

Section 7

NORTHCENTRAL REGION MSW COMPOSITION

Introduction

DEP manages Pennsylvania’s waste stream via a network of six regional offices. An objective of this study was to derive results for each of the regions in the Commonwealth. Aggregate State-wide results are provided in Section 4 of this report. The purpose of this section is to provide detailed results specifically for the Northcentral Region. A map of the Northcentral region is shown in Figure 1.

Figure 1 Northcentral Region Map

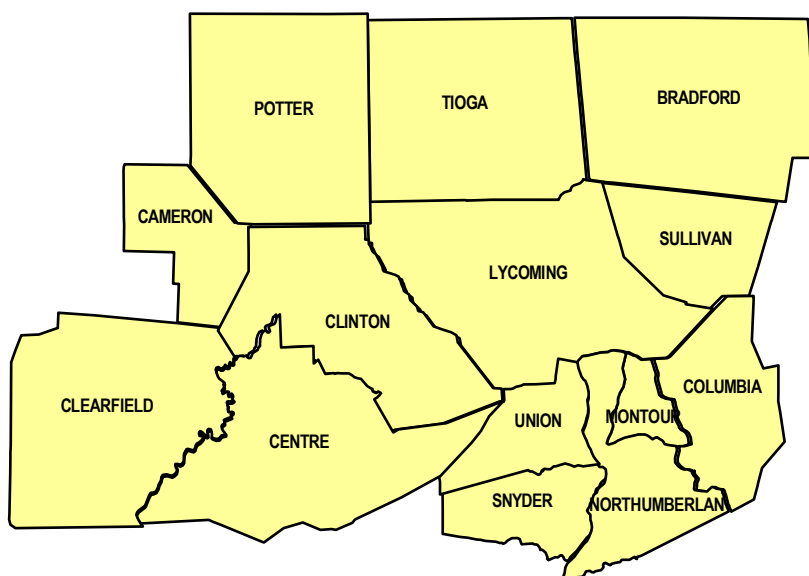


Table 1 summarizes the demographic and economic characteristics of the Northcentral region.

Table 1 Northcentral Region Demographic Summary

	Urban	Suburban	Rural	Total
Communities [1]	2	15	408	425
Population [1]	69,126	107,815	591,014	767,955
Housing Units [1]	28,266	44,479	241,385	314,130
Employment [2]	34,212	48,735	118,387	201,334

[1] Source: 2001 U.S. Census data provided by DEP

[2] Source: 2001 estimates provided by ESRI-BIS, Arlington, VA, based on U.S. Census data.

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Table 2 summarizes the waste that was reported by the Commonwealth's landfills (and incinerators) to have been disposed from each County within the Northcentral region in 2001.

Table 2 Northcentral Region Waste Disposal Summary [1]

County	MSW Disposed (tons)
Bradford	17,008
Cameron	3,646
Centre	100,354
Clearfield	52,320
Clinton	23,350
Columbia	47,133
Lycoming	99,014
Montour	9,880
Northumberland	68,900
Potter	115
Snyder	12,534
Sullivan	582
Tioga	11,926
Union	22,421
Total	469,180

[1] Source: County-level disposal quantity estimates are based on the 2001 DEP landfill disposal database

In order to aggregate the MSW composition data that was collected in this study, it was necessary to develop estimates of waste generation by county within the region. This was performed in the following steps:

- 1) Surveying urban, suburban, and rural communities across the Commonwealth to compile urban, suburban and rural residential MSW disposal factors (tons of disposed MSW per household per year);
- 2) Applying the residential generation factors to the total households in the region to estimate total disposed residential waste;
- 3) Estimating total regional waste disposed based on a statistical analysis of reported county-level waste disposal records relative to county-level population and employment; and
- 4) Netting out residential waste to calculate disposed commercial waste quantities.

The results of this process are shown in Table 3 for the Northcentral Region.

Table 3 Northcentral Region Disposed MSW Summary (tons) [1]

Waste Generating Sector	Tons of Waste Disposed			
	Urban	Suburban	Rural	Total
Residential generators	24,132	48,182	234,449	306,764
Commercial generators	21,044	30,892	110,480	162,416
Total	45,177	79,075	344,928	469,180

[1] Source: 2001 DEP database of disposed tons as reported by Pennsylvania disposal facilities.

In order to develop composition estimates for each of these demographic areas and generating sectors, field sampling was performed at two waste processing and disposal facilities:

- Bradford County Landfill (Burlington, Bradford County); and
- Centre County Transfer Station (Bellefonte, Centre County).

Sampling at these facilities was performed across four seasons to account for seasonal variation in MSW composition. Table 4 summarizes the sampling summary for the Northcentral Region.

Table 4 Northcentral Region Sampling Summary

Waste Generating Sector	Number of Samples			
	Urban	Suburban	Rural	Total
Physical MSW Samples				
Residential	29	25	57	111
Commercial	31	30	21	82
Subtotal—physical samples	60	55	78	193
Visual Bulk Waste Samples	20	20	19	59
Total Samples	80	75	97	252

Regional Aggregate Results

The remainder of this section presents a graphical and tabular summary of the Northcentral region’s disposed MSW composition. Specific figures and tables are summarized below.

- Figure 2 is a pie chart that shows the percentage composition of major material groups in the aggregate regional waste stream.
- Figure 3 is a bar chart that shows the estimated mean quantities of material disposed (or incinerated) from the region, again by major material group.

