfer Station to discuss logistics and understand what resources would be available to use while performing the sort. It was determined that the sort would be conducted in a designated area inside the transfer station on the tipping floor. Palm Beach County assisted in the sort by providing operators and equipment to retrieve, transport, and dispose of the samples

2.2 Sampling Method

Five to six commercial trucks and two to three residential trucks for a total of approximately eight trucks per day were sampled. As residential (automated collection vehicles) or commercial (typically front-loader) garbage trucks entered the tipping floor they were directed to a specified area of the floor where the samples were obtained.

A researcher conducted interviews with each incoming truck driver regarding information on where the particular load came from and what it might contain. Notes about the interview, the tare weight of the truck, and the total weight of the truck were recorded for each load on a sample sheet (see section 5.2. Sampling Sheet). To retrieve a sample, the load from the truck was emptied and then mixed up by a track loader following the cone and quartering method specified in the ASTM method. Then, a 200 to 300 pound sample was brought over, as seen in Figure 2, to the section of the tipping floor where the sort was conducted and stacked in piles, which were labeled with the corresponding sample number.

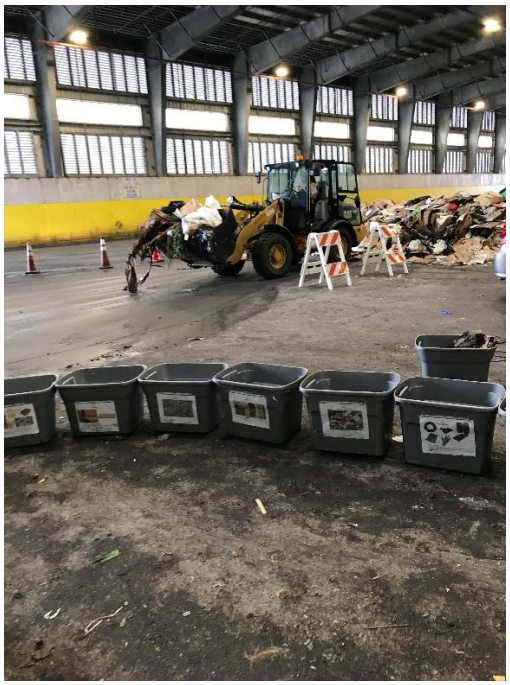


Figure 2. Transportation and Delivery of a sample.

2.3 Sorting Method

After the track loader operator delivered the sample, when the sorting team was prepared to start the sample, the operator loaded the sample into bins. The bins were brought to the scale on the tipping floor, weighed until the contents of the bins reached 200 pounds or more, dumped on the sorting table, and sorted into 39 categories (shown in Table 1).

Table 1. List of Categories used in the Palm Beach County Waste Composition

1	Newspaper	21	Clear Glass
2	Corrugated Cardboard (OCC)	22	Brown Glass
3	High Grade Paper (Office type)	23	Aluminum Cans/ Foil
4	Polycoated aseptic containers	24	Steel/Tin cans
5	Food service container (polycoated)	25	Other Ferrous Metals
6	Other Composite (metal coated)	26	Other Non- Ferrous
7	Boxboards	27	Yard waste
8	Other Paper	28	Food waste
9	#1 PET bottles	29	Animal By-Product
10	#2 HDPE bottles- translucent	30	Other Organics
11	#2 HDPE bottles- colored	31	Wood
12	#3-#7 (Other plastic bottles)	32	Asphalt shingles
13	Expanded Polystyrene (food service)	33	gypsum drywall
14	Expanded Polystyrene	34	concrete/bricks
15	Rigid Plastic (tubs, cups,lids)	35	Rubber and Leather
16	Rigid Plastic (food service plastics)	36	Clothing, Footwear, other textiles
17	Grocery Bags	37	Small appliances/ Electronics
18	Other Flexible Plastic	38	Hazardous waste
19	Other Plastics	39	Residuals
20	Green Glass		

The table that was used had a 2 inch by 2 inch metal screen on top. This allowed any residue smaller than 2 inches by 2 inches to fall through the table. Note the residue was not sorted into the 39 categories but was accounted for in its own category called “Residuals”. Also, if any bulky items were picked up, it was noted on the sample observation sheet.

Figure 3. Sorting Table with a sample.

