

Section 11

SOUTHWEST 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 Southwest Region. A map of the Southwest region is shown in Figure 1.

Figure 1 Southwest Region Map



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

Table 1 Southwest Region Demographic Summary

	Urban	Suburban	Rural	Total
Communities [1]	4	254	323	581
Population [1]	391,178	1,540,325	688,399	2,619,902
Housing Units [1]	168,881	654,008	283,027	1,105,916
Employment [2]	220,156	500,628	138,488	859,272

[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 Southwest region in 2001.

Table 2 Southwest Region Waste Disposal Summary [1]

County	MSW Disposed (tons)
Allegheny	1,089,305
Armstrong	30,701
Beaver	86,193
Cambria	86,935
Fayette	75,515
Greene	21,741
Indiana	39,388
Somerset	52,743
Washington	138,750
Westmoreland	250,980
Total	1,872,249

[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 Southwest Region.

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

Waste Generating Sector	Tons of Waste Disposed			
	Urban	Suburban	Rural	Total
Residential generators	152,208	747,890	290,193	1,190,291
Commercial generators	128,887	437,251	115,820	681,959
Total	281,095	1,185,141	406,012	1,872,249

[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:

- Imperial Landfill (Imperial, Allegheny County); and
- Laurel Highlands Landfill (Vintondale, Cambria 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 Southwest Region.

Table 4 Southwest Region Sampling Summary

Waste Generating Sector	Number of Samples			
	Urban	Suburban	Rural	Total
Physical MSW Samples				
Residential	35	40	33	108
Commercial	30	39	25	94
Subtotal—physical samples	65	79	58	202
Visual Bulk Waste Samples	16	38	21	75
Total Samples	81	117	79	277

Regional Aggregate Results

The remainder of this section presents a graphical and tabular summary of the Southwest 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
Southwest Region Aggregate MSW Composition

