Seattle Public Utilities

1998/99 Residential Waste Stream Composition Study

Final Report

prepared by

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1 OVERVIEW

1.1 Introduction

Effective solid waste management begins with knowing what is in the waste stream - how much of which types of material is disposed by each generator type. This basic information is essential to all aspects of policy and program implementation. Thus, the City of Seattle Public Utilities (formerly Solid Waste Utility) first launched an ongoing waste composition study in 1988. The objectives of this study include:

- Obtaining information for characterizing the total waste stream
- Establishing a baseline for continued long-term measurement of system performance
- Obtaining specific information about various waste substreams to enable the City to estimate the recycling potential within each one
- Understanding the differences between substreams so that targeted recycling programs can be designed, implemented, and monitored
- Creating and maintaining a database for ongoing evaluation and analysis of waste composition data

This report summarizes the results of the waste samples taken during 1998/99 waste composition study. Table 1-1 below shows the number waste samples obtained since the start of this project.

Table 1-1 Samples per Study Period, by Substream

	Number of Samples			
Year	**Commercial**	**Residential**	**Self-Haul**	**Overall**
1988-89	121	212	217	550
1990	0	114	203	317
1992	251	0	197	448
1994-95	0	368	0	368
1996	348	0	199	547
1998-99	0	360	0	360
Study to date	**720**	**1,054**	**816**	**2,590**

This report provides composition estimates for Seattle's residential waste stream based on sampling conducted from May 1998 through April 1999. Cascadia Consulting Group served as the prime contractor for this research. Sky Valley Associates conducted the fieldwork, and E. Ashley Steel provided the statistical analysis.

This report is organized into four sections. Section 1 briefly summarizes the project and Section 2 provides an overview of the results obtained during the 1998/99 sampling period. In Section 3, findings from this year's study are compared to the results obtained four and ten years ago. Complete results of the residential waste sampling by generator type, service area, season, and demographics are presented in Section 4. Detailed appendices follow the main body of the report.

1.2 Sources of Disposed Waste

For any specific geographic area, the total waste stream is composed of various substreams. A "waste substream" is determined by the particular generation and collection characteristics which make it a unique portion of the total waste stream. The City of Seattle has three substreams: commercial, residential, and self-haul. In 1998/99, only the residential substream was studied. No self-haul or commercial loads were sampled.

For comparison purposes, the residential substream was divided into four sectors by residence type and service area: single-family north, single-family south, multi-family north, and multi-family south. In Seattle, these four sectors are defined as follows:

- ***Single-family north:*** Primarily detached single-family, duplex, triplex, and four-plex homes located north of Yesler Way. Waste is collected from trashcans by a city-contracted hauler.
- ***Single-family south***: Primarily detached single-family, duplex, triplex, and four-plex homes located south of Yesler Way. Waste is collected from trashcans by a city-contracted hauler.
- ***Multi-family north:*** Primarily apartments and condominiums with five or more units located north of Yesler Way. Waste is collected from dumpsters by a city-contracted hauler.
- ***Multi-family south:*** Primarily apartments and condominiums with five or more units located south of Yesler Way. Waste is collected from dumpsters by a city-contracted hauler.

It should be noted that this study measures waste disposal, not generation. (Waste generation equals the sum of disposed and recycled amounts.) The samples were taken from loads destined for the landfill and do not include tonnage collected through recycling or yard waste composting programs.

For a full account of the project's methodology, please see Appendix B.

2 SUMMARY OF 1998/99 SAMPLING RESULTS

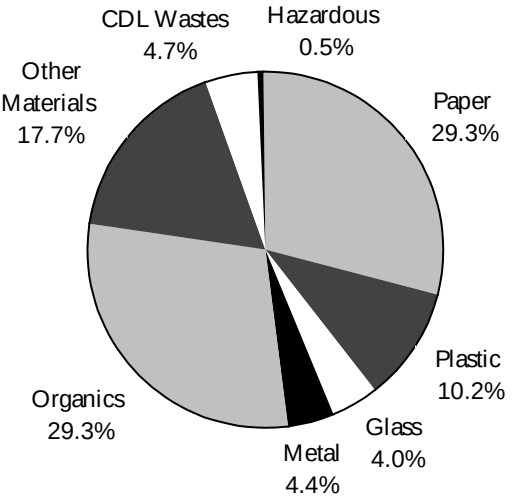
2.1 Overall Residential Waste

The 1998/99 phase of Seattle's waste study focused on the residential substream. Samples were allocated to the north and south service areas, and to the single- and multi-family sectors. Thus, in order to accurately characterize the overall residential waste stream, composition estimates were calculated by performing a weighted average based on residence type and service area. Please see Appendix D for more detail regarding the weighted average calculations.

The composition results, by weight, are illustrated in Figure 2-1.[1] Paper and organics categories accounted for more than half (58.6%) of the residential waste stream. The following four components accounted for 49.9% of the overall residential substream. The complete results are presented in Table 2-2.

- Food 26.7% Mean tonnage estimate 39,087
- Mixed Low Grade Paper 10.5% Mean tonnage estimate 15,402
- Animal by-products 6.5% Mean tonnage estimate 9,462
- Compostable/Soiled Paper 6.2% Mean tonnage estimate 9,026

Figure 2-1 Composition Summary: Overall Residential
(May 1998 – April 1999)



[1] All waste composition estimates were derived using a 90% confidence level. This means that there is a 90% certainty that the actual composition is within the calculated range.

2.2 Residential Waste by Subpopulation

Waste composition estimates were also calculated for various subpopulations of Seattle's residential waste stream including:

- *Residence type:* single-family and multi-family
- *Service area:* north and south
- *Residence type combined with service area:* single-family north and single-family south
- *Season:* spring, summer, fall, and winter
- *Household income*: low and high
- *Household size*: small and large

As with the overall estimates, weighted averages were used to calculate composition estimates by residence type, service area, and season. The largest components for each subpopulation (each accounting for more than 5%) are shown in Table 2-1. Food, mixed low grade paper, and compostable/soiled paper are large components in all the subpopulations. Frequently, animal by-products (which includes animal wastes and kitty litter) were also a large component of the waste stream.

Table 2-1 Largest Waste Components, by Subpopulation
(May 1998 – April 1999)

Subpopulation	Food	Mixed Low Grade Paper	Compostable/ Soiled Paper	Animal by-Products	Disposable Diapers	Newspaper	OCC/Kraft, unwaxed	Sum of Largest
Single-family	30.6%	9.4%	6.8%	6.9%	5.1%			58.8%
Multi-family	21.0%	12.1%	5.2%	5.8%		6.9%	5.7%	56.7%
North Service Area	25.0%	11.1%	5.9%	7.4%		5.2%		54.6%
South Service Area	30.1%	9.3%	6.6%		5.6%			51.6%
Single-family North	28.7%	10.0%	6.7%	8.3%				53.7%
Single-family South	33.4%	8.4%	7.1%		6.3%			55.2%
Spring	24.3%	10.2%	6.5%	7.1%		5.3%		53.4%
Summer	26.2%	11.2%	5.8%	5.6%				48.8%
Fall	29.6%	10.5%	5.8%	5.6%				51.5%
Winter	26.2%	10.4%	6.4%	7.5%				50.5%
Low Income	32.8%	8.1%	6.7%	5.1%	5.8%			58.5%
High Income	27.6%	9.7%	6.6%	8.4%				52.3%
Small Households	28.3%	10.4%	6.7%	8.2%				53.6%
Large Households	35.5%	8.5%	7.2%		6.2%			57.4%
Overall Residential	26.7%	10.5%	6.2%	6.5%				49.9%

The following conclusions can be drawn from the waste composition estimates of the overall residential substream and for each subpopulation within:

- The broad waste categories of paper and organics typically accounted for about half of the waste stream.
- Food, low-grade paper, and compostable/soiled paper were always among the largest components. Animal by-products (which include animal wastes and kitty litter) were a large component of the waste stream in the overall residential substream and many of its subpopulations.
- The composition estimates of the largest components within each subpopulation were similar. The main differences appear to be the following[2]:
  - single-family residences disposed more food than multi-family; multi-family residences disposed more mixed low grade paper,
  - in the north more mixed low grade paper was disposed than in the south; the south disposed more food,
  - low income residences disposed more food than high income residences,
  - and small households disposed more mixed low grade paper but less food than large households.

[2] No statistical tests were performed to identify differences between subpopulations in the estimated percentage of each component disposed. Therefore, the comparisons mentioned in this paragraph may not be statistically significant.