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- Figure 4 compares the incidence of recyclable materials as targeted in Act 101 that were found to be disposed by residential and commercial generators in the region.
- Figure 5 shows the 10 most prevalent materials being disposed in the region, by weight.
- Table 5 contains a detailed statistical presentation of the aggregate MSW composition in the region. This tabular summary includes the statistical mean composition, as well as the standard deviation, upper and lower confidence intervals, and a “sampling error”. The sampling error indicates the width of the confidence intervals relative to the mean. Lower sampling error signifies narrower confidence intervals (and therefore greater certainty of the mean composition shown).
- Figure 6 compares the percentage of disposed MSW landfilled from urban, suburban and rural communities within the region.
- Table 6 compares the mean composition of disposed MSW from urban, suburban and rural communities within the region.

Results by Generating Sector

An objective of the study was to compare and contrast the composition of residential and commercial waste within the region.

- Figure 7 and Figure 8 summarize the percentage of MSW landfilled by major material group for residential generators and commercial generators, respectively.
- Tables 7 and 8, like Table 6, compare the mean composition of urban, suburban, and rural waste. Table 7 focuses on residential generators in the region, while Table 8 shows the same comparison for commercial generators.

Bulky Waste

The State-wide MSW sort primarily targeted residential and commercial compacting vehicles, as well as commercial compacting and open-top roll-offs carrying non-C&D and non-industrial waste. These loads make up the majority of loads entering the Commonwealth’s disposal facilities. However, it was expected at the outset of the study that some incoming loads of MSW—primarily those in open-top roll-off vehicles—would contain bulky waste that was not conducive to physical sorting. Therefore, the study methodology allowed for selected visual, volumetric sampling of bulky loads to the extent they were observed during the sampling and sorting process.

- Figure 9 shows the weight percentage composition of bulky items by major material group. Bulky loads were found to include a range of materials, including multi-family move-outs, residential and commercial clean-outs, miscellaneous commercial waste, and some renovation and construction type waste (although pure C&D loads were excluded from the analysis).

- Figure 10 lists the top 10 most prevalent bulky materials disposed during the study.

Self Haul Waste

Self haulers were found to deliver only a small fraction of waste to disposal facilities during the study. Our sampling plan allowed for selected sampling of self-haulers, which include: residential haulers of renovation and/or clean-out waste, and commercial contractors hauling small renovation, construction, land clearing, and/or clean-out type waste. Note that an insufficient number of self-haul samples were obtained to develop region-specific results.