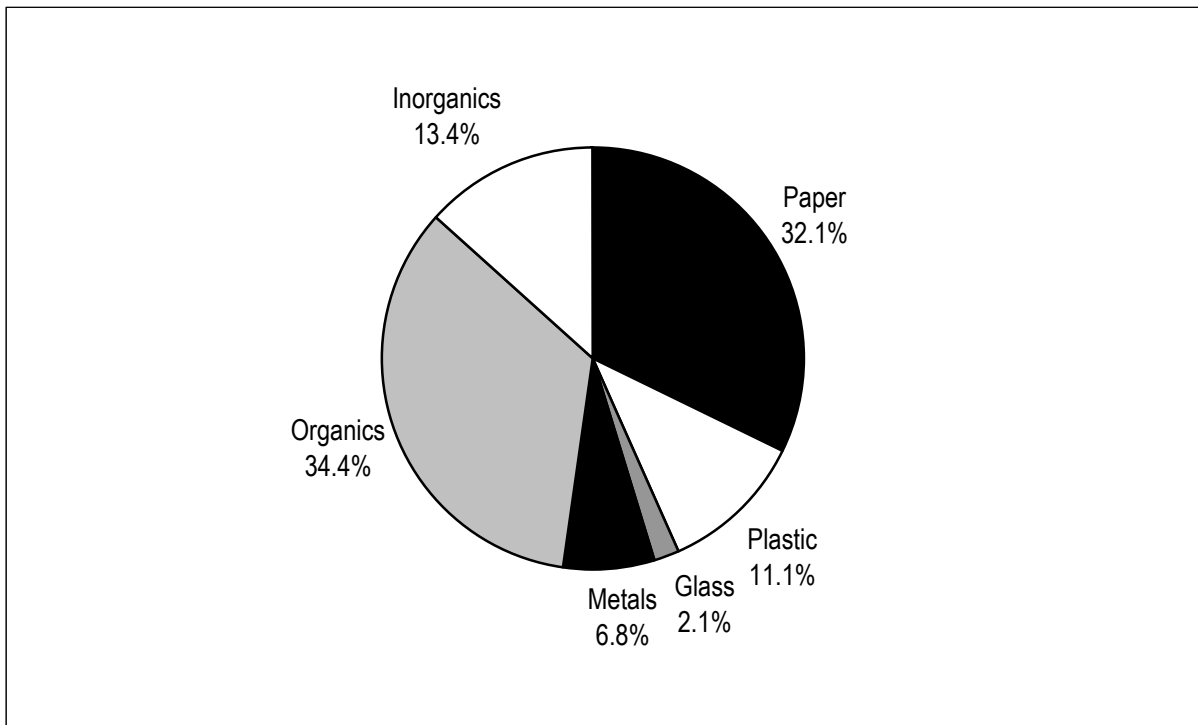


Figure 3
Southwest Region Aggregate MSW Tons Disposed

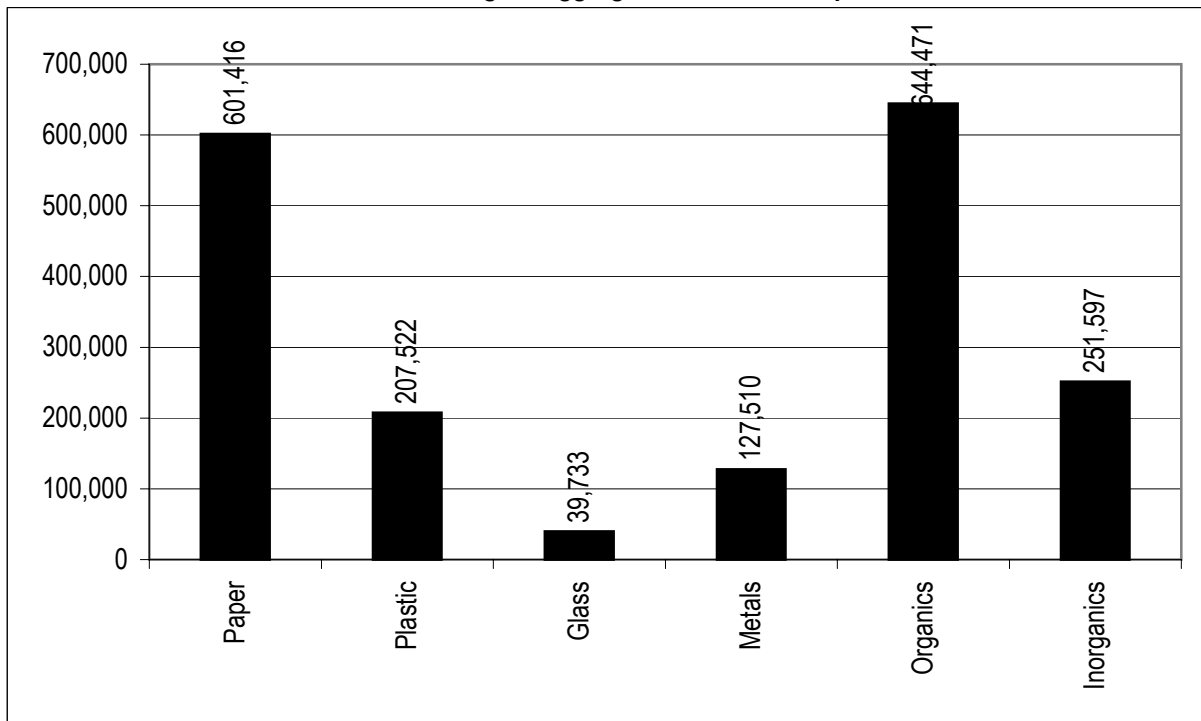


Figure 4
Act 101- Recyclables in Disposed MSW (tons)