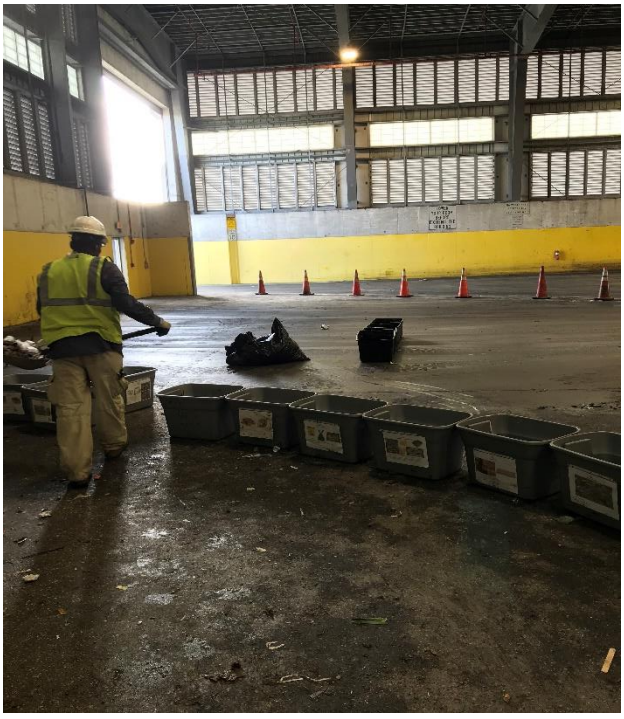


Figure 4. Set-up of Palm Beach County Waste Composition.

Figure 5. Examples of different category bins. Category 28, Food Waste, is on the left. Category 16, Food Service Rigid Plastic, is on the right.

After the table was cleared of all garbage, the 39 different category bins were weighed one-by-one on the scale. After the weight had been recorded (see section 5.3. Data Collection Sheet), the contents of the bins were discarded into a pile near the sorting table which was picked up and discarded by the bulldozer operator.

3 DATA AND RESULTS

3.1 Raw Data Collected

Raw data refers to the fact that this data is presented in the 39 categories decided upon by the UF team. The next section puts these categories into broader categories in order to give a general breakdown of the MSW stream. Each table in this section is color-coded to match the general category it falls under in section 3.2.

The percentages were based on the averages of the mass fraction for each category. The equations used, as seen below, follow the ASTM D5231 method. In order to take the individual mass fraction of each category in an individual sample Equation 3 was used.

$$mf_i = \frac{w_i}{\sum_{i=1}^{j} w_i} * 100 \qquad (3)$$

Where:

$$mf_i = mass\ fraction\ of\ component\ i$$

$$w_i = \text{weight of component i}$$

$$\text{j} = \text{number of components}$$

After each mass fraction was calculated, the average of the mass fractions for all 40 samples for the category was taken and multiplied by 100 to obtain a percentage, as seen in Equation 4 and 5.

$$\bar{\text{m}}f_i = (\frac{1}{n}\sum_{k=1}^{n}(mf_i)_k) \quad (4)$$

$$Category\ Percentage = \bar{\text{m}}f_i * 100 \quad (5)$$

Where:

$$\bar{\text{m}}f_i = \text{mean mass fraction}$$

Raw data from the Palm Beach County waste sort is shown in Table 2. The total waste stream, commercial samples, and residential samples were recorded. To divide the samples into commercial and residential, the data sheets were cross referenced with the sample sheets to see what they were designated as by the interviewer.

Table 2. Raw Data Collected in Palm Beach County.