Figure 2
Northcentral Region Aggregate MSW Composition

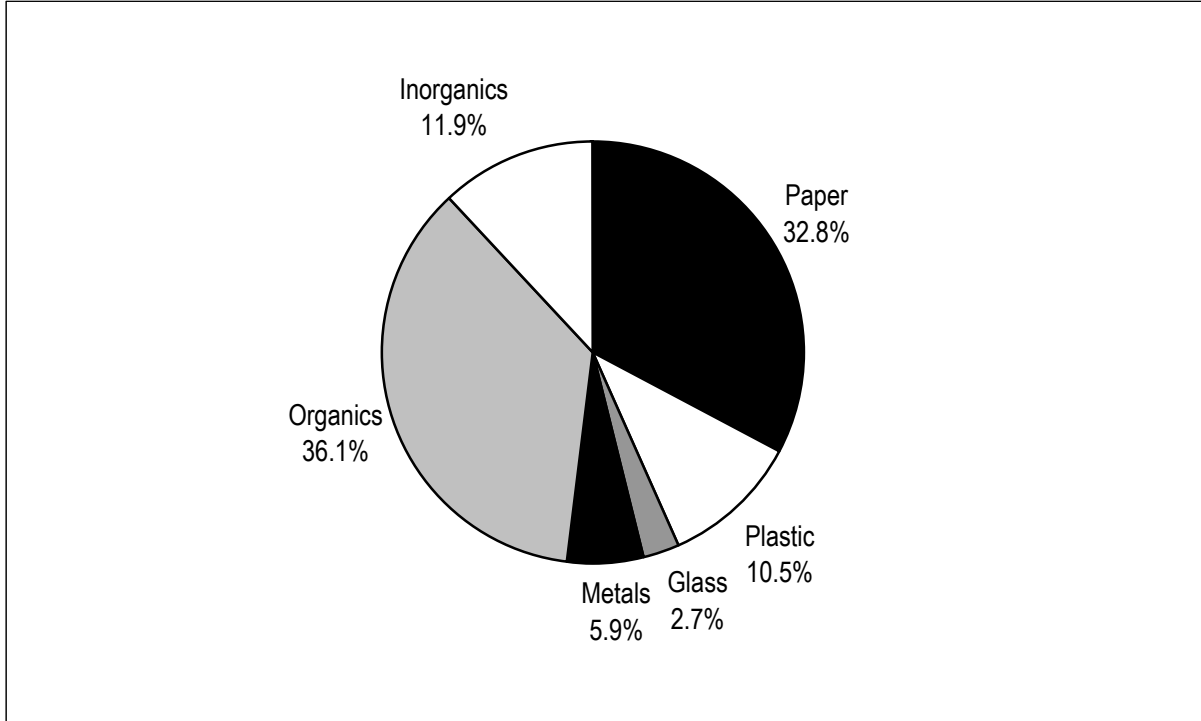


Figure 3
Northcentral Region Aggregate MSW Tons Disposed

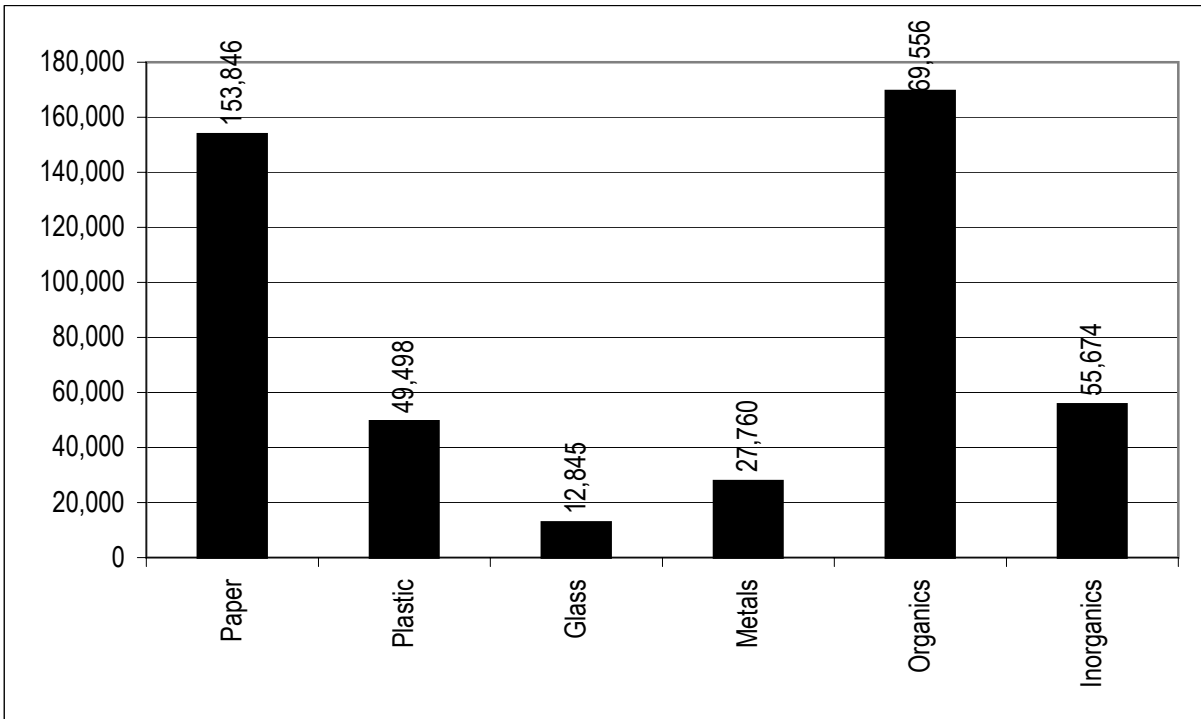


Figure 4
Act 101- Recyclables in Disposed MSW (tons)

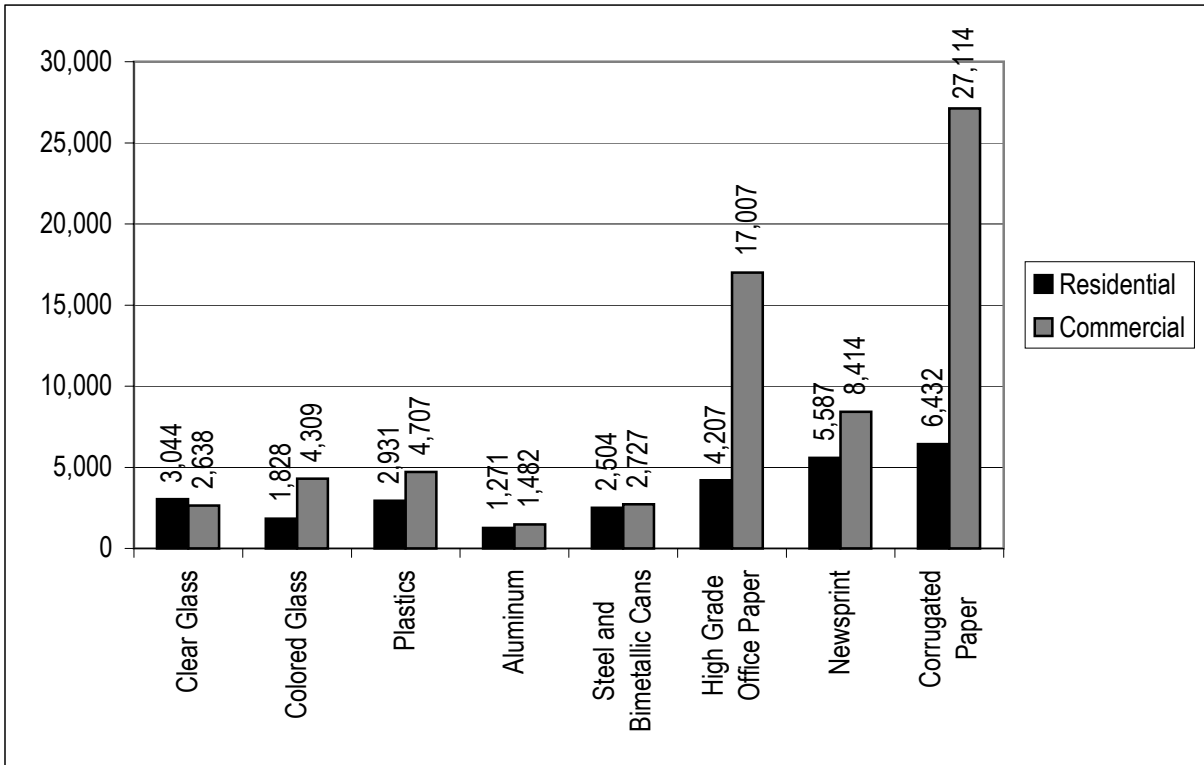
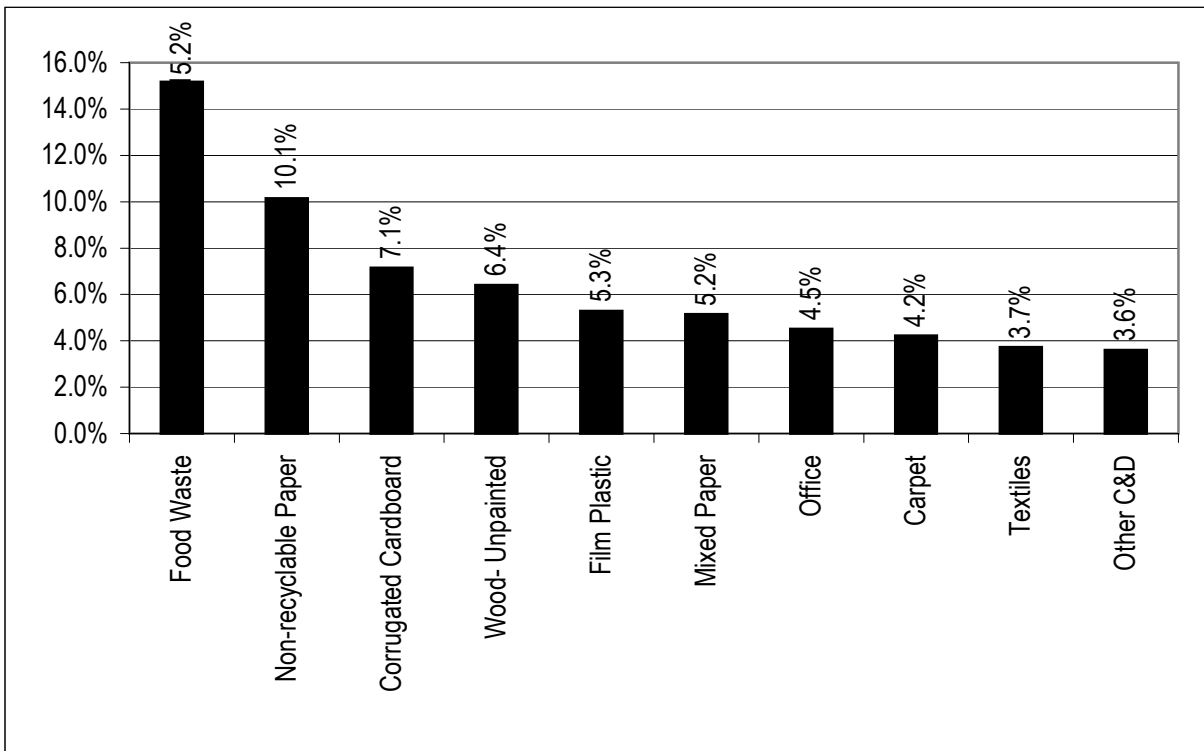