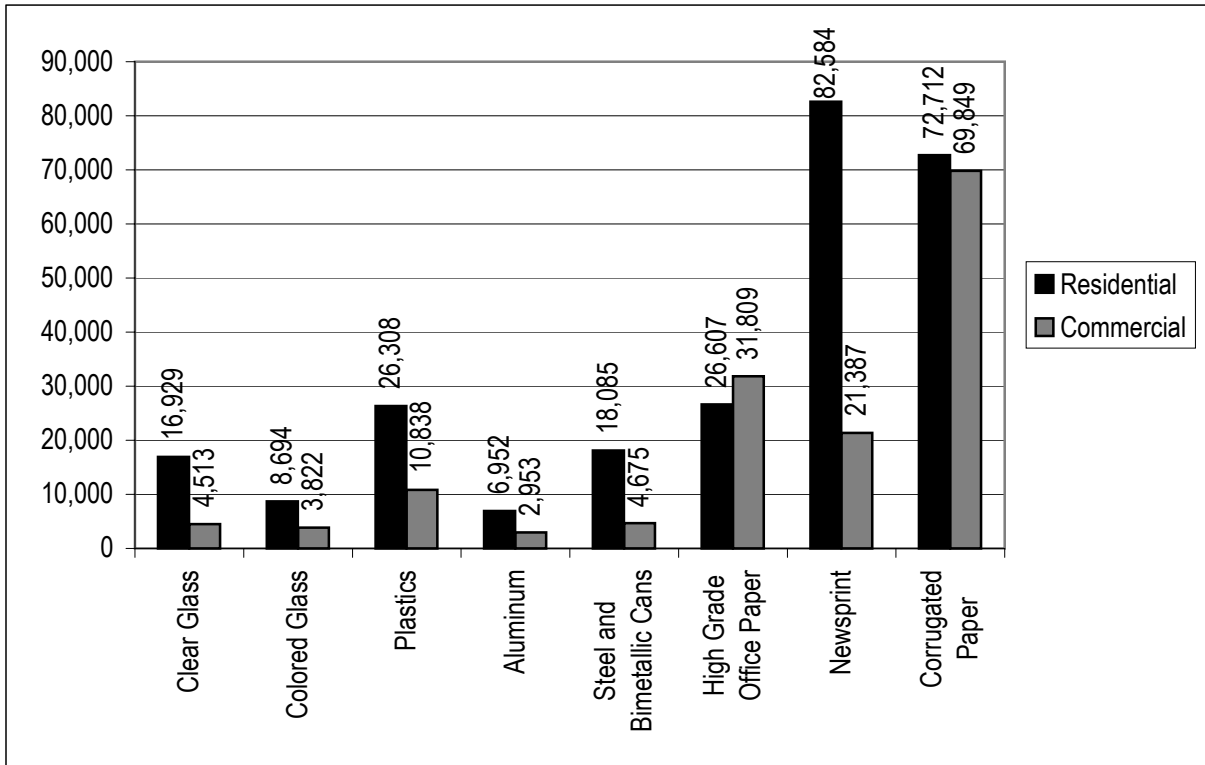
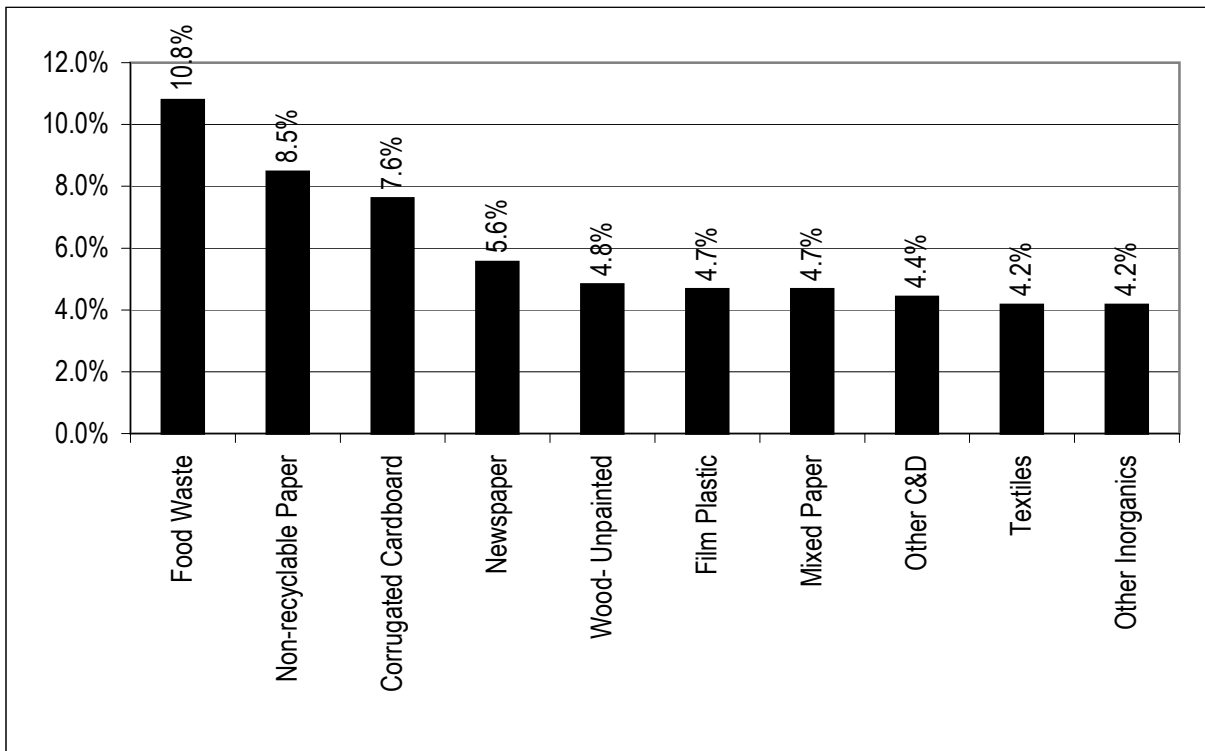