Table 2-2 Composition by Weight: Overall Residential
(May 1998- April 1999)

Calculated at a 90% confidence interval

	Tons	Mean	Low	High		Tons	Mean	Low	High
Paper	**42,965**	**29.3%**			***Organics***	**42,914**	**29.3%**		
Newspaper	6,885	4.7%	4.4%	5.0%	Pallets	39	0.0%	0.0%	0.1%
OCC/Kraft, unwaxed	6,282	4.3%	4.0%	4.6%	Crates/Boxes	35	0.0%	0.0%	0.0%
OCC/Kraft, waxed	180	0.1%	0.0%	0.3%	Leaves and Grass	3,191	2.2%	1.7%	2.6%
Office Paper	1,218	0.8%	0.7%	1.0%	Prunings	562	0.4%	0.3%	0.5%
Computer Paper	33	0.0%	0.0%	0.0%	Food	39,087	26.7%	26.0%	27.3%
Mixed Low Grade	15,402	10.5%	10.1%	10.9%	***Other Materials***	**25,946**	**17.7%**		
Phone Books	597	0.4%	0.3%	0.5%	Textiles/Clothing	2,992	2.0%	1.9%	2.2%
Milk/Juice Polycoats	945	0.6%	0.6%	0.7%	Carpet/Upholstery	2,106	1.4%	1.2%	1.7%
Frozen Food Polycoats	431	0.3%	0.3%	0.3%	Leather	241	0.2%	0.1%	0.2%
Compostable/Soiled	9,026	6.2%	5.9%	6.4%	Disposable Diapers	5,872	4.0%	3.7%	4.3%
Paper/Other Materials	1,812	1.2%	1.1%	1.3%	Animal By-Products	9,462	6.5%	5.9%	7.0%
Other Paper	154	0.1%	0.1%	0.1%	Rubber Products	274	0.2%	0.1%	0.2%
Plastic	**14,889**	**10.2%**			Tires	263	0.2%	0.1%	0.3%
PET Pop and Liquor	591	0.4%	0.4%	0.4%	Ash	395	0.3%	0.1%	0.4%
Other PET Bottles	235	0.2%	0.1%	0.2%	Furniture	935	0.6%	0.4%	0.9%
HDPE Milk and Juice	365	0.2%	0.2%	0.3%	Mattresses	165	0.1%	0.0%	0.3%
Other HDPE Bottles	571	0.4%	0.4%	0.4%	Small Appliances	571	0.4%	0.3%	0.5%
Other Plastic Bottles	246	0.2%	0.2%	0.2%	A/V Equipment	640	0.4%	0.2%	0.6%
Jars and Tubs	741	0.5%	0.5%	0.5%	Ceramics/Porcelain	335	0.2%	0.2%	0.3%
Expanded Polystyrene	926	0.6%	0.5%	0.8%	Non-distinct Fines	700	0.5%	0.4%	0.6%
Other Rigid Packaging	1,420	1.0%	0.9%	1.0%	Misc. Organics	534	0.4%	0.2%	0.5%
Grocery/Bread Bags	2,075	1.4%	1.4%	1.5%	Misc. Inorganics	460	0.3%	0.2%	0.4%
Garbage Bags	1,861	1.3%	1.2%	1.4%	***CDL Wastes***	**6,867**	**4.7%**		
Other Film	3,578	2.4%	2.3%	2.6%	Dimension Lumber	1,318	0.9%	0.6%	1.2%
Plastic Products	1,244	0.8%	0.8%	0.9%	Other Untreated Wood	437	0.3%	0.2%	0.4%
Plastic/Other Materials	1,036	0.7%	0.6%	0.8%	Treated Wood	958	0.7%	0.5%	0.8%
Glass	**5,926**	**4.0%**			Contaminated Wood	282	0.2%	0.1%	0.3%
Clear Beverage	1,508	1.0%	0.9%	1.1%	New Gypsum Scrap	6	0.0%	0.0%	0.0%
Green Beverage	1,226	0.8%	0.7%	0.9%	Demo Gypsum Scrap	620	0.4%	0.2%	0.6%
Brown Beverage	1,261	0.9%	0.7%	1.0%	Fiberglass Insulation	51	0.0%	0.0%	0.1%
Container Glass	1,303	0.9%	0.8%	1.0%	Rock/Concrete/Brick	948	0.6%	0.2%	1.1%
Fluorescent Tubes	7	0.0%	0.0%	0.0%	Asphaltic Roofing	217	0.1%	0.1%	0.2%
Other Glass	622	0.4%	0.3%	0.5%	Other Construction Debris	451	0.3%	0.2%	0.4%
Metal	**6,461**	**4.4%**			Sand/Soil/Dirt	1,580	1.1%	0.7%	1.4%
Aluminum Cans	724	0.5%	0.5%	0.5%	***Hazardous***	**692**	**0.5%**		
Alum. Foil/Containers	359	0.2%	0.2%	0.3%	Latex Paints	67	0.0%	0.0%	0.1%
Other Aluminum	53	0.0%	0.0%	0.1%	Hazardous Adhesives/Glues	12	0.0%	0.0%	0.0%
Other Nonferrous	88	0.1%	0.0%	0.1%	NonHazardous Adhesives/Glues	49	0.0%	0.0%	0.1%
Tin Food Cans	1,890	1.3%	1.2%	1.4%	Oil-based Paints/Solvents	5	0.0%	0.0%	0.0%
Empty Aerosol Cans	269	0.2%	0.2%	0.2%	Cleaners	6	0.0%	0.0%	0.0%
Other Ferrous	1,697	1.2%	0.8%	1.6%	Pesticides/Herbicides	1	0.0%	0.0%	0.0%
Mixed Metals/Materials	1,349	0.9%	0.7%	1.1%	Dry-Cell Batteries	153	0.1%	0.1%	0.2%
Motor Oil Filters	31	0.0%	0.0%	0.0%	Wet-Cell Batteries	0	0.0%	0.0%	0.0%
					Gasoline/Kerosene	1	0.0%	0.0%	0.0%
					Motor Oil/Diesel Oil	41	0.0%	0.0%	0.1%
					Asbestos	1	0.0%	0.0%	0.0%
					Explosives	0	0.0%	0.0%	0.0%
Total Tons	**146,660**				Other Hazardous Chemicals	178	0.1%	0.0%	0.3%
Sample Count	**360**				Other NonHazardous Chemicals	177	0.1%	0.1%	0.2%

3 TRENDS IN RESIDENTIAL DISPOSAL: 1988/89 – 1998/99

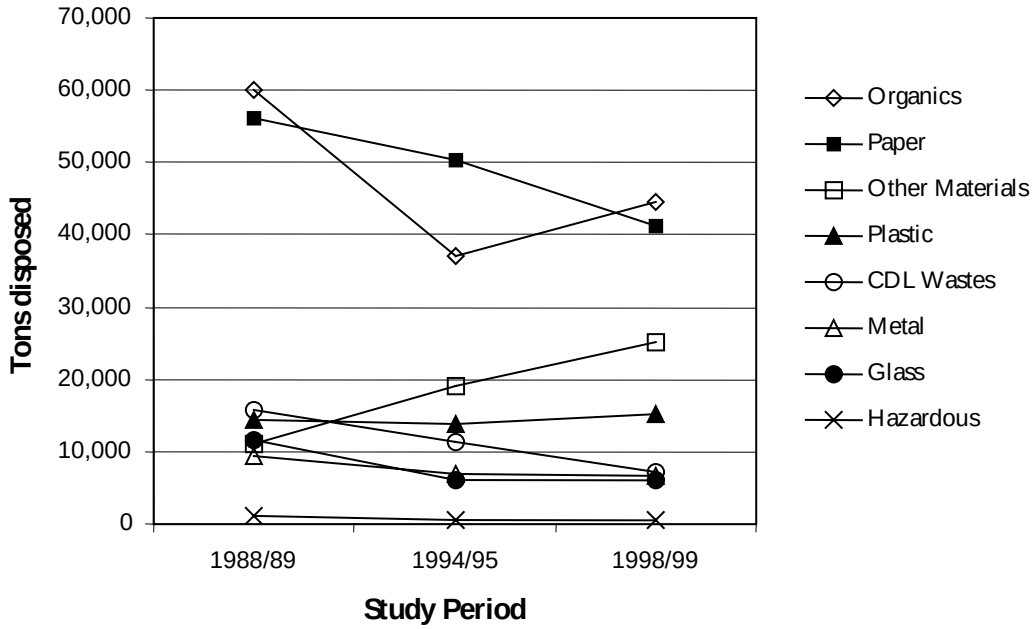
The overall residential results for the 1998/99 study were compared to the 1988/89 and the 1994/95 findings[3]. Comparisons with the 1988/89 study identify trends that have developed since the start of the curbside recycling program ten years ago. Both of the previous studies followed the same basic methodology as the 1998/99 study.[4]

The year-to-year comparisons were made by examining the changes in the total amount of waste disposed and in composition percentages for each of the eight broad waste categories. Statistical t-tests were used to analyze differences in the composition percentages. Section 3.1 provides an overview of the changes in the last ten years and in the last four years. Section 3.2 and Section 3.3 provide the detailed results of the comparisons.