Figure 5
Northcentral Region Top 10 Most Prevalent Materials



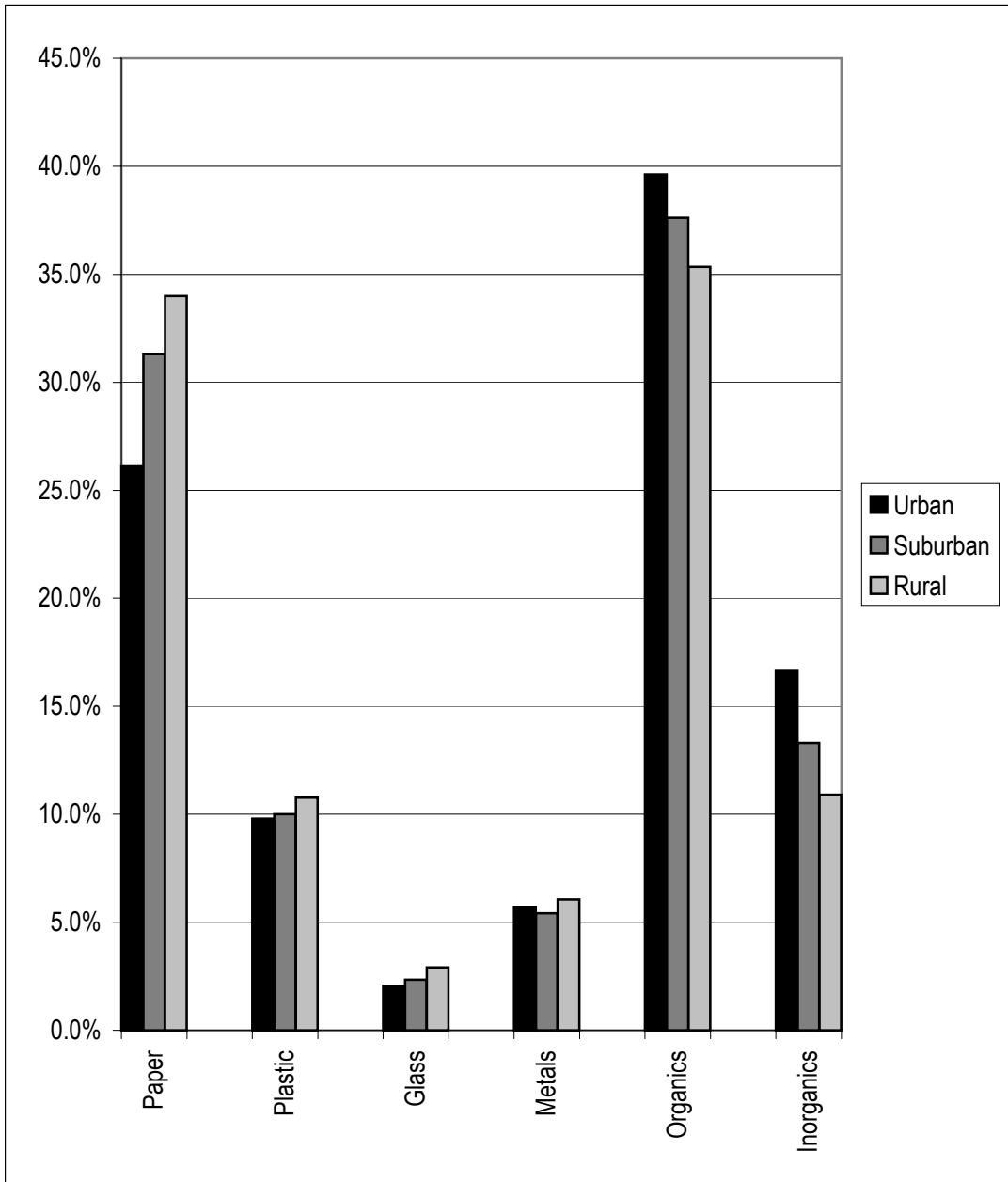
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**Table 5
Northcentral Region Aggregate Landfilled MSW Composition Detail (Weight Percent)**