Figure 5
Southwest Region Top 10 Most Prevalent Materials



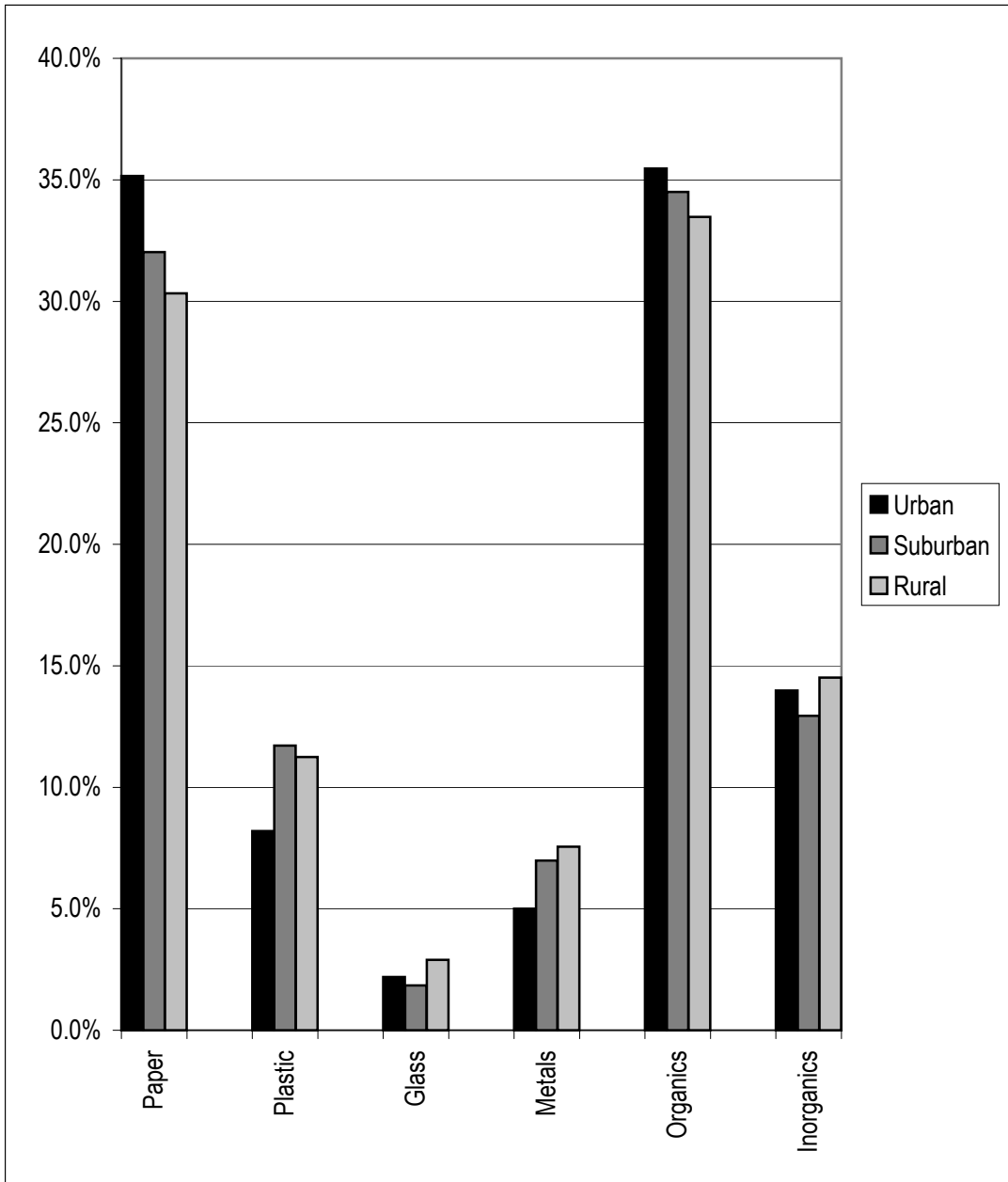
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**Table 5
Southwest Region Aggregate Landfilled MSW Composition Detail (Weight Percent)**