3.1 Trends in Waste Disposed Over the Last Ten Years

Figure 3-1 illustrates the changes in disposed tons over the last ten years for each of the eight broad waste categories. The total amount of waste disposed decreased dramatically from 179,968 tons in 1988/89 to 145,591 tons in 1994/95 It then remained steady from 1994/95 to 1998/99 (146,660 tons). Overall, the broad waste categories of paper, organics, and "other materials" (which included animal by-products, disposable diapers, furniture, carpet, etc.) showed the greatest changes.

Figure 3-1 Changes in Disposed Tons, 1988/89 to 1998/99



[3] The composition percentages used to analyze the differences in disposed tonnage and to perform statistical tests were calculated using unweighted averages for each of the three study periods.
[4] See Appendix B for more detail regarding the methodology.

The following describes the changes in amount and composition percentages of each commodity over the last ten years (since 1988/89) and over the last four years (since 1994/95).

- ***Paper***: The mean percentage of paper in the waste stream decreased over both the last ten years and the last four years. The total tonnage of paper decreased from an estimated 56,220 tons in 1988/89 to 50,350 tons in 1994/95 and 41,178 tons in 1998/99.
- ***Plastic***. The mean percentage of plastics increased over both the last ten years and the last four years. The estimated tonnage of plastics in the waste stream, however, decreased slightly from 1988/89 (14,508 tons) to 1994/95 (13,941 tons) and then increased by 1998/99 (15,085 tons.)
- ***Glass***. The mean percentage of glass decreased over the last ten years, with container glass showing the sharpest decline. The estimated amount of glass dropped during the last ten years from 11,537 tons to 6,055 tons. Over the last four years, the amount of glass in the waste stream remained steady.
- ***Metal***. The mean percentage of metal in the waste stream remained steady over both the last ten years and the last four years. The total tonnage of metal decreased from 9,491 tons in 1988/89 to 6,819 tons in 1994/95 and 6,541 tons in 1998/99.
- ***Organics***. Over the last ten years, the mean percentage of organics showed a noticeable decrease. The amount disposed also decreased from 60,145 tons in 1988/89 to 44,573 tons in 1998/99. Since 1994/95, however, the estimated percentage of organics has increased, particularly in the amount of food wastes. In 1994/95, approximately 32,219 tons of food waste was disposed as compared to 44,573 tons in 1998/99.
- ***Other Materials***. The mean percentage of other materials in the waste stream has increased over both the last ten years and the last four years. The increase since 1988/89 is difficult to measure because in that study period, animal-by-products, furniture, mattresses, small appliances, and A/V equipment were not sorted individually. The estimated total disposed amount in 1988/89 was 11,046 tons as compared to 25,302 tons in 1998/99.

  The components in the "other materials" waste category in the 1994/95 and the 1998/99 studies, however, were more comparable. As with the composition percentages, the tonnage also increased (by approximately 6,033 tons). Most of this increase can be attributed to animal-by-products.
- ***CDL Wastes***. The mean percentage of CDL wastes decreased over both the last ten years and the last four years. The estimated tonnage also decreased from 15,830 tons in 1988/89 to 11,277 in 1994/95 and then to 7,280 in 1998/99.
- ***Hazardous***. The mean percentage of hazardous materials remained steady over both the last ten years and the last four years. The estimated amount of hazardous materials decreased however, from 1988/89 (1,192 tons) to 1994/95 (667 tons). It then remained steady to 1998/99 (646 tons).

3.2 Changes in Disposed Tons

3.2.1 Changes in Disposed Tons, 1988/89 vs. 1998/99

The overall amount of waste disposed in the residential substream has decreased over the last ten years (see Table 3-1.) CDL wastes, glass, and hazardous materials experienced the largest decreases, followed by metal, paper, and organics. The amount of "other materials" disposed in the waste stream increased dramatically, but at least part of this increase is due to the addition of various sorting categories such as furniture, small appliances, and AV equipment, which in the 1988/89 study were classified according to their dominant material type[5].

Table 3-1 Tonnage Disposed by Material Class for the 1988/99 and 1998/99 Study Periods

	Estimated Disposed Tons			
	1988/89	**1998/99**	***Difference***	**% Change**
CDL Wastes	15,830	7,280	-8,551	-54%
Glass	11,537	6,055	-5,482	-48%
Hazardous	1,192	646	-545	-46%
Metal	9,491	6,541	-2,950	-31%
Paper	56,220	41,178	-15,042	-27%
Organics	60,145	44,573	-15,572	-26%
Plastic	14,508	15,085	577	4%
Other Materials	11,046	25,302	14,256	129%
Total Residential	179,968	146,660	-33,308	-19%

[5] The change in sorting categories may have also affected the estimated proportions of plastic, metal, and glass causing them to be slightly higher in the 1988/89 study. The exact amount of this difference cannot be calculated.

3.2.2 Changes in Disposed Tons, 1994/95 vs. 1998/99

The overall amount of residential waste disposed remained steady between the 1994/95 and 1998/99 study periods[6]. CDL waste and paper showed the most dramatic decreases, by 35% and 18%, respectively. "Other materials" appeared to increase the most (32%) followed by organics (20%). Differences in tonnage between study periods for each of the broad material categories are presented in Table 3-2.

Table 3-2 Tonnage Disposed by Material Class for the 1994/95 and 1998/99 Study Periods

	Estimated Disposed Tons			
	1994/95	**1998/99**	***Difference***	**% Change**
CDL Wastes	11,277	7,280	-3,998	-35%
Paper	50,350	41,178	-9,173	-18%
Metal	6,819	6,541	-278	-4%
Hazardous	666	646	-19	-3%
Glass	6,204	6,055	-149	-2%
Plastic	13,941	15,085	1,144	8%
Organics	37,113	44,573	7,460	20%
Other Materials	19,221	25,302	6,081	32%
Total Residential	145,591	146,660	1,069	1%

3.3 Changes in Composition Percentages

Composition estimates obtained in this study period were compared to the findings of the 1988/89 and 1994/95 studies using t-tests. A t-test is a standard statistical test used to assess whether the differences between two groups are significant. In this case, t-tests were used to determine if the percentage of each of the eight broad material categories disposed in 1998/99 differed from the percentage disposed in 1988/89 and 1994/95[7]. The results of the t-tests can be used to indicate trends occurring in the waste stream over time. (Please see Appendix E for the calculation formulae.)

From the t-test, a p-value can be calculated. A p-value is a measure of the difference between the two groups. For the year-to-year comparisons, p-values below 0.0125 are considered to be statistically significant.

[6] In March 1997, the Seattle Housing Authority began collecting residential waste that was previously collected by City of Seattle's contracted haulers. This difference caused a decrease in the amount of waste collected in the south service area.

[7] In order to control for population changes and other factors that may influence the total amount of waste disposed from year to year, statistical tests were applied to the waste proportions, not the actual tonnage. For example, say that paper accounts for 30% of the residential substream's disposed waste each year, and that the substream disposed of 1,000 tons of waste in one year and 2,000 tons of waste in the next. While the amount of paper increased from 300 to 600 tons, the percentage remained the same. Therefore, the statistical tests would indicate that there had been no change.

3.3.1 Changes in Composition, 1988/89 to 1998/99

Comparisons made between the estimated composition percentages in 1988/89 and 1998/99 indicate that the proportion of paper, glass, organics, and CDL waste has decreased over the last ten years. The percentages of plastic and other materials appeared to have increased.

In Table 3-3, the arrows indicate increases or decreases in the percentage of the broad waste category disposed between study periods. The percentage highlighted in bold is the greater of the two. P-values highlighted with an "*" indicate significant differences.

Table 3-3 Changes in Waste Composition, 1988/89 vs. 1998/99

	Mean Ratio (Material Wt/Total Wt)		t-Statistic	p-Value (Cut-off for statistically valid difference = 0.0125)
	1988/89	*1998/99*		
↓ Organics	**33.42%**	30.39%	2.7731	0.0057 *
↓ Paper	**31.24%**	28.08%	3.7744	0.0002 *
↓ CDL Wastes	**8.80%**	4.96%	5.3033	0.0000 *
↓ Glass	**6.41%**	4.13%	7.8050	0.0000 *
↑ Other Materials	6.14%	**17.25%**	19.0123	0.0000 *
↑ Plastic	8.06%	**10.29%**	7.6070	0.0000 *
Metal	5.27%	4.46%	2.3289	0.0202
Hazardous	0.66%	0.44%	2.1545	0.0316
Number of Samples	*212*	*360*		

3.3.2 Changes in Composition, 1994/95 vs. 1998/99

Comparisons made between the 1994/95 and the 1998/99 studies indicate decreases in the proportions of paper and CDL wastes disposed (see Table 3-4.) The proportions of organics, other materials, and plastics increased[8].