	Material Categories	Tons Disposed	Mean Composition	Standard Deviation	Confidence Interval		Sampling Error
					Lower (%)	Upper (%)	
Paper		153,846	32.8%	18.7%	29.3%	36.6%	11.1%
	1 Newspaper	14,000	3.0%	3.4%	2.5%	3.7%	19.4%
	2 Corrugated Cardboard	33,546	7.1%	7.5%	5.9%	9.0%	21.7%
	3 Office	21,214	4.5%	5.3%	3.6%	5.9%	25.2%
	4 Magazine/ Glossy	10,904	2.3%	2.6%	2.0%	2.8%	18.9%
	5 Polycoated/Aseptic Containers	2,375	0.5%	0.9%	0.4%	0.6%	23.4%
	6 Mixed Paper	24,225	5.2%	5.4%	4.4%	6.2%	17.7%
	7 Non-recyclable Paper	47,582	10.1%	7.7%	8.8%	12.0%	15.6%
Plastic		49,498	10.5%	7.0%	9.5%	11.7%	10.8%
	8 #1 PET Bottles	4,196	0.9%	0.9%	0.8%	1.1%	18.7%
	9 #2 HDPE Bottles	3,442	0.7%	1.7%	0.6%	0.9%	23.5%
	10 #3-#7 Bottles	531	0.1%	0.4%	0.1%	0.2%	32.0%
	11 Expanded Polystyrene	2,251	0.5%	0.6%	0.4%	0.6%	18.9%
	12 Film Plastic	24,812	5.3%	3.8%	4.6%	6.2%	14.5%
	13 Other Rigid Plastic	14,266	3.0%	3.8%	2.6%	3.6%	16.0%
Glass		12,845	2.7%	6.1%	2.2%	3.4%	22.0%
	14 Clear Glass	5,682	1.2%	2.3%	1.0%	1.5%	23.7%
	15 Green Glass	2,207	0.5%	1.4%	0.3%	0.7%	33.2%
	16 Amber Glass	3,930	0.8%	2.3%	0.6%	1.2%	31.8%
	17 Non-recyclable Glass	1,026	0.2%	2.2%	0.2%	0.3%	39.0%
Metals		27,760	5.9%	9.1%	5.1%	6.9%	14.9%
	18 Steel Cans	5,231	1.1%	1.5%	0.9%	1.4%	20.6%
	19 Aluminum Cans	2,753	0.6%	3.2%	0.4%	0.8%	30.2%
	20 Other Ferrous	13,871	3.0%	7.0%	2.4%	3.8%	24.0%
	21 Other Aluminum	3,959	0.8%	2.2%	0.7%	1.1%	24.5%
	22 Other Non-Ferrous	1,946	0.4%	1.4%	0.3%	0.5%	24.3%
Organics		169,556	36.1%	20.4%	33.0%	39.5%	9.0%
	23 Yard Waste- Grass	6,189	1.3%	3.9%	1.0%	1.9%	35.9%
	24 Yard Waste- Other	8,964	1.9%	5.3%	1.5%	2.5%	27.2%
	25 Wood- Unpainted	30,109	6.4%	15.3%	4.7%	9.1%	33.9%
	26 Wood- Painted	7,129	1.5%	6.1%	1.2%	2.0%	27.1%
	27 Food Waste	71,256	15.2%	13.8%	12.9%	18.3%	17.5%
	28 Textiles	17,518	3.7%	6.8%	3.1%	4.7%	21.3%
	29 Diapers	16,052	3.4%	5.9%	2.7%	4.5%	26.4%
	30 Fines	5,138	1.1%	1.4%	0.9%	1.3%	19.2%
	31 Other Organics	7,202	1.5%	4.1%	1.2%	2.0%	28.1%
Inorganics		55,674	11.9%	22.9%	9.7%	14.5%	20.2%
	32 Electronics	4,610	1.0%	4.6%	0.7%	1.4%	33.7%
	33 Carpet	19,694	4.2%	8.1%	2.8%	6.7%	46.4%
	34 Drywall	5,102	1.1%	6.3%	0.8%	1.5%	30.6%
	35 Other C&D	17,094	3.6%	19.3%	2.7%	5.2%	34.7%
	36 HHW	1,647	0.4%	1.5%	0.3%	0.5%	32.7%
	37 Other Inorganics	6,555	1.4%	2.7%	1.1%	1.8%	24.2%
	38 Furniture	972	0.2%	2.2%	0.1%	0.3%	47.9%
	Total	469,180	100.0%				

Figure 6

Landfilled Aggregate Waste Composition Results by Demographic Sector (Weight Percent)



Material Group	Demographic Sector			Aggregate
	Urban	Suburban	Rural	
Paper	26.1%	31.3%	34.0%	32.8%
Plastic	9.8%	10.0%	10.8%	10.5%
Glass	2.1%	2.3%	2.9%	2.7%
Metals	5.7%	5.4%	6.1%	5.9%
Organics	39.6%	37.6%	35.3%	36.1%
Other Waste	16.7%	13.3%	10.9%	11.9%
Total	100.0%	100.0%	100.0%	100.0%