	Material Categories	Tons Disposed	Mean Composition	Standard Deviation	Confidence Interval		Sampling Error
					Lower (%)	Upper (%)	
Paper		601,416	32.1%	20.6%	29.2%	35.3%	9.5%
	1 Newspaper	103,971	5.6%	4.8%	4.8%	6.6%	16.7%
	2 Corrugated Cardboard	142,560	7.6%	11.7%	6.5%	9.1%	17.4%
	3 Office	58,416	3.1%	4.6%	2.6%	3.8%	18.5%
	4 Magazine/ Glossy	41,539	2.2%	3.1%	1.8%	2.7%	20.3%
	5 Polycoated/Aseptic Containers	8,887	0.5%	0.7%	0.4%	0.6%	19.6%
	6 Mixed Paper	87,489	4.7%	6.3%	4.0%	5.6%	16.3%
	7 Non-recyclable Paper	158,554	8.5%	7.8%	7.3%	10.1%	16.7%
Plastic		207,522	11.1%	7.7%	10.0%	12.3%	10.5%
	8 #1 PET Bottles	20,413	1.1%	1.5%	0.9%	1.3%	18.2%
	9 #2 HDPE Bottles	16,733	0.9%	0.8%	0.8%	1.1%	18.3%
	10 #3-#7 Bottles	5,208	0.3%	0.8%	0.2%	0.4%	28.3%
	11 Expanded Polystyrene	13,534	0.7%	0.9%	0.6%	0.9%	18.8%
	12 Film Plastic	87,520	4.7%	4.0%	4.1%	5.5%	14.7%
	13 Other Rigid Plastic	64,114	3.4%	3.7%	3.0%	4.0%	14.4%
Glass		39,733	2.1%	2.4%	1.8%	2.4%	14.3%
	14 Clear Glass	21,442	1.1%	1.3%	1.0%	1.4%	18.7%
	15 Green Glass	4,457	0.2%	0.5%	0.2%	0.3%	27.8%
	16 Amber Glass	8,059	0.4%	1.2%	0.3%	0.6%	26.1%
	17 Non-recyclable Glass	5,775	0.3%	0.9%	0.2%	0.4%	31.2%
Metals		127,510	6.8%	11.6%	5.8%	8.0%	16.4%
	18 Steel Cans	22,759	1.2%	1.4%	1.0%	1.5%	19.9%
	19 Aluminum Cans	9,905	0.5%	1.0%	0.4%	0.6%	18.1%
	20 Other Ferrous	73,469	3.9%	11.1%	3.1%	5.2%	27.3%
	21 Other Aluminum	10,872	0.6%	1.8%	0.5%	0.8%	26.8%
	22 Other Non-Ferrous	10,504	0.6%	1.9%	0.4%	0.8%	31.1%
Organics		644,471	34.4%	21.1%	31.7%	37.3%	8.2%
	23 Yard Waste- Grass	57,833	3.1%	7.8%	2.1%	4.6%	39.9%
	24 Yard Waste- Other	56,154	3.0%	6.2%	2.3%	4.1%	30.3%
	25 Wood- Unpainted	90,281	4.8%	16.3%	3.8%	6.4%	26.7%
	26 Wood- Painted	62,243	3.3%	8.0%	2.8%	4.2%	21.3%
	27 Food Waste	202,064	10.8%	10.9%	9.4%	12.7%	15.1%
	28 Textiles	78,019	4.2%	8.1%	3.5%	5.1%	19.6%
	29 Diapers	55,618	3.0%	5.5%	2.5%	3.7%	21.0%
	30 Fines	16,993	0.9%	0.9%	0.8%	1.1%	19.5%
	31 Other Organics	25,266	1.3%	2.6%	1.1%	1.8%	25.1%
Inorganics		251,597	13.4%	23.7%	11.4%	15.8%	16.4%
	32 Electronics	30,597	1.6%	5.2%	1.3%	2.2%	30.0%
	33 Carpet	32,648	1.7%	6.0%	1.3%	2.4%	30.5%
	34 Drywall	17,989	1.0%	5.9%	0.7%	1.3%	29.0%
	35 Other C&D	82,870	4.4%	15.7%	3.5%	5.8%	25.8%
	36 HHW	5,567	0.3%	2.2%	0.2%	0.4%	32.8%
	37 Other Inorganics	77,924	4.2%	10.7%	3.2%	5.6%	29.6%
	38 Furniture	4,002	0.2%	3.3%	0.1%	0.4%	54.3%
	Total	1,872,249	100.0%				

Figure 6

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



Material Group	Demographic Sector			
	Urban	Suburban	Rural	Aggregate
Paper	35.2%	32.0%	30.3%	32.1%
Plastic	8.2%	11.7%	11.2%	11.1%
Glass	2.2%	1.8%	2.9%	2.1%
Metals	5.0%	7.0%	7.6%	6.8%
Organics	35.5%	34.5%	33.5%	34.4%
Other Waste	14.0%	12.9%	14.5%	13.4%
Total	100.0%	100.0%	100.0%	100.0%

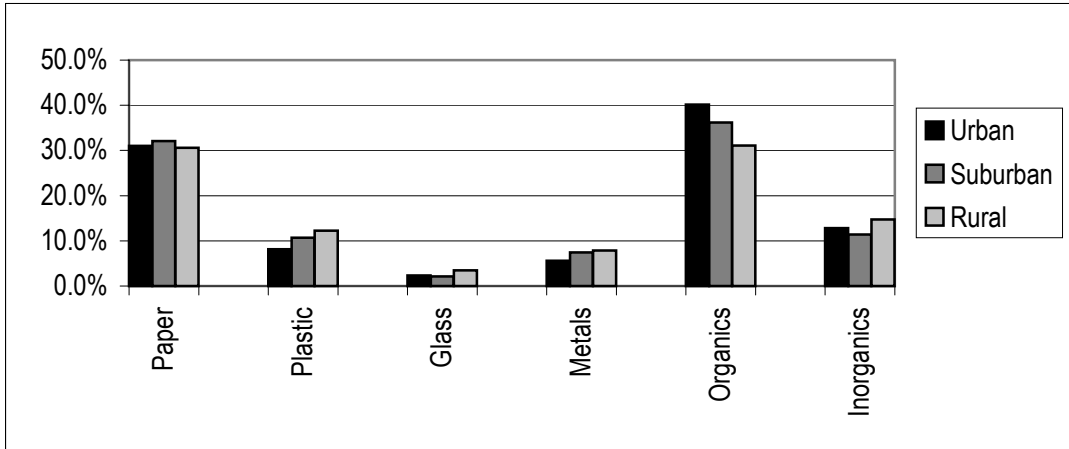
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**Table 6
Landfilled Aggregate MSW Composition Detail by Demographic Sector (Weight Percent)**