Sample	Category	Percentage (%)		
		Total	Commercial	Residential
1	Newspaper	1.3	1.1	1.6
2	Corrugated Cardboard (OCC)	7.1	8.0	5.0
3	High Grade Paper (Office type)	3.2	3.9	1.7
4	Polycoated aseptic containers	0.6	0.7	0.3
5	Food service container (polycoated)	1.4	1.8	0.6
6	Other Composite (metal coated)	0.6	0.7	0.3
7	Boxboards	1.8	1.7	2.1
8	Other Paper	12.6	10	18.5
9	#1 PET bottles	2.2	2.3	2
10	#2 HDPE bottles- translucent	0.4	0.4	0.2
11	#2 HDPE bottles- colored	0.5	0.5	0.7
12	#3-#7 (Other plastic bottles)	0.2	0.2	0.2
13	Expanded Polystyrene (food service)	0.4	0.4	0.3
14	Expanded Polystyrene	0.6	0.5	0.9
15	Rigid Plastic (tubs, cups,lids)	1.2	1.0	1.6
16	Rigid Plastic (food service plastics)	1.4	1.4	1.2
17	Grocery Bags	1.2	1.0	1.4
18	Other Flexible Plastic	7.2	7.8	5.7
19	Other Plastics	2.9	2.7	3.3
20	Green	0.8	0.7	0.9
21	Clear	1.7	1.6	2.0
22	Brown	0.6	0.6	0.7
23	Aluminum Cans/ Foil	1.0	0.9	1.4
24	Steel/Tin cans	0.7	0.7	0.6
25	Other Ferrous Metals	0.7	0.8	0.5
26	Other Non- Ferrous	0.3	0.2	0.5
27	Yard waste	2.5	2.9	1.7
28	Food waste	17.2	17.9	15.7
29	Animal By-Product	1.5	0.4	4.1
30	Other Organics	2.6	2.1	3.9
31	Wood	1.9	1.8	2.2
32	Asphalt shingles	0.0	0.0	0.0
33	gypsum drywall	0.2	0.2	0.0
34	concrete/bricks	0.8	0.9	0.5
35	Rubber and Leather	0.5	0.7	0.2
36	Clothing, Footwear, other textiles	3.6	3.5	3.9
37	Small appliances/ Electronics	1.3	0.9	2.3
38	Hazardous waste	0.6	0.7	0.5
39	Residuals	15.0	16.7	10.9

3.2 Processed Data

Data presented in this section has been complied into more general categories. The colors in the tables correspond to the colors from the tables in section 3.1. Categories highlighted in Table 2 were compiled into the general categories with the same highlighted color, as seen below in the tables below. For example, the categories from the conducted study entitled “Other Paper”, “Polycoated Aseptic Containers”, “Food Service Containers”, “Other Composite”, and “Boxboards” were compiled into the general category “Other Paper”.

Processed data from the Palm Beach County waste sort is shown in Table 3 below. Graphical representations of each waste sort can be found in Figures 6-8.

Table 3. Processed Data in Palm Beach County

	Percentage (%)		
WasteCalc Categories	Total	Commercial	Residential
Newspaper	1.3	1.1	1.6
Glass	3.1	2.9	3.6
Aluminum Cans	1	0.9	1.4
Plastic Bottles	3.3	3.4	3.1
Steel Cans	0.7	0.7	0.6
Corrugated Paper	7.1	8	5
Office Paper	3.2	3.9	1.7
Yard Trash	2.5	2.9	1.7
Other Plastics	14.9	14.8	14.4
Ferrous Metals	0.7	0.8	0.5
Non-Ferrous Metals	0.3	0.2	0.5
Other Paper	17	14.9	21.8
Textiles	3.6	3.5	3.9
C&D Debris	2.9	2.9	2.7
Food	17.2	17.9	15.7
Miscellaneous	21.5	21.5	21.9
White Goods	0		
Tires	0		