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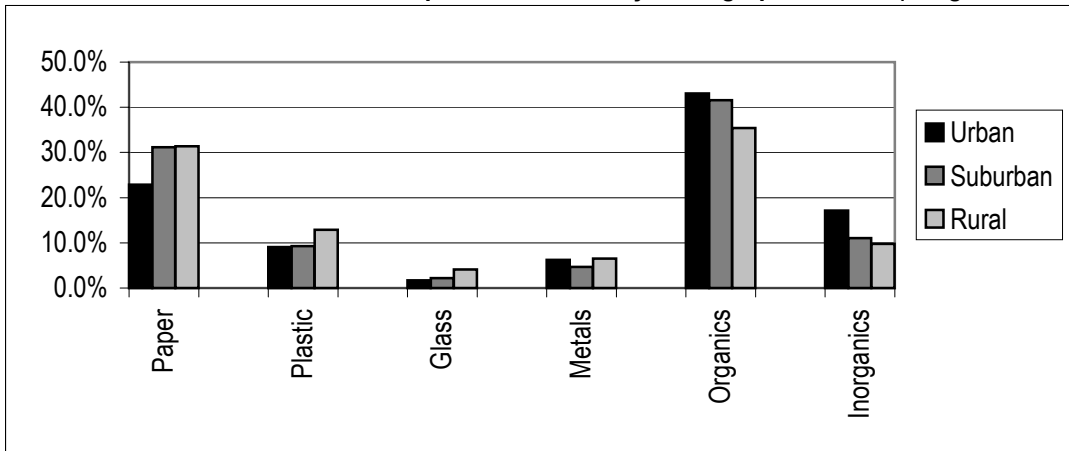
Table 6

Landfilled Aggregate MSW Composition Detail by Demographic Sector (Weight Percent)

	Material Categories	Urban	Suburban	Rural	Aggregate
Paper		26.1%	31.3%	34.0%	32.8%
	1 Newspaper	2.1%	2.2%	3.3%	3.0%
	2 Corrugated Cardboard	6.1%	6.8%	7.4%	7.1%
	3 Office	2.5%	2.8%	5.2%	4.5%
	4 Magazine/ Glossy	1.9%	2.9%	2.2%	2.3%
	5 Polycoated/Aseptic Containers	0.3%	0.5%	0.5%	0.5%
	6 Mixed Paper	5.6%	7.2%	4.6%	5.2%
	7 Non-recyclable Paper	7.7%	9.0%	10.7%	10.1%
Plastic		9.8%	10.0%	10.8%	10.5%
	8 #1 PET Bottles	0.8%	0.9%	0.9%	0.9%
	9 #2 HDPE Bottles	0.4%	0.5%	0.8%	0.7%
	10 #3-#7 Bottles	0.1%	0.1%	0.1%	0.1%
	11 Expanded Polystyrene	0.4%	0.4%	0.5%	0.5%
	12 Film Plastic	5.0%	5.2%	5.3%	5.3%
	13 Other Rigid Plastic	3.2%	2.9%	3.0%	3.0%
Glass		2.1%	2.3%	2.9%	2.7%
	14 Clear Glass	0.9%	1.0%	1.3%	1.2%
	15 Green Glass	0.3%	0.4%	0.5%	0.5%
	16 Amber Glass	0.6%	0.6%	0.9%	0.8%
	17 Non-recyclable Glass	0.2%	0.4%	0.2%	0.2%
Metals		5.7%	5.4%	6.1%	5.9%
	18 Steel Cans	0.5%	0.7%	1.3%	1.1%
	19 Aluminum Cans	0.4%	0.4%	0.6%	0.6%
	20 Other Ferrous	2.9%	2.6%	3.0%	3.0%
	21 Other Aluminum	1.0%	0.8%	0.8%	0.8%
	22 Other Non-Ferrous	0.9%	0.8%	0.3%	0.4%
Organics		39.6%	37.6%	35.3%	36.1%
	23 Yard Waste- Grass	1.3%	0.8%	1.4%	1.3%
	24 Yard Waste- Other	5.1%	4.8%	0.8%	1.9%
	25 Wood- Unpainted	7.5%	6.1%	6.3%	6.4%
	26 Wood- Painted	3.4%	2.0%	1.2%	1.5%
	27 Food Waste	13.7%	15.3%	15.4%	15.2%
	28 Textiles	4.1%	3.9%	3.6%	3.7%
	29 Diapers	1.9%	1.7%	4.0%	3.4%
	30 Fines	1.5%	1.6%	0.9%	1.1%
	31 Other Organics	1.0%	1.4%	1.6%	1.5%
Inorganics		16.7%	13.3%	10.9%	11.9%
	32 Electronics	0.9%	0.8%	1.0%	1.0%
	33 Carpet	3.9%	3.9%	4.3%	4.2%
	34 Drywall	3.9%	2.7%	0.4%	1.1%
	35 Other C&D	6.1%	4.3%	3.2%	3.6%
	36 HHW	0.3%	0.4%	0.3%	0.4%
	37 Other Inorganics	1.6%	1.1%	1.4%	1.4%
	38 Furniture	0.0%	0.1%	0.3%	0.2%
	Total	100.0%	100.0%	100.0%	100.0%