	Material Categories	Urban	Suburban	Rural	Aggregate
Paper		35.2%	32.0%	30.3%	32.1%
	1 Newspaper	6.2%	5.3%	6.0%	5.6%
	2 Corrugated Cardboard	9.2%	7.9%	5.6%	7.6%
	3 Office	4.3%	3.0%	2.6%	3.1%
	4 Magazine/ Glossy	2.5%	2.1%	2.5%	2.2%
	5 Polycoated/Aseptic Containers	0.5%	0.5%	0.3%	0.5%
	6 Mixed Paper	5.3%	4.7%	4.2%	4.7%
	7 Non-recyclable Paper	7.2%	8.5%	9.2%	8.5%
Plastic		8.2%	11.7%	11.2%	11.1%
	8 #1 PET Bottles	1.1%	1.1%	1.1%	1.1%
	9 #2 HDPE Bottles	0.5%	0.9%	1.1%	0.9%
	10 #3-#7 Bottles	0.3%	0.3%	0.1%	0.3%
	11 Expanded Polystyrene	0.4%	0.8%	0.6%	0.7%
	12 Film Plastic	3.2%	5.0%	4.7%	4.7%
	13 Other Rigid Plastic	2.6%	3.6%	3.6%	3.4%
Glass		2.2%	1.8%	2.9%	2.1%
	14 Clear Glass	1.2%	1.0%	1.4%	1.1%
	15 Green Glass	0.4%	0.2%	0.3%	0.2%
	16 Amber Glass	0.5%	0.4%	0.6%	0.4%
	17 Non-recyclable Glass	0.1%	0.3%	0.6%	0.3%
Metals		5.0%	7.0%	7.6%	6.8%
	18 Steel Cans	1.1%	1.1%	1.8%	1.2%
	19 Aluminum Cans	0.5%	0.5%	0.7%	0.5%
	20 Other Ferrous	2.0%	4.3%	4.1%	3.9%
	21 Other Aluminum	0.7%	0.6%	0.5%	0.6%
	22 Other Non-Ferrous	0.7%	0.6%	0.5%	0.6%
Organics		35.5%	34.5%	33.5%	34.4%
	23 Yard Waste- Grass	2.2%	3.5%	2.4%	3.1%
	24 Yard Waste- Other	5.1%	2.7%	2.3%	3.0%
	25 Wood- Unpainted	5.7%	4.9%	3.9%	4.8%
	26 Wood- Painted	5.4%	2.8%	3.5%	3.3%
	27 Food Waste	9.0%	11.0%	11.5%	10.8%
	28 Textiles	4.2%	4.1%	4.3%	4.2%
	29 Diapers	1.5%	3.0%	3.9%	3.0%
	30 Fines	1.0%	0.9%	0.8%	0.9%
	31 Other Organics	1.4%	1.5%	0.8%	1.3%
Inorganics		14.0%	12.9%	14.5%	13.4%
	32 Electronics	3.0%	1.6%	0.8%	1.6%
	33 Carpet	1.8%	1.7%	1.7%	1.7%
	34 Drywall	2.7%	0.6%	0.8%	1.0%
	35 Other C&D	3.4%	3.8%	7.0%	4.4%
	36 HHW	0.2%	0.3%	0.3%	0.3%
		37 Other Inorganics	2.8%	4.6%	4.0%
	38 Furniture	0.0%	0.3%	0.0%	0.2%
	Total	100.0%	100.0%	100.0%	100.0%

Figure 7

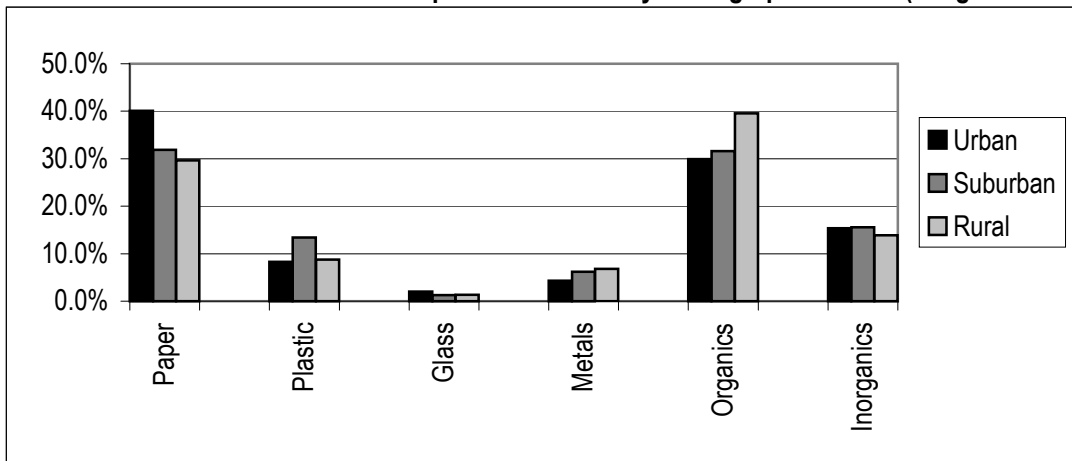
Landfilled Residential MSW Composition Results by Demographic Sector (Weight Percent)