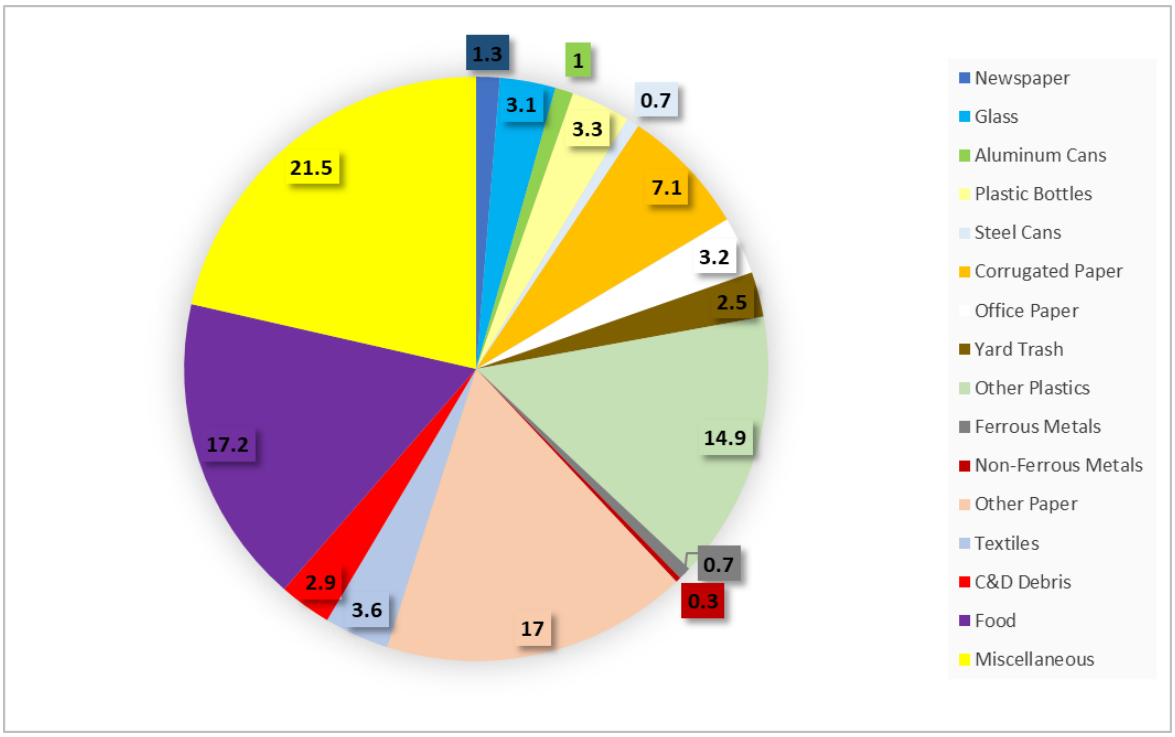


Figure 6. Representation of Total Waste Collected.

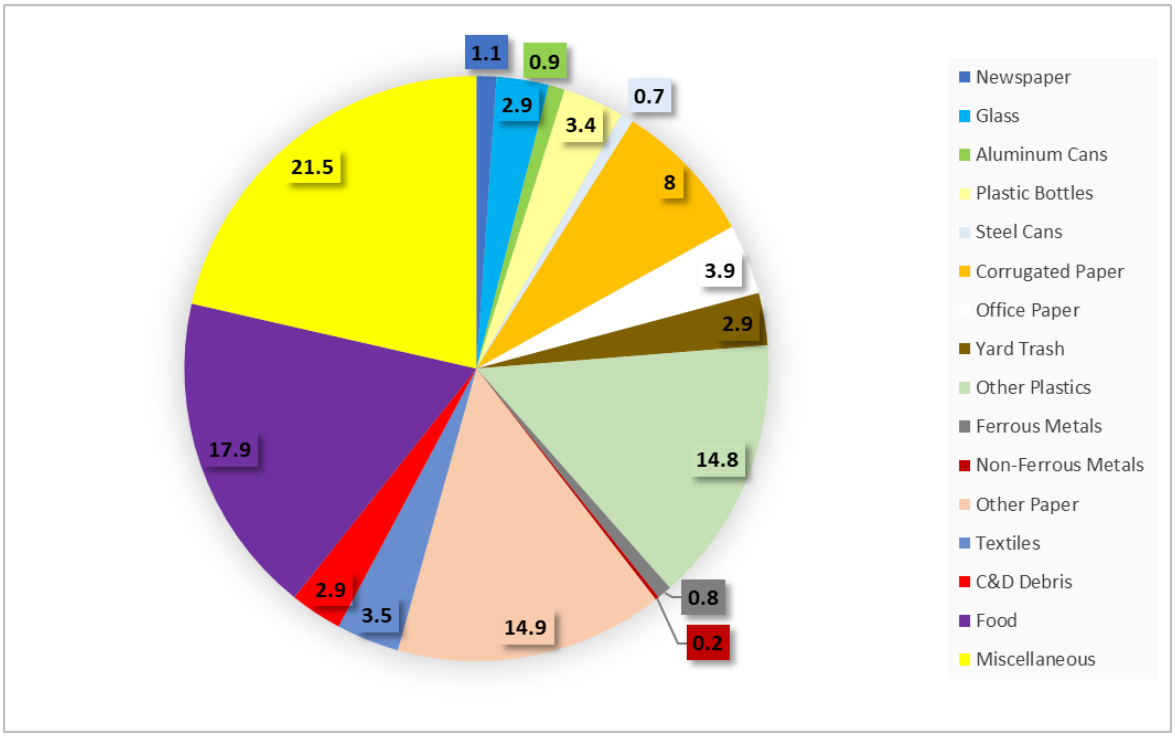


Figure 7. Representation of Commercial Waste Collected.