Table 3-4 Changes in Waste Composition, 1994/95 vs. 1998/99

	Mean Ratio (Material Wt/Total Wt)		t-Statistic	p-Value (Cut-off for statistically valid difference = 0.0125)
	1994/95	*1998/99*		
↓ Paper	**34.58%**	28.08%	9.6978	0.0000 *
↓ CDL Wastes	**7.75%**	4.96%	4.7050	0.0000 *
↑ Organics	25.49%	**30.39%**	6.6875	0.0000 *
↑ Other Materials	13.20%	**17.25%**	7.0250	0.0000 *
↑ Plastic	9.58%	**10.29%**	3.0118	0.0027 *
Metal	4.68%	4.46%	0.6896	0.4907
Glass	4.26%	4.13%	0.5852	0.5586
Hazardous	0.46%	0.44%	0.1852	0.8531
Number of Samples	*368*	*360*		

[8] In Table 3-4, the arrows indicate increases or decreases in the percentage of the broad waste category disposed between study periods. The percentage highlighted in bold is the greater of the two. P-values highlighted with an "*" indicate significant differences.

4 COMPOSITION RESULTS: BY SUBPOPULATION

4.1 Overview

A total of 360 waste samples were sorted from May 1998 to April 1999. Descriptive data about each subpopulation's samples are summarized in Table 4-1.

Table 4-1 Number, Sum and Average Size of Samples, and Average Net Load Weight, by Subpopulation

Subpopulation	Number of Samples	*(All weights in pounds)* Sum of Sample Weights	Average Sample Size	Average Vehicle Net Weight
Single-family	241	57,038	236.7	14,278
Multi-family	119	28,767	241.7	17,462
North	180	42,689	237.2	14,679
South	180	43,117	239.5	15,959
Single-family North	121	28,411	234.8	13,710
Single-family South	120	28,628	238.6	14,726
Spring	92	21,196	230.4	13,614
Summer	85	17,498	205.9	16,656
Fall	88	22,445	255.1	16,632
Winter	95	24,666	259.6	14,719
Low Income	56	13,502	241.1	14,572
High Income	59	13,768	233.4	13,638
Small Household	48	11,168	232.7	11,604
Large Household	73	17,675	242.1	16,023
Overall	**360**	**85,805**	**238.3**	**15,405**

4.2 Comparisons Among Subpopulations

Composition estimates by generator type and service area were compared using t-tests. The subpopulations compared included: single-family vs. multi-family, north vs. south, and single-family north vs. single-family south.

Eleven waste categories were used to detect the differences between the subpopulations: newspaper, OCC/kraft paper, curbside paper, curbside plastic, non-curbside plastic, aluminum, curbside glass, tin, yard debris, food, and household hazardous wastes. The materials included in each of the waste comparison categories are outlined in Table 4-2. The categories for the comparisons were chosen in order to:

- Measure the degree to which residents are removing recyclables from the disposed waste stream. (Comprehensive recycling programs, available to single and multi-family homes throughout the city, collect all the materials listed in Table 4-2, except those in the non-curbside plastic, household hazardous, and food categories.)

- Gauge the amount of other plastic products (that are not accepted in current recycling programs) present in the waste stream of different subpopulations.
- Examine the potential variations in the amount of household hazardous and food wastes disposed by different sectors.

For the comparisons between subpopulations, a p-value lower than 0.0091 indicates a significant difference. The results of these comparisons are provided in Sections 4.3.2, 4.4.2, and 4.5.2.

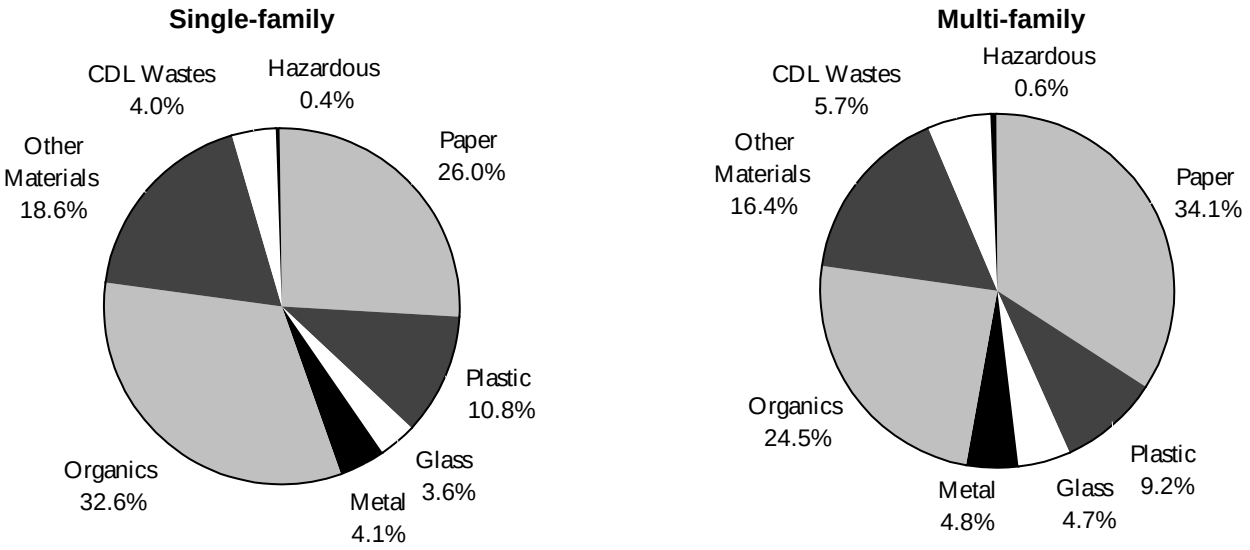
Table 4-2 Material Groupings used for Comparisons

Comparison Label	Sampling Component	Comparison Label	Sampling Component
Newspaper	Newspaper	Aluminum	Aluminum Cans
OCC/Kraft	OCC/Kraft unwaxed		Alum. Foil/Containers
	OCC/Kraft waxed	Curbside Glass	Clear Beverage
Curbside Paper	Office Paper		Green Beverage
	Computer Paper		Brown Beverage
	Mixed Low Grade		Container Glass
	Phone Books	Yard Debris	Leaves and Grass
Curbside Plastic	PET Pop & Liquor		Prunings
	Other PET Bottles	Food	Food
	HDPE Milk & Juice	Household Hazardous	Latex Paints
	Other HDPE Bottles		Hazardous Adhesives/Glues
Non-Curbside Plastic	Other Plastic Bottles		Oil-based Paints/Solvents
	Jars and Tubs		Cleaners
	Expanded Polystyrene		Pesticides/Herbicides
	Other Rigid Packaging		Dry-Cell Batteries
	Grocery/Bread Bags		Wet-Cell Batteries
	Garbage Bags		Gasoline/Kerosene
	Other Film		Motor Oil/Diesel Oil
	Plastic Products		Asbestos
	Plastic/Other Materials		Explosives
Tin	Tin Food Cans		Other Hazardous Chemicals

4.3 By Residence Type

A total of 241 samples were sorted from single-family residences and 119 samples were sorted from multi-family residences. Figure 4-1 summarizes the percentage of each of the broad waste categories disposed by both the single- and multi-family subpopulations. Paper and organics comprised the bulk of the waste stream of both the single- and the multi-family subpopulations (a combined total of 58.6% in each). Organics accounted for 32.6% of the waste in the single-family subpopulation, as compared to 24.5% in the multi-family subpopulation. Paper accounted for 34.1% of the multi-family waste stream as compared to 26.0% in the single-family waste stream.

Figure 4-1 Composition Summary: by Residence Type
(May 1998 – April 1999)



4.3.1 Largest Components

Food, mixed low grade paper, compostable/soiled paper, and animal by-products are among the largest waste components disposed in both the single-family and the multi-family waste streams (see Table 4-3). Newspaper and unwaxed OCC/kraft paper were among the largest components in the multi-family subpopulation, and disposable diapers were among the largest components disposed in the single-family subpopulation.