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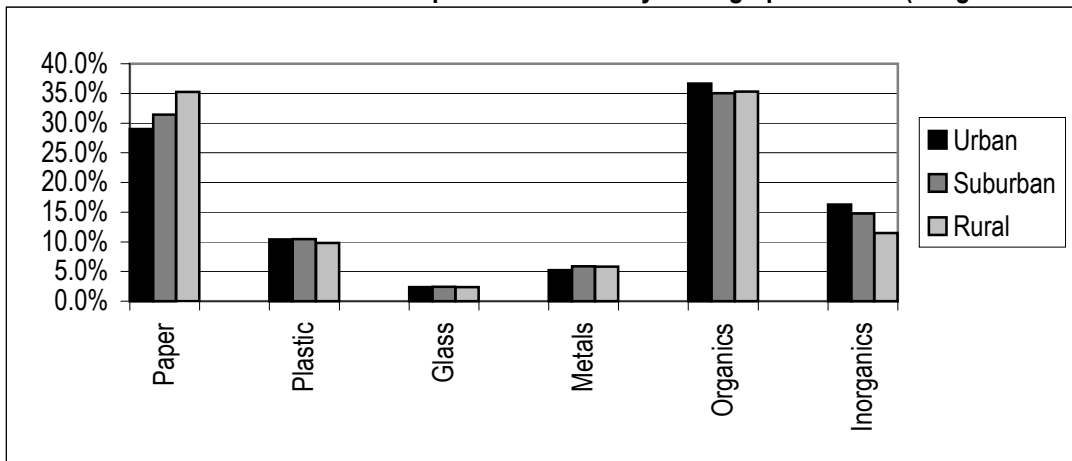
Landfilled Residential MSW Composition Results by Demographic Sector (Weight Percent)



Generator	Demographic Sector			
	Urban	Suburban	Rural	Aggregate
Paper	22.9%	31.2%	31.4%	30.2%
Plastic	9.1%	9.3%	12.9%	11.7%
Glass	1.7%	2.2%	4.1%	3.4%
Metals	6.2%	4.7%	6.5%	6.2%
Organics	43.0%	41.6%	35.4%	37.6%
Other Waste	17.1%	11.0%	9.7%	10.9%
Total	100.0%	100.0%	100.0%	100.0%

Figure 8

Landfilled Commercial MSW Composition Results by Demographic Sector (Weight Percent)



Generator	Demographic Sector			
	Urban	Suburban	Rural	Aggregate
Paper	29.0%	31.4%	35.2%	34.2%
Plastic	10.4%	10.4%	9.8%	9.9%
Glass	2.4%	2.4%	2.4%	2.4%
Metals	5.3%	5.9%	5.8%	5.8%
Organics	36.7%	35.1%	35.3%	35.4%
Other Waste	16.3%	14.8%	11.5%	12.4%
Total	100.0%	100.0%	100.0%	100.0%

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**Table 7
Landfilled Residential MSW Composition Detail by Demographic Sector (Weight Percent)**

	Material Categories	Urban	Suburban	Rural	Aggregate
Paper		22.9%	31.2%	31.4%	30.2%
	1 Newspaper	1.7%	2.0%	4.2%	3.4%
	2 Corrugated Cardboard	4.9%	3.5%	3.9%	4.0%
	3 Office	2.1%	1.3%	3.0%	2.6%
	4 Magazine/ Glossy	1.6%	4.1%	2.5%	2.7%
	5 Polycoated/Aseptic Containers	0.3%	0.9%	0.5%	0.6%
	6 Mixed Paper	5.0%	8.9%	3.7%	4.9%
7 Non-recyclable Paper	7.3%	10.4%	13.5%	12.1%	
Plastic		9.1%	9.3%	12.9%	11.7%
	8 #1 PET Bottles	0.5%	0.6%	1.1%	0.9%
	9 #2 HDPE Bottles	0.3%	0.5%	1.1%	0.9%
	10 #3-#7 Bottles	0.1%	0.2%	0.3%	0.2%
	11 Expanded Polystyrene	0.4%	0.4%	0.8%	0.7%
	12 Film Plastic	4.3%	4.7%	6.9%	6.1%
13 Other Rigid Plastic	3.5%	2.9%	2.7%	2.9%	
Glass		1.7%	2.2%	4.1%	3.4%
	14 Clear Glass	0.8%	0.8%	2.4%	1.9%
	15 Green Glass	0.3%	0.3%	0.4%	0.4%
	16 Amber Glass	0.3%	0.3%	0.9%	0.7%
17 Non-recyclable Glass	0.3%	0.7%	0.4%	0.4%	
Metals		6.2%	4.7%	6.5%	6.2%
	18 Steel Cans	0.5%	0.9%	1.9%	1.5%
	19 Aluminum Cans	0.3%	0.4%	1.0%	0.8%
	20 Other Ferrous	3.4%	1.9%	2.8%	2.7%
	21 Other Aluminum	1.3%	1.0%	0.5%	0.7%
22 Other Non-Ferrous	0.8%	0.6%	0.3%	0.4%	
Organics		43.0%	41.6%	35.4%	37.6%
	23 Yard Waste- Grass	1.8%	0.6%	1.4%	1.3%
	24 Yard Waste- Other	7.8%	7.4%	1.1%	3.2%
	25 Wood- Unpainted	8.0%	7.3%	2.2%	3.9%
	26 Wood- Painted	5.3%	2.8%	1.2%	2.0%
	27 Food Waste	10.2%	12.9%	16.5%	15.0%
	28 Textiles	4.2%	3.8%	4.5%	4.3%
	29 Diapers	3.0%	3.0%	4.3%	3.9%
	30 Fines	1.3%	1.5%	1.4%	1.4%
31 Other Organics	1.4%	2.4%	2.8%	2.5%	
Inorganics		17.1%	11.0%	9.7%	10.9%
	32 Electronics	1.2%	0.5%	1.2%	1.1%
	33 Carpet	2.6%	1.2%	0.7%	1.1%
	34 Drywall	2.4%	2.2%	0.9%	1.3%
	35 Other C&D	9.0%	5.4%	3.8%	4.8%
	36 HHW	0.4%	0.8%	0.8%	0.7%
	37 Other Inorganics	1.5%	1.0%	1.8%	1.6%
38 Furniture	0.0%	0.0%	0.5%	0.4%	
	Total	100.0%	100.0%	100.0%	100.0%