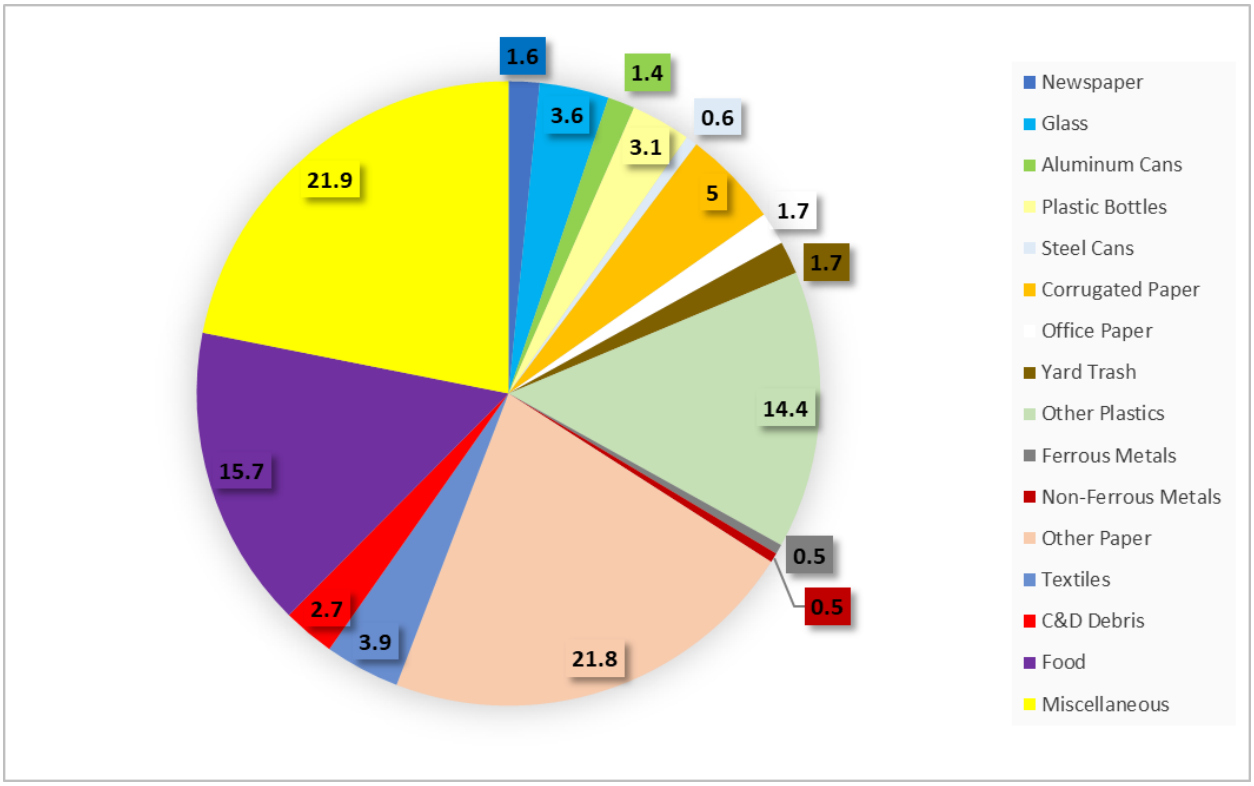


Figure 8. Representation of Residential Waste Collected.

3.3 Overview of Results

The highest component of the MSW stream in Palm Beach County was "Food Waste" at 17.2%. In the US Environmental Protection Agency's (EPA) *Advancing Sustainable Material Management: 2015 Fact Sheet*, the highest component of US MSW in 2015 was "Other Paper" at 26%. Palm Beach County has a different outcome with a significant portion of the country. According to this report, Food Waste accounts for 15% of the MSW stream in the US on average. The lowest component was "Non-Ferrous Metals" at 0.3%. Materials that can be recycled, including glass, aluminum cans, steel cans, plastic bottles, corrugated boxes, newspaper and office paper are classified as recyclables. The percentage from each of these categories were summed to make a recyclable category. Approximately 19.7% of the MSW stream consists of recyclable material.