Table 4-3 Largest Components by Residence Type
(May 1998 – April 1999)

	Single-family	Multi-family
Food	30.6%	21.0%
Mixed Low Grade Paper	9.4%	12.1%
Compostable/soiled Paper	6.8%	5.2%
Animal by-products	6.9%	5.8%
Newspaper		6.9%
OCC/Kraft, Unwaxed Paper		5.7%
Disposable Diapers	5.1%	
Sum of largest components	**58.8%**	**56.7%**

The full composition results by residence type are presented in Table 4-5 and Table 4-6.

4.3.2 Comparisons Between Single and Multi-family Residences

The eleven waste category groups (as outlined in Table 4-2 above) were compared between single- and multi-family dwellings. The results are presented in Table 4-4. In the table, the composition percentage that is higher between the two residence types is highlighted in bold. P-values highlighted with an "*" indicate significant differences.

A greater percentage of curbside paper, newspaper, OCC/Kraft, curbside glass, yard debris, curbside plastic, and aluminum was disposed in the multi-family waste stream[9]. In the single-family waste stream, greater percentages of non-curbside plastic and food were disposed. Variations in the relative amount of tin and household hazardous materials were not statistically significant. (Please see Appendix E for the calculation formulae.)

Table 4-4 Statistically Significant Differences, by Residence Type
(May 1998- April 1999)

	Mean Ratio (Material Wt/Total Wt)		t-Statistic	p-Value (Cut-off for statistically valid difference = 0.0091)
	Single-family	*Multi-family*		
Food	**31.09%**	21.40%	10.8863	0.0000 *
Non-Curbside Plastic	**9.66%**	7.96%	4.4872	0.0000 *
Curbside Paper	9.98%	**13.75%**	8.0339	0.0000 *
Newspaper	3.10%	**6.55%**	10.4997	0.0000 *
OCC/Kraft	3.18%	**5.76%**	8.8735	0.0000 *
Curbside Glass	3.38%	**4.33%**	3.0210	0.0027 *
Yard Debris	2.04%	**3.54%**	2.7258	0.0067 *
Curbside Plastic	1.13%	**1.33%**	3.1282	0.0019 *
Aluminum	0.68%	**0.91%**	4.5023	0.0000 *
Tin	1.35%	1.26%	1.0268	0.3052
Household Hazardous	0.24%	0.34%	0.7957	0.4267
Number of Samples	*241*	*119*		

[9] These figures measure disposed waste only, and do not include tonnage collected through recycling programs. Also, comparisons between single- and multi-family waste proportions were calculated using unweighted composition percentages.

Table 4-5 Composition by Weight: Single-family
(May 1998 – April 1999)

Calculated at a 90% confidence interval

	Tons	Mean	Low	High		Tons	Mean	Low	High
Paper	**22,394**	**26.0%**			***Organics***	**28,063**	**32.6%**		
Newspaper	2,743	3.2%	2.9%	3.5%	Pallets	0	0.0%	0.0%	0.0%
OCC/Kraft, unwaxed	2,812	3.3%	3.1%	3.4%	Crates/Boxes	19	0.0%	0.0%	0.0%
OCC/Kraft, waxed	18	0.0%	0.0%	0.0%	Leaves and Grass	1,387	1.6%	1.2%	2.0%
Office Paper	567	0.7%	0.6%	0.7%	Prunings	306	0.4%	0.3%	0.5%
Computer Paper	12	0.0%	0.0%	0.0%	Food	26,351	30.6%	29.7%	31.4%
Mixed Low Grade	8,085	9.4%	9.0%	9.8%	***Other Materials***	**16,037**	**18.6%**		
Phone Books	128	0.1%	0.1%	0.2%	Textiles/Clothing	1,569	1.8%	1.7%	2.0%
Milk/Juice Polycoats	601	0.7%	0.7%	0.7%	Carpet/Upholstery	1,212	1.4%	1.1%	1.7%
Frozen Food Polycoats	285	0.3%	0.3%	0.4%	Leather	155	0.2%	0.1%	0.2%
Compostable/Soiled	5,898	6.8%	6.6%	7.1%	Disposable Diapers	4,390	5.1%	4.7%	5.5%
Paper/Other Materials	1,163	1.3%	1.2%	1.5%	Animal By-Products	5,944	6.9%	6.3%	7.5%
Other Paper	83	0.1%	0.1%	0.1%	Rubber Products	184	0.2%	0.2%	0.3%
Plastic	**9,337**	**10.8%**			Tires	165	0.2%	0.0%	0.4%
PET Pop and Liquor	293	0.3%	0.3%	0.4%	Ash	299	0.3%	0.2%	0.5%
Other PET Bottles	125	0.1%	0.1%	0.2%	Furniture	364	0.4%	0.1%	0.8%
HDPE Milk and Juice	180	0.2%	0.2%	0.2%	Mattresses	0	0.0%	0.0%	0.0%
Other HDPE Bottles	358	0.4%	0.4%	0.5%	Small Appliances	233	0.3%	0.2%	0.4%
Other Plastic Bottles	159	0.2%	0.2%	0.2%	A/V Equipment	295	0.3%	0.1%	0.5%
Jars and Tubs	476	0.6%	0.5%	0.6%	Ceramics/Porcelain	188	0.2%	0.2%	0.3%
Expanded Polystyrene	689	0.8%	0.5%	1.1%	Non-distinct Fines	411	0.5%	0.4%	0.6%
Other Rigid Packaging	958	1.1%	1.0%	1.2%	Misc. Organics	311	0.4%	0.3%	0.5%
Grocery/Bread Bags	1,286	1.5%	1.4%	1.6%	Misc. Inorganics	319	0.4%	0.3%	0.5%
Garbage Bags	1,074	1.2%	1.2%	1.3%	***CDL Wastes***	**3,415**	**4.0%**		
Other Film	2,336	2.7%	2.6%	2.8%	Dimension Lumber	714	0.8%	0.5%	1.2%
Plastic Products	743	0.9%	0.8%	1.0%	Other Untreated Wood	189	0.2%	0.1%	0.3%
Plastic/Other Materials	658	0.8%	0.6%	0.9%	Treated Wood	451	0.5%	0.4%	0.7%
Glass	**3,071**	**3.6%**			Contaminated Wood	205	0.2%	0.1%	0.3%
Clear Beverage	857	1.0%	0.9%	1.1%	New Gypsum Scrap	3	0.0%	0.0%	0.0%
Green Beverage	544	0.6%	0.5%	0.7%	Demo Gypsum Scrap	231	0.3%	0.2%	0.4%
Brown Beverage	514	0.6%	0.5%	0.7%	Fiberglass Insulation	3	0.0%	0.0%	0.0%
Container Glass	829	1.0%	0.9%	1.0%	Rock/Concrete/Brick	677	0.8%	0.0%	1.6%
Fluorescent Tubes	7	0.0%	0.0%	0.0%	Asphaltic Roofing	193	0.2%	0.1%	0.4%
Other Glass	320	0.4%	0.3%	0.4%	Other Construction Debris	269	0.3%	0.1%	0.5%
Metal	**3,535**	**4.1%**			Sand/Soil/Dirt	481	0.6%	0.3%	0.8%
Aluminum Cans	310	0.4%	0.3%	0.4%	***Hazardous***	**353**	**0.4%**		
Alum. Foil/Containers	252	0.3%	0.3%	0.3%	Latex Paints	46	0.1%	0.0%	0.1%
Other Aluminum	31	0.0%	0.0%	0.1%	Hazardous Adhesives/Glues	5	0.0%	0.0%	0.0%
Other Nonferrous	49	0.1%	0.0%	0.1%	NonHazardous Adhesives/Gl	49	0.1%	0.0%	0.1%
Tin Food Cans	1,122	1.3%	1.2%	1.4%	Oil-based Paints/Solvents	3	0.0%	0.0%	0.0%
Empty Aerosol Cans	169	0.2%	0.2%	0.2%	Cleaners	5	0.0%	0.0%	0.0%
Other Ferrous	796	0.9%	0.6%	1.2%	Pesticides/Herbicides	1	0.0%	0.0%	0.0%
Mixed Metals/Materials	791	0.9%	0.6%	1.2%	Dry-Cell Batteries	66	0.1%	0.1%	0.1%
Motor Oil Filters	17	0.0%	0.0%	0.0%	Wet-Cell Batteries	0	0.0%	0.0%	0.0%
					Gasoline/Kerosene	1	0.0%	0.0%	0.0%
					Motor Oil/Diesel Oil	41	0.0%	0.0%	0.1%
					Asbestos	1	0.0%	0.0%	0.0%
					Explosives	0	0.0%	0.0%	0.0%
Total Tons	**86,205**				Other Hazardous Chemicals	31	0.0%	0.0%	0.1%
Sample Count	**241**				Other NonHazardous Chemi	104	0.1%	0.1%	0.2%

Table 4-6 Composition by Weight: Multi-family (May 1998 – April 1999)