Table 8
Landfilled Commercial MSW Composition Detail by Demographic Sector (Weight Percent)

	Material Categories	Urban	Suburban	Rural	Aggregate
Paper		29.0%	31.4%	35.2%	34.2%
	1 Newspaper	2.4%	2.4%	2.8%	2.7%
	2 Corrugated Cardboard	7.2%	8.8%	9.0%	8.8%
	3 Office	2.9%	3.7%	6.2%	5.5%
	4 Magazine/ Glossy	2.2%	2.2%	2.1%	2.1%
	5 Polycoated/Aseptic Containers	0.2%	0.2%	0.5%	0.5%
	6 Mixed Paper	6.1%	6.0%	5.1%	5.3%
	7 Non-recyclable Paper	8.0%	8.0%	9.4%	9.1%
Plastic		10.4%	10.4%	9.8%	9.9%
	8 #1 PET Bottles	1.0%	1.0%	0.8%	0.9%
	9 #2 HDPE Bottles	0.5%	0.5%	0.7%	0.6%
	10 #3-#7 Bottles	0.0%	0.0%	0.1%	0.1%
	11 Expanded Polystyrene	0.4%	0.4%	0.4%	0.4%
	12 Film Plastic	5.6%	5.6%	4.6%	4.8%
	13 Other Rigid Plastic	2.9%	2.9%	3.2%	3.1%
Glass		2.4%	2.4%	2.4%	2.4%
	14 Clear Glass	1.0%	1.0%	0.8%	0.9%
	15 Green Glass	0.4%	0.4%	0.5%	0.5%
	16 Amber Glass	0.8%	0.8%	0.9%	0.9%
	17 Non-recyclable Glass	0.2%	0.2%	0.1%	0.1%
Metals		5.3%	5.9%	5.8%	5.8%
	18 Steel Cans	0.6%	0.6%	1.0%	0.9%
	19 Aluminum Cans	0.4%	0.5%	0.5%	0.5%
	20 Other Ferrous	2.5%	3.1%	3.2%	3.1%
	21 Other Aluminum	0.8%	0.7%	1.0%	0.9%
	22 Other Non-Ferrous	1.0%	0.9%	0.2%	0.4%
Organics		36.7%	35.1%	35.3%	35.4%
	23 Yard Waste- Grass	0.9%	0.9%	1.5%	1.3%
	24 Yard Waste- Other	2.8%	3.1%	0.7%	1.2%
	25 Wood- Unpainted	7.0%	5.4%	8.3%	7.8%
	26 Wood- Painted	1.8%	1.5%	1.1%	1.2%
	27 Food Waste	16.8%	16.8%	14.8%	15.3%
	28 Textiles	4.0%	4.0%	3.2%	3.4%
	29 Diapers	0.9%	0.9%	3.9%	3.2%
	30 Fines	1.7%	1.7%	0.7%	0.9%
	31 Other Organics	0.7%	0.7%	1.1%	1.0%
Inorganics		16.3%	14.8%	11.5%	12.4%
	32 Electronics	0.6%	1.0%	0.9%	0.9%
	33 Carpet	5.0%	5.6%	6.0%	5.9%
	34 Drywall	5.2%	3.0%	0.1%	1.0%
	35 Other C&D	3.6%	3.6%	2.9%	3.0%
	36 HHW	0.2%	0.2%	0.1%	0.1%
	37 Other Inorganics	1.7%	1.2%	1.2%	1.3%
	38 Furniture	0.0%	0.1%	0.1%	0.1%
	Total	100.0%	100.0%	100.0%	100.0%

Section 7

Figure 9

Northcentral Region Aggregate Composition of Bulky Loads (Visual Samples)

Material Group	% Weight
Paper	12.2%
Plastic	0.9%
Glass	0.1%
Metals	7.7%
Organics	42.0%
Inorganics	37.3%
Total	100.0%

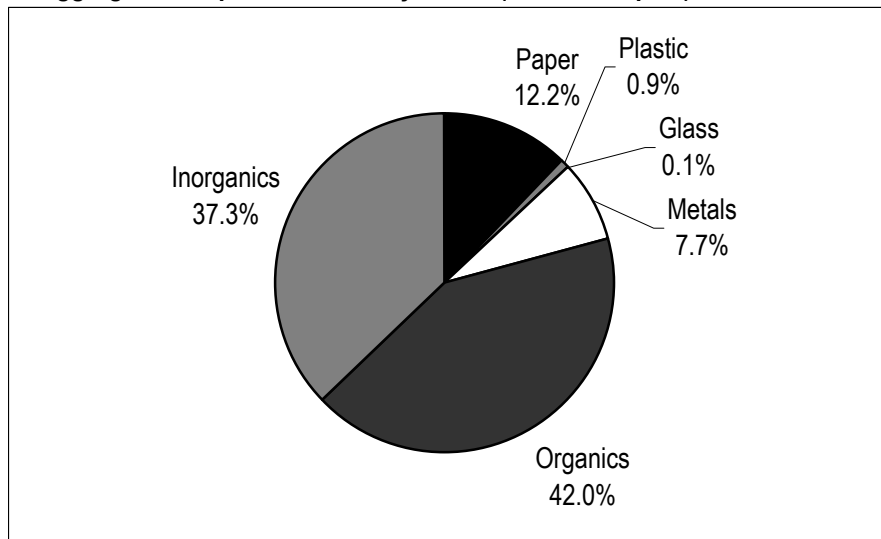


Figure 10

Northcentral Region Top 10 Most Prevalent Bulky Materials