"Food Waste" is the highest component in the commercial MSW stream at 17.9%. The highest component in the residential stream is "Other Paper" at 21.8%. The lowest component in each stream is "Non-Ferrous Metals".

4 CONCLUSION

Results of the Palm Beach County waste composition study can now be incorporated into the WasteCalc program. WasteCalc is an online tool created by FDEP and outside contractors that allow any county in Florida to input information about the amount of waste landfilled, recycled, and combusted. Currently, many counties in

Florida have not had a recent or any waste composition studies conducted. When this occurs, WasteCalc generates the material composition percentages based on counties that are similar in population density to that specific county. However, it is important to conduct waste composition studies in various counties so that WasteCalc can provide the counties with more accurate and representative information. This data obtained in this study will provide more accurate results for this county and counties similar to Palm Beach County. The information provided may also help to make decisions about sustainable materials management in the future in Palm Beach County.

5 APPENDIX

5.1 ASTM Tables for calculating sample size

TABLE 3 Values of Mean ($\bar{x}$) and Standard Deviation(s) for Within-Week Sampling to Determine MSW Component Composition[A]

Component	Standard Deviation(s)	Mean ($\bar{x}$)
Newsprint	0.07	0.10
Corrugated	0.06	0.14
Plastic	0.03	0.09
Yard waste	0.14	0.04
Food waste	0.03	0.10
Wood	0.06	0.06
Other organics	0.06	0.05
Ferrous	0.03	0.05
Aluminum	0.004	0.01
Glass	0.05	0.08
Other inorganics	0.03	0.06
		1.00

[A]The tabulated mean values and standard deviations are estimates based on field test data reported for MSW sampled during weekly sampling periods at several locations around the United States.

t-distribution

	Confidence Level									
	60%	70%	80%	85%	90%	95%	98%	99%	99.8%	99.9%
	Level of Significance									
2 Tailed	0.40	0.30	0.20	0.15	0.10	0.05	0.02	0.01	0.002	0.001
1 Tailed	0.20	0.15	0.10	0.075	0.05	0.025	0.01	0.005	0.001	0.0005
df										
1	1.376	1.963	3.133	4.195	6.320	12.69	31.81	63.67	—	—
2	1.060	1.385	1.883	2.278	2.912	4.271	6.816	9.520	19.65	26.30
3	0.978	1.250	1.637	1.924	2.352	3.179	4.525	5.797	9.937	12.39
4	0.941	1.190	1.533	1.778	2.132	2.776	3.744	4.596	7.115	8.499
5	0.919	1.156	1.476	1.699	2.015	2.570	3.365	4.030	5.876	6.835
6	0.906	1.134	1.440	1.650	1.943	2.447	3.143	3.707	5.201	5.946
7	0.896	1.119	1.415	1.617	1.895	2.365	2.999	3.500	4.783	5.403
8	0.889	1.108	1.397	1.592	1.860	2.306	2.897	3.356	4.500	5.039
9	0.883	1.100	1.383	1.574	1.833	2.262	2.822	3.250	4.297	4.780
10	0.879	1.093	1.372	1.559	1.813	2.228	2.764	3.170	4.144	4.586
11	0.875	1.088	1.363	1.548	1.796	2.201	2.719	3.106	4.025	4.437
12	0.873	1.083	1.356	1.538	1.782	2.179	2.682	3.055	3.930	4.318
13	0.870	1.079	1.350	1.530	1.771	2.160	2.651	3.013	3.852	4.221
14	0.868	1.076	1.345	1.523	1.761	2.145	2.625	2.977	3.788	4.141
15	0.866	1.074	1.341	1.517	1.753	2.131	2.603	2.947	3.733	4.073
16	0.865	1.071	1.337	1.512	1.746	2.120	2.584	2.921	3.687	4.015
17	0.863	1.069	1.333	1.508	1.740	2.110	2.567	2.899	3.646	3.965
18	0.862	1.067	1.330	1.504	1.734	2.101	2.553	2.879	3.611	3.922
19	0.861	1.066	1.328	1.500	1.729	2.093	2.540	2.861	3.580	3.884
20	0.860	1.064	1.325	1.497	1.725	2.086	2.529	2.846	3.552	3.850
21	0.859	1.063	1.323	1.494	1.721	2.080	2.518	2.832	3.528	3.820
22	0.858	1.061	1.321	1.492	1.717	2.074	2.509	2.819	3.505	3.792
23	0.857	1.060	1.319	1.489	1.714	2.069	2.500	2.808	3.485	3.768
24	0.857	1.059	1.318	1.487	1.711	2.064	2.493	2.797	3.467	3.746
25	0.856	1.058	1.316	1.485	1.708	2.060	2.486	2.788	3.451	3.725
26	0.856	1.058	1.315	1.483	1.706	2.056	2.479	2.779	3.435	3.707
27	0.855	1.057	1.314	1.482	1.703	2.052	2.473	2.771	3.421	3.690
28	0.855	1.056	1.313	1.480	1.701	2.048	2.468	2.764	3.409	3.674
29	0.854	1.055	1.311	1.479	1.699	2.045	2.463	2.757	3.397	3.660
30	0.854	1.055	1.310	1.477	1.697	2.042	2.458	2.750	3.386	3.646
40	0.851	1.050	1.303	1.468	1.684	2.021	2.424	2.705	3.307	3.551
50	0.849	1.047	1.299	1.462	1.676	2.009	2.404	2.678	3.262	3.496
60	0.848	1.045	1.296	1.458	1.671	2.000	2.391	2.661	3.232	3.460
70	0.847	1.044	1.294	1.456	1.667	1.994	2.381	2.648	3.211	3.435
80	0.846	1.043	1.292	1.453	1.664	1.990	2.374	2.639	3.196	3.417
90	0.846	1.042	1.291	1.452	1.662	1.987	2.369	2.632	3.184	3.402
100	0.845	1.042	1.290	1.451	1.660	1.984	2.365	2.626	3.174	3.391
∞	0.842	1.036	1.282	1.440	1.645	1.960	2.327	2.576	3.091	3.291