Calculated at a 90% confidence interval

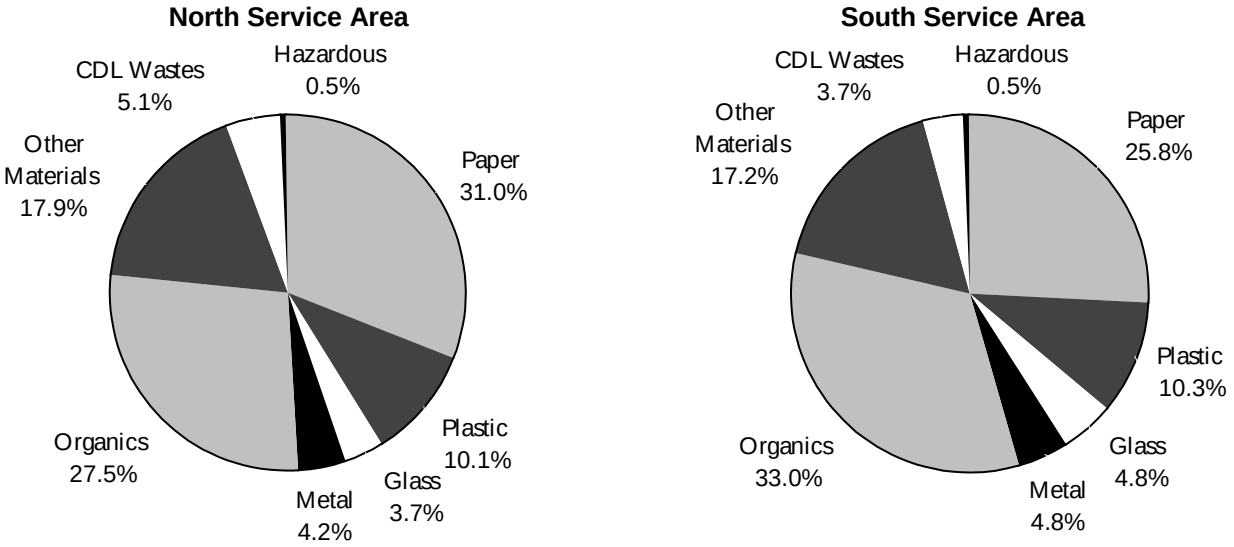
	Tons	Mean	Low	High
Paper	**20,587**	**34.1%**		
Newspaper	4,150	6.9%	6.2%	7.5%
OCC/Kraft, unwaxed	3,475	5.7%	5.1%	6.4%
OCC/Kraft, waxed	162	0.3%	0.0%	0.6%
Office Paper	652	1.1%	0.8%	1.4%
Computer Paper	21	0.0%	0.0%	0.1%
Mixed Low Grade	7,323	12.1%	11.4%	12.9%
Phone Books	470	0.8%	0.5%	1.1%
Milk/Juice Polycoats	343	0.6%	0.5%	0.7%
Frozen Food Polycoats	146	0.2%	0.2%	0.3%
Compostable/Soiled	3,125	5.2%	4.8%	5.6%
Paper/Other Materials	649	1.1%	0.9%	1.2%
Other Paper	71	0.1%	0.1%	0.2%
Plastic	**5,549**	**9.2%**		
PET Pop and Liquor	298	0.5%	0.4%	0.6%
Other PET Bottles	109	0.2%	0.1%	0.2%
HDPE Milk and Juice	185	0.3%	0.3%	0.3%
Other HDPE Bottles	213	0.4%	0.3%	0.4%
Other Plastic Bottles	87	0.1%	0.1%	0.2%
Jars and Tubs	265	0.4%	0.4%	0.5%
Expanded Polystyrene	236	0.4%	0.3%	0.4%
Other Rigid Packaging	461	0.8%	0.7%	0.8%
Grocery/Bread Bags	789	1.3%	1.2%	1.4%
Garbage Bags	786	1.3%	1.1%	1.5%
Other Film	1,240	2.1%	1.8%	2.3%
Plastic Products	502	0.8%	0.7%	1.0%
Plastic/Other Materials	378	0.6%	0.4%	0.8%
Glass	**2,857**	**4.7%**		
Clear Beverage	651	1.1%	0.9%	1.2%
Green Beverage	684	1.1%	0.9%	1.4%
Brown Beverage	748	1.2%	0.8%	1.6%
Container Glass	473	0.8%	0.7%	0.9%
Fluorescent Tubes	0	0.0%	0.0%	0.0%
Other Glass	302	0.5%	0.3%	0.7%
Metal	**2,927**	**4.8%**		
Aluminum Cans	415	0.7%	0.6%	0.8%
Alum. Foil/Containers	107	0.2%	0.1%	0.2%
Other Aluminum	23	0.0%	0.0%	0.1%
Other Nonferrous	39	0.1%	0.0%	0.1%
Tin Food Cans	769	1.3%	1.1%	1.4%
Empty Aerosol Cans	101	0.2%	0.1%	0.2%
Other Ferrous	902	1.5%	0.6%	2.4%
Mixed Metals/Materials	558	0.9%	0.6%	1.3%
Motor Oil Filters	14	0.0%	0.0%	0.0%
Total Tons	**60,455**			
Sample Count	**119**			

	Tons	Mean	Low	High
Organics	**14,836**	**24.5%**		
Pallets	39	0.1%	0.0%	0.2%
Crates/Boxes	16	0.0%	0.0%	0.1%
Leaves and Grass	1,807	3.0%	2.0%	4.0%
Prunings	256	0.4%	0.2%	0.6%
Food	12,717	21.0%	19.9%	22.2%
Other Materials	**9,905**	**16.4%**		
Textiles/Clothing	1,424	2.4%	2.1%	2.6%
Carpet/Upholstery	895	1.5%	1.0%	2.0%
Leather	86	0.1%	0.1%	0.2%
Disposable Diapers	1,477	2.4%	2.0%	2.8%
Animal By-Products	3,516	5.8%	4.8%	6.8%
Rubber Products	90	0.1%	0.1%	0.2%
Tires	98	0.2%	0.0%	0.3%
Ash	95	0.2%	0.0%	0.3%
Furniture	572	0.9%	0.4%	1.4%
Mattresses	166	0.3%	0.0%	0.7%
Small Appliances	339	0.6%	0.4%	0.8%
A/V Equipment	346	0.6%	0.2%	1.0%
Ceramics/Porcelain	148	0.2%	0.1%	0.4%
Non-distinct Fines	289	0.5%	0.3%	0.6%
Misc. Organics	223	0.4%	0.1%	0.6%
Misc. Inorganics	141	0.2%	0.1%	0.3%
CDL Wastes	**3,456**	**5.7%**		
Dimension Lumber	604	1.0%	0.6%	1.4%
Other Untreated Wood	248	0.4%	0.2%	0.6%
Treated Wood	508	0.8%	0.5%	1.1%
Contaminated Wood	77	0.1%	0.1%	0.2%
New Gypsum Scrap	3	0.0%	0.0%	0.0%
Demo Gypsum Scrap	389	0.6%	0.2%	1.1%
Fiberglass Insulation	48	0.1%	0.0%	0.2%
Rock/Concrete/Brick	270	0.4%	0.1%	0.8%
Asphaltic Roofing	24	0.0%	0.0%	0.1%
Other Construction Debris	182	0.3%	0.1%	0.5%
Sand/Soil/Dirt	1,101	1.8%	1.1%	2.6%
Hazardous	**339**	**0.6%**		
Latex Paints	21	0.0%	0.0%	0.1%
Hazardous Adhesives/Glues	7	0.0%	0.0%	0.0%
NonHazardous Adhesives/Gl	0	0.0%	0.0%	0.0%
Oil-based Paints/Solvents	3	0.0%	0.0%	0.0%
Cleaners	1	0.0%	0.0%	0.0%
Pesticides/Herbicides	0	0.0%	0.0%	0.0%
Dry-Cell Batteries	87	0.1%	0.0%	0.3%
Wet-Cell Batteries	0	0.0%	0.0%	0.0%
Gasoline/Kerosene	0	0.0%	0.0%	0.0%
Motor Oil/Diesel Oil	0	0.0%	0.0%	0.0%
Asbestos	0	0.0%	0.0%	0.0%
Explosives	0	0.0%	0.0%	0.0%
Other Hazardous Chemicals	148	0.2%	0.0%	0.6%
Other NonHazardous Chemi	73	0.1%	0.0%	0.2%

4.4 By Service Area

A total of 180 samples were sorted in both the north and south service areas. On a broad waste category level, paper and organics accounted for the highest percentage of waste in the north and south service areas. Combined, these two categories accounted for 58.5% of the waste in the north and 58.8% of the waste in the south. In the north, paper accounted for a greater percentage of the composition than organics; in the south, organics accounted for a greater percentage than paper. Very little differences existed between the other broad waste categories.