Generator	Demographic Sector			
	Urban	Suburban	Rural	Aggregate
Paper	31.0%	32.1%	30.6%	31.6%
Plastic	8.1%	10.7%	12.2%	10.8%
Glass	2.4%	2.2%	3.5%	2.5%
Metals	5.6%	7.5%	7.9%	7.3%
Organics	40.1%	36.2%	31.1%	35.4%
Other Waste	12.8%	11.4%	14.7%	12.4%
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	40.1%	31.9%	29.6%	33.1%
Plastic	8.3%	13.4%	8.8%	11.7%
Glass	2.0%	1.3%	1.4%	1.4%
Metals	4.3%	6.2%	6.8%	5.9%
Organics	29.9%	31.6%	39.5%	32.7%
Other Waste	15.4%	15.6%	13.9%	15.3%
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		31.0%	32.1%	30.6%	31.6%
	1 Newspaper	7.5%	6.6%	7.6%	6.9%
	2 Corrugated Cardboard	4.9%	6.9%	4.6%	6.1%
	3 Office	2.6%	2.4%	1.6%	2.2%
	4 Magazine/ Glossy	3.3%	2.4%	2.9%	2.6%
	5 Polycoated/Aseptic Containers	0.5%	0.4%	0.4%	0.4%
	6 Mixed Paper	5.0%	4.4%	3.0%	4.1%
7 Non-recyclable Paper	7.2%	9.1%	10.5%	9.2%	
Plastic		8.1%	10.7%	12.2%	10.8%
	8 #1 PET Bottles	0.9%	1.1%	1.3%	1.1%
	9 #2 HDPE Bottles	0.7%	1.0%	1.3%	1.1%
	10 #3-#7 Bottles	0.4%	0.2%	0.1%	0.2%
	11 Expanded Polystyrene	0.6%	0.7%	0.7%	0.7%
	12 Film Plastic	3.3%	4.3%	5.0%	4.4%
13 Other Rigid Plastic	2.3%	3.3%	3.8%	3.3%	
Glass		2.4%	2.2%	3.5%	2.5%
	14 Clear Glass	1.5%	1.3%	1.7%	1.4%
	15 Green Glass	0.2%	0.2%	0.3%	0.2%
	16 Amber Glass	0.6%	0.4%	0.7%	0.5%
17 Non-recyclable Glass	0.1%	0.3%	0.8%	0.4%	
Metals		5.6%	7.5%	7.9%	7.3%
	18 Steel Cans	1.1%	1.4%	2.2%	1.5%
	19 Aluminum Cans	0.6%	0.4%	0.9%	0.6%
	20 Other Ferrous	2.4%	4.4%	3.6%	3.9%
	21 Other Aluminum	0.6%	0.7%	0.6%	0.7%
22 Other Non-Ferrous	0.9%	0.6%	0.5%	0.6%	
Organics		40.1%	36.2%	31.1%	35.4%
	23 Yard Waste- Grass	2.4%	5.5%	2.8%	4.5%
	24 Yard Waste- Other	8.5%	3.5%	3.1%	4.1%
	25 Wood- Unpainted	5.8%	3.9%	2.4%	3.8%
	26 Wood- Painted	4.2%	2.2%	2.6%	2.6%
	27 Food Waste	9.1%	10.8%	11.5%	10.7%
	28 Textiles	4.1%	5.1%	3.5%	4.6%
	29 Diapers	2.1%	2.4%	3.3%	2.6%
	30 Fines	1.5%	1.2%	1.0%	1.2%
31 Other Organics	2.5%	1.6%	0.8%	1.5%	
Inorganics		12.8%	11.4%	14.7%	12.4%
	32 Electronics	2.9%	1.6%	0.8%	1.6%
	33 Carpet	1.7%	1.5%	2.0%	1.6%
	34 Drywall	2.5%	0.4%	0.9%	0.8%
	35 Other C&D	3.1%	2.5%	7.9%	3.9%
	36 HHW	0.1%	0.3%	0.4%	0.3%
	37 Other Inorganics	2.5%	4.9%	2.8%	4.1%
38 Furniture	0.0%	0.1%	0.0%	0.1%	
	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		40.1%	31.9%	29.6%	33.1%
	1 Newspaper	4.6%	3.0%	2.1%	3.1%
	2 Corrugated Cardboard	14.2%	9.7%	7.9%	10.2%
	3 Office	6.3%	4.1%	4.9%	4.7%
	4 Magazine/ Glossy	1.6%	1.5%	1.4%	1.5%
	5 Polycoated/Aseptic Containers	0.4%	0.8%	0.2%	0.6%
	6 Mixed Paper	5.6%	5.3%	7.2%	5.7%
7 Non-recyclable Paper	7.3%	7.5%	5.9%	7.2%	
Plastic		8.3%	13.4%	8.8%	11.7%
	8 #1 PET Bottles	1.4%	1.0%	0.5%	1.0%
	9 #2 HDPE Bottles	0.3%	0.7%	0.6%	0.6%
	10 #3-#7 Bottles	0.2%	0.6%	0.1%	0.4%
	11 Expanded Polystyrene	0.3%	1.1%	0.4%	0.8%
	12 Film Plastic	3.1%	6.1%	3.9%	5.2%
13 Other Rigid Plastic	3.0%	3.9%	3.2%	3.6%	
Glass		2.0%	1.3%	1.4%	1.4%
	14 Clear Glass	0.9%	0.6%	0.6%	0.7%
	15 Green Glass	0.6%	0.1%	0.2%	0.2%
	16 Amber Glass	0.3%	0.3%	0.2%	0.3%
17 Non-recyclable Glass	0.1%	0.2%	0.3%	0.2%	
Metals		4.3%	6.2%	6.8%	5.9%
	18 Steel Cans	1.1%	0.5%	0.8%	0.7%
	19 Aluminum Cans	0.3%	0.5%	0.3%	0.4%
	20 Other Ferrous	1.7%	4.2%	5.3%	3.9%
	21 Other Aluminum	0.9%	0.4%	0.2%	0.4%
22 Other Non-Ferrous	0.4%	0.5%	0.2%	0.5%	
Organics		29.9%	31.6%	39.5%	32.7%
	23 Yard Waste- Grass	2.1%	0.0%	1.6%	0.7%
	24 Yard Waste- Other	1.0%	1.4%	0.3%	1.2%
	25 Wood- Unpainted	5.6%	6.7%	7.8%	6.7%
	26 Wood- Painted	6.8%	3.8%	5.8%	4.7%
	27 Food Waste	8.8%	11.4%	11.3%	10.9%
	28 Textiles	4.4%	2.5%	6.3%	3.5%
	29 Diapers	0.7%	3.9%	5.4%	3.6%
	30 Fines	0.5%	0.4%	0.3%	0.4%
31 Other Organics	0.1%	1.5%	0.7%	1.1%	
Inorganics		15.4%	15.6%	13.9%	15.3%
	32 Electronics	3.2%	1.6%	0.7%	1.7%
	33 Carpet	2.0%	2.2%	0.9%	2.0%
	34 Drywall	2.9%	1.0%	0.5%	1.2%
	35 Other C&D	3.8%	5.9%	4.8%	5.4%
	36 HHW	0.3%	0.3%	0.1%	0.3%
	37 Other Inorganics	3.1%	3.9%	6.9%	4.3%
38 Furniture	0.1%	0.7%	0.0%	0.5%	
	Total	100.0%	100.0%	100.0%	100.0%