5.2 Sampling Sheet

Is this waste Class I? (If not, we do not need)

SAMPLE #: 1 Tix # 05326621

Truck number: 415631

Route number: _____

Tonnage of Truck + sample: _____

Tonnage of Truck: _____

Name of Hauler company: Waste Management

Date sample arrived (month/day): 5/6/19

Time sample arrived (0:00 a.m./p.m.): 8:52 am

Circle ~~waste type:~~

(Commercial)

If commercial:

multifamily residential

(mix of various commercial waste)

Single family residential

Other: _____

Where did the load come from?

Zone: Boca Raton

Approximate area (street names or neighborhoods):

~~Clintmore~~

Clint Moore

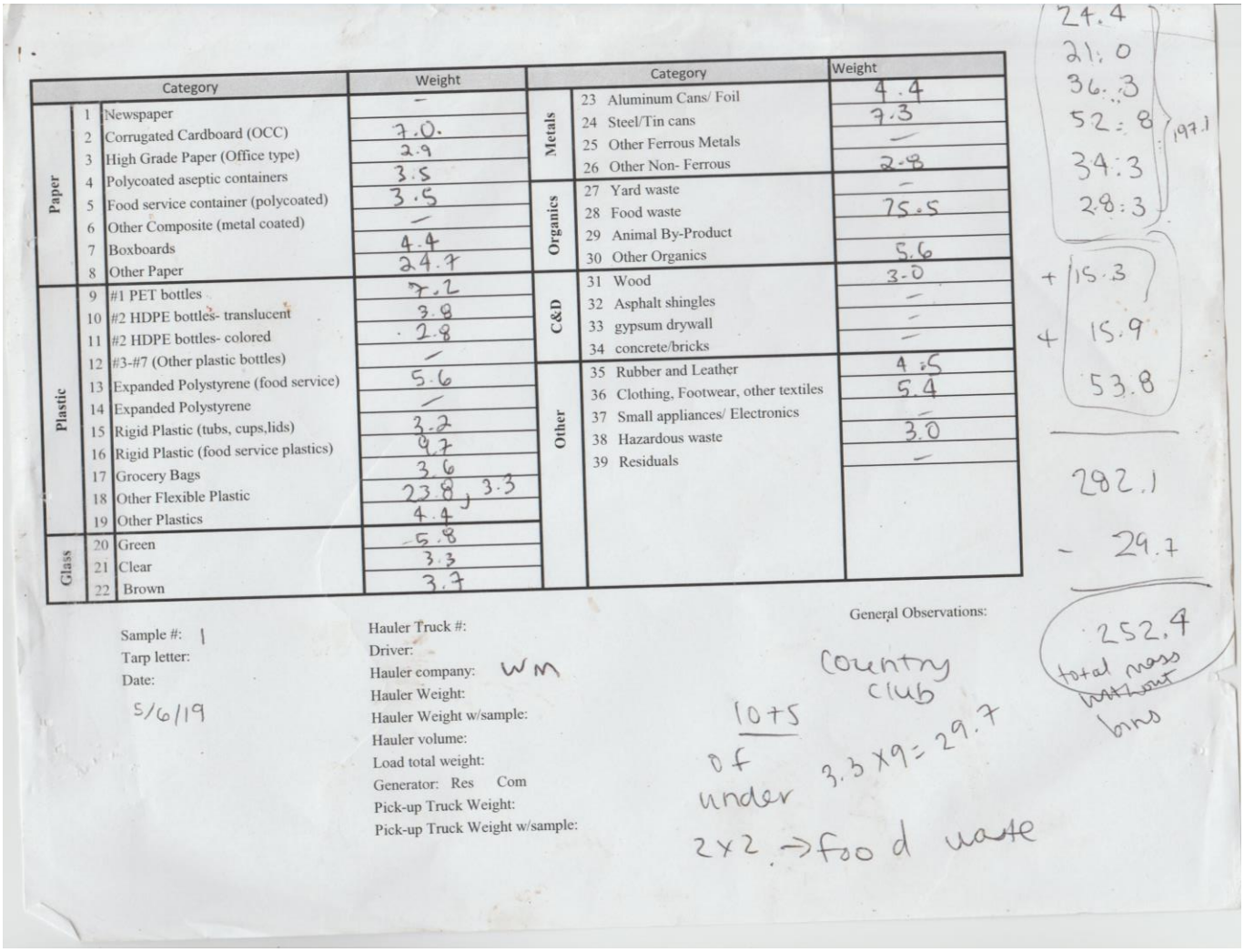
Additional notes/ observations from driver about load:

- mostly businesses
  - restaurants
- compactor truck

Any bulky items or white goods picked up in the load?

Nope!

5.3 Data Collection Sheet



		Category	Weight
Paper	1	Newspaper	–
	2	Corrugated Cardboard (OCC)	7.0
	3	High Grade Paper (Office type)	2.9
	4	Polycoated aseptic containers	3.5
	5	Food service container (polycoated)	3.5
	6	Other Composite (metal coated)	–
	7	Boxboards	4.4
	8	Other Paper	24.7
Plastic	9	#1 PET bottles	7.2
	10	#2 HDPE bottles- translucent	3.8
	11	#2 HDPE bottles- colored	2.8
	12	#3-#7 (Other plastic bottles)	–
	13	Expanded Polystyrene (food service)	5.6
	14	Expanded Polystyrene	–
	15	Rigid Plastic (tubs, cups,lids)	3.2
	16	Rigid Plastic (food service plastics)	9.7
	17	Grocery Bags	3.6
	18	Other Flexible Plastic	23.8, 3.3
	19	Other Plastics	4.4
Glass	20	Green	5.8
	21	Clear	3.3
	22	Brown	3.7

		Category	Weight
Metals	23	Aluminum Cans/ Foil	4.4
	24	Steel/Tin cans	7.3
	25	Other Ferrous Metals	–
	26	Other Non- Ferrous	2.8
Organics	27	Yard waste	–
	28	Food waste	75.5
	29	Animal By-Product	–
	30	Other Organics	5.6
C&D	31	Wood	3.0
	32	Asphalt shingles	–
	33	gypsum drywall	–
	34	concrete/bricks	–
Other	35	Rubber and Leather	4.5
	36	Clothing, Footwear, other textiles	5.4
	37	Small appliances/ Electronics	–
	38	Hazardous waste	3.0
	39	Residuals	–

24.4
21.0
36.3
52.8
34.3
28.3
197.1

+ 15.3
+ 15.9
53.8

282.1
- 29.7

252.4 total mass without bins

Sample #: 1
Tarp letter:
Date: 5/6/19

Hauler Truck #:
Driver:
Hauler company: WM
Hauler Weight:
Hauler Weight w/sample:
Hauler volume:
Load total weight:
Generator: Res Com
Pick-up Truck Weight:
Pick-up Truck Weight w/sample:

General Observations:
Country club
10+5 of under
3.3 x 9 = 29.7
2x2 → food waste