Figure 4-2 Composition Summary: by Service Area
(May 1998 – April 1999)



4.4.1 Largest Components

Food, mixed low grade paper, and soiled/compostable paper accounted for a large percentage of the waste stream in both the north and south service areas (see Table 4-7). In addition, the north service area had a high percentage of animal by-products and newspaper, while the south service area had a high proportion of disposable diapers. The full composition results for the north and south service areas are presented in Table 4-9 and Table 4-10.

Table 4-7 Largest Components by Service Area
(May 1998 – April 1999)

	North	South
Food	25.0%	30.1%
Mixed low grade paper	11.1%	9.3%
Soiled/Compostable paper	5.9%	6.6%
Animal by-products	7.4%	
Disposable diapers		5.6%
Newspaper	5.2%	
Sum of largest components	**54.6%**	**51.6%**

4.4.2 Comparisons Between North and South Service Areas

Eleven waste category groups (listed in Table 4-2 above) were compared between the two service areas. As shown in Table 4-8, there was a greater percentage of curbside paper and OCC/Kraft in the waste stream of the north service area. In the south service area, there were greater percentages of food, curbside glass, tin, and aluminum than in the north service area[10]. Variations in the relative amount of non-curbside plastic, newspaper, yard debris, curbside plastic, and household hazardous materials were not statistically significant[11]. (Please see Appendix E for the calculation formulae.)

Table 4-8 Statistically Significant Differences, by Service Area
(May 1998 – April 1999)

	Mean Ratio (Material Wt/Total Wt)		t-Statistic	p-Value (Cut-off for statistically valid difference = 0.0091
	North	*South*		
Curbside Paper	**12.05%**	10.44%	3.4358	0.0007 *
OCC/Kraft	**4.51%**	3.58%	3.0920	0.0021 *
Food	26.06%	**29.61%**	3.7458	0.0002 *
Curbside Glass	3.04%	**4.35%**	4.4989	0.0000 *
Tin	1.18%	**1.46%**	3.3816	0.0008 *
Aluminum	0.63%	**0.88%**	5.3652	0.0000 *
Non-Curbside Plastic	9.21%	8.97%	0.6284	0.5301
Newspaper	4.69%	3.82%	2.4519	0.0147
Yard Debris	2.23%	2.86%	1.2107	0.2268
Curbside Plastic	1.14%	1.25%	1.7281	0.0848
Household Hazardous	0.30%	0.26%	0.3236	0.7464
Number of Samples	*180*	*180*		

[10] These figures measure disposed waste only, and do not include tonnage collected through recycling programs. Also, comparisons between north and south waste proportions were calculated using unweighted composition percentages.

[11] In Table 4-8, the composition percentage that is higher between the two service areas is highlighted in bold. P-values highlighted with an "*" indicate significant differences.

Table 4-9 Composition by Weight: North Service Area
(May 1998 – April 1999)

Calculated with a 90% confidence interval

	Tons	Mean	Low	High
Paper	**30,952**	**31.0%**		
Newspaper	5,181	5.2%	4.7%	5.6%
OCC/Kraft, unwaxed	4,679	4.7%	4.3%	5.1%
OCC/Kraft, waxed	176	0.2%	0.0%	0.4%
Office Paper	990	1.0%	0.8%	1.2%
Computer Paper	29	0.0%	0.0%	0.0%
Mixed Low Grade	11,065	11.1%	10.5%	11.6%
Phone Books	399	0.4%	0.2%	0.6%
Milk/Juice Polycoats	729	0.7%	0.7%	0.8%
Frozen Food Polycoats	297	0.3%	0.3%	0.3%
Compostable/Soiled	5,946	5.9%	5.6%	6.3%
Paper/Other Materials	1,333	1.3%	1.2%	1.5%
Other Paper	129	0.1%	0.1%	0.2%
Plastic	**10,085**	**10.1%**		
PET Pop and Liquor	397	0.4%	0.4%	0.4%
Other PET Bottles	161	0.2%	0.1%	0.2%
HDPE Milk and Juice	230	0.2%	0.2%	0.3%
Other HDPE Bottles	392	0.4%	0.3%	0.4%
Other Plastic Bottles	162	0.2%	0.1%	0.2%
Jars and Tubs	540	0.5%	0.5%	0.6%
Expanded Polystyrene	612	0.6%	0.4%	0.8%
Other Rigid Packaging	1,022	1.0%	1.0%	1.1%
Grocery/Bread Bags	1,338	1.3%	1.3%	1.4%
Garbage Bags	1,284	1.3%	1.2%	1.4%
Other Film	2,408	2.4%	2.3%	2.6%
Plastic Products	772	0.8%	0.7%	0.9%
Plastic/Other Materials	767	0.8%	0.6%	1.0%
Glass	**3,688**	**3.7%**		
Clear Beverage	790	0.8%	0.7%	0.9%
Green Beverage	825	0.8%	0.7%	1.0%
Brown Beverage	889	0.9%	0.6%	1.1%
Container Glass	759	0.8%	0.7%	0.8%
Fluorescent Tubes	3	0.0%	0.0%	0.0%
Other Glass	422	0.4%	0.3%	0.5%
Metal	**4,222**	**4.2%**		
Aluminum Cans	446	0.4%	0.4%	0.5%
Alum. Foil/Containers	227	0.2%	0.2%	0.3%
Other Aluminum	17	0.0%	0.0%	0.0%
Other Nonferrous	28	0.0%	0.0%	0.0%
Tin Food Cans	1,198	1.2%	1.1%	1.3%
Empty Aerosol Cans	174	0.2%	0.1%	0.2%
Other Ferrous	1,154	1.2%	0.6%	1.7%
Mixed Metals/Materials	972	1.0%	0.7%	1.3%
Motor Oil Filters	8	0.0%	0.0%	0.0%
Total Tons	**99,930**			
Sample Count	**180**			

	Tons	Mean	Low	High
Organics	**27,469**	**27.5%**		
Pallets	39	0.0%	0.0%	0.1%
Crates/Boxes	17	0.0%	0.0%	0.0%
Leaves and Grass	2,057	2.1%	1.5%	2.7%
Prunings	387	0.4%	0.3%	0.5%
Food	24,969	25.0%	24.1%	25.9%
Other Materials	**17,914**	**17.9%**		
Textiles/Clothing	1,887	1.9%	1.7%	2.1%
Carpet/Upholstery	1,430	1.4%	1.1%	1.8%
Leather	150	0.2%	0.1%	0.2%
Disposable Diapers	3,264	3.3%	2.9%	3.6%
Animal By-Products	7,407	7.4%	6.7%	8.2%
Rubber Products	175	0.2%	0.1%	0.2%
Tires	113	0.1%	0.0%	0.2%
Ash	255	0.3%	0.1%	0.4%
Misc. Organics	380	0.4%	0.2%	0.5%
Furniture	646	0.6%	0.3%	1.0%
Mattresses	166	0.2%	0.0%	0.4%
Small Appliances	379	0.4%	0.3%	0.5%
A/V Equipment	569	0.6%	0.3%	0.9%
Ceramics/Porcelain	257	0.3%	0.2%	0.4%
Non-distinct Fines	540	0.5%	0.4%	0.7%
Misc. Inorganics	296	0.3%	0.2%	0.4%
CDL Wastes	**5,123**	**5.1%**		
Dimension Lumber	1,057	1.1%	0.7%	1.4%
Other Untreated Wood	274	0.3%	0.2%	0.4%
Treated Wood	712	0.7%	0.5%	0.9%
Contaminated Wood	160	0.2%	0.1%	0.2%
New Gypsum Scrap	3	0.0%	0.0%	0.0%
Demo Gypsum Scrap	449	0.4%	0.1%	0.8%
Fiberglass Insulation	32	0.0%	0.0%	0.1%
Rock/Concrete/Brick	805	0.8%	0.1%	1.5%
Asphaltic Roofing	151	0.2%	0.0%	0.3%
Other Construction Debris	325	0.3%	0.1%	0.5%
Sand/Soil/Dirt	1,156	1.2%	0.7%	1.6%
Hazardous	**477**	**0.5%**		
Latex Paints	50	0.0%	0.0%	0.1%
Hazardous Adhesives/Glues	10	0.0%	0.0%	0.0%
NonHazardous Adhesives/Gl	19	0.0%	0.0%	0.0%
Oil-based Paints/Solvents	3	0.0%	0.0%	0.0%
Cleaners	1	0.0%	0.0%	0.0%
Pesticides/Herbicides	1	0.0%	0.0%	0.0%
Dry-Cell Batteries	117	0.1%	0.0%	0.2%
Wet-Cell Batteries	0	0.0%	0.0%	0.0%
Gasoline/Kerosene	0	0.0%	0.0%	0.0%
Motor Oil/Diesel Oil	5	0.0%	0.0%	0.0%
Asbestos	1	0.0%	0.0%	0.0%
Explosives	0	0.0%	0.0%	0.0%
Other Hazardous Chemicals	154	0.2%	0.0%	0.4%
Other NonHazardous Chemi	116	0.1%	0.0%	0.2%