Figure 9

Southwest Region Aggregate Composition of Bulky Loads (Visual Samples)

Material Group	% Weight
Paper	21.2%
Plastic	1.4%
Glass	0.7%
Metals	6.3%
Organics	33.5%
Inorganics	37.0%
Total	100.0%

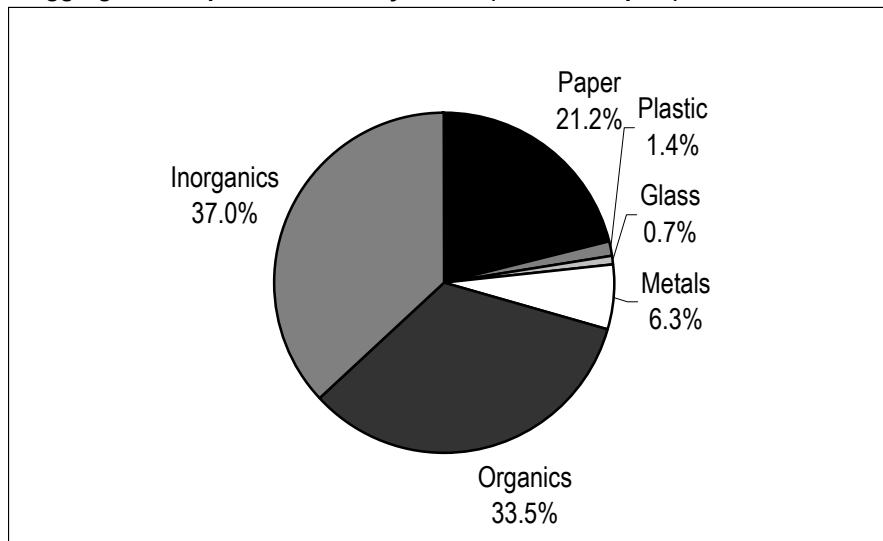


Figure 10

Southwest Region Top 10 Most Prevalent Bulky Materials