Table 4-10 Composition by Weight: South Service Area
(May 1998 – April 1999)

Calculated with a 90% confidence interval

	Tons	Mean	Low	High
Paper	**12,042**	**25.8%**		
Newspaper	1,713	3.7%	3.4%	4.0%
OCC/Kraft, unwaxed	1,610	3.4%	3.2%	3.7%
OCC/Kraft, waxed	5	0.0%	0.0%	0.0%
Office Paper	231	0.5%	0.4%	0.6%
Computer Paper	4	0.0%	0.0%	0.0%
Mixed Low Grade	4,348	9.3%	8.9%	9.7%
Phone Books	198	0.4%	0.3%	0.6%
Milk/Juice Polycoats	217	0.5%	0.4%	0.5%
Frozen Food Polycoats	134	0.3%	0.3%	0.3%
Compostable/Soiled	3,077	6.6%	6.3%	6.9%
Paper/Other Materials	481	1.0%	1.0%	1.1%
Other Paper	25	0.1%	0.0%	0.1%
Plastic	**4,802**	**10.3%**		
PET Pop and Liquor	194	0.4%	0.4%	0.4%
Other PET Bottles	74	0.2%	0.1%	0.2%
HDPE Milk and Juice	134	0.3%	0.3%	0.3%
Other HDPE Bottles	179	0.4%	0.3%	0.4%
Other Plastic Bottles	84	0.2%	0.2%	0.2%
Jars and Tubs	202	0.4%	0.4%	0.5%
Expanded Polystyrene	313	0.7%	0.6%	0.7%
Other Rigid Packaging	399	0.9%	0.8%	0.9%
Grocery/Bread Bags	736	1.6%	1.5%	1.7%
Garbage Bags	577	1.2%	1.2%	1.3%
Other Film	1,169	2.5%	2.3%	2.7%
Plastic Products	471	1.0%	0.9%	1.2%
Plastic/Other Materials	270	0.6%	0.5%	0.7%
Glass	**2,232**	**4.8%**		
Clear Beverage	714	1.5%	1.3%	1.7%
Green Beverage	401	0.9%	0.7%	1.0%
Brown Beverage	372	0.8%	0.7%	0.9%
Container Glass	542	1.2%	1.1%	1.3%
Fluorescent Tubes	4	0.0%	0.0%	0.0%
Other Glass	199	0.4%	0.4%	0.5%
Metal	**2,236**	**4.8%**		
Aluminum Cans	277	0.6%	0.5%	0.6%
Alum. Foil/Containers	132	0.3%	0.3%	0.3%
Other Aluminum	36	0.1%	0.0%	0.1%
Other Nonferrous	60	0.1%	0.1%	0.2%
Tin Food Cans	691	1.5%	1.4%	1.6%
Empty Aerosol Cans	95	0.2%	0.2%	0.2%
Other Ferrous	543	1.2%	0.6%	1.7%
Mixed Metals/Materials	378	0.8%	0.6%	1.0%
Motor Oil Filters	23	0.0%	0.0%	0.1%
Total Tons	**46,729**			
Sample Count	**180**			

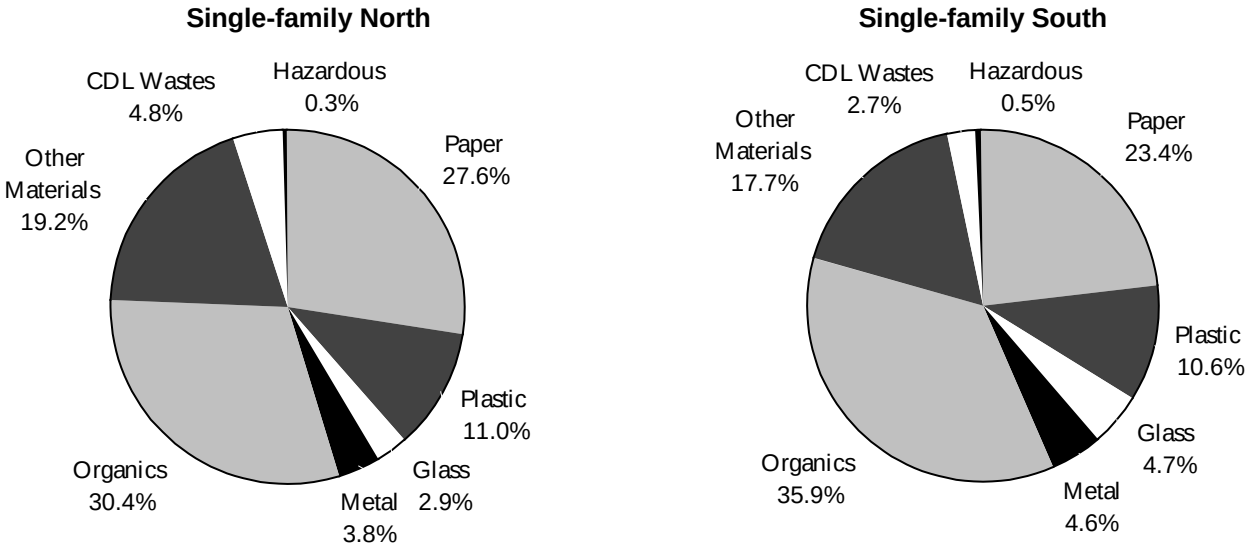
	Tons	Mean	Low	High
Organics	**15,414**	**33.0%**		
Pallets	0	0.0%	0.0%	0.0%
Crates/Boxes	18	0.0%	0.0%	0.1%
Leaves and Grass	1,132	2.4%	1.7%	3.1%
Prunings	175	0.4%	0.2%	0.5%
Food	14,088	30.1%	29.1%	31.2%
Other Materials	**8,036**	**17.2%**		
Textiles/Clothing	1,102	2.4%	2.2%	2.5%
Carpet/Upholstery	677	1.4%	1.1%	1.8%
Leather	90	0.2%	0.1%	0.2%
Disposable Diapers	2,594	5.6%	5.1%	6.0%
Animal By-Products	2,073	4.4%	3.9%	5.0%
Rubber Products	99	0.2%	0.1%	0.3%
Tires	150	0.3%	0.0%	0.6%
Ash	140	0.3%	0.1%	0.4%
Furniture	289	0.6%	0.3%	1.0%
Mattresses	0	0.0%	0.0%	0.0%
Small Appliances	192	0.4%	0.3%	0.5%
A/V Equipment	73	0.2%	0.1%	0.2%
Ceramics/Porcelain	79	0.2%	0.1%	0.2%
Non-distinct Fines	161	0.3%	0.2%	0.4%
Misc. Organics	155	0.3%	0.3%	0.4%
Misc. Inorganics	164	0.4%	0.2%	0.5%
CDL Wastes	**1,752**	**3.7%**		
Dimension Lumber	264	0.6%	0.4%	0.8%
Other Untreated Wood	162	0.3%	0.2%	0.5%
Treated Wood	247	0.5%	0.4%	0.7%
Contaminated Wood	121	0.3%	0.1%	0.4%
New Gypsum Scrap	3	0.0%	0.0%	0.0%
Demo Gypsum Scrap	172	0.4%	0.2%	0.5%
Fiberglass Insulation	19	0.0%	0.0%	0.1%
Rock/Concrete/Brick	146	0.3%	0.1%	0.5%
Asphaltic Roofing	66	0.1%	0.0%	0.2%
Other Construction Debris	127	0.3%	0.1%	0.4%
Sand/Soil/Dirt	426	0.9%	0.5%	1.3%
Hazardous	**215**	**0.5%**		
Latex Paints	17	0.0%	0.0%	0.1%
Hazardous Adhesives/Glues	2	0.0%	0.0%	0.0%
NonHazardous Adhesives/Gl	30	0.1%	0.0%	0.2%
Oil-based Paints/Solvents	3	0.0%	0.0%	0.0%
Cleaners	5	0.0%	0.0%	0.0%
Pesticides/Herbicides	0	0.0%	0.0%	0.0%
Dry-Cell Batteries	36	0.1%	0.1%	0.1%
Wet-Cell Batteries	0	0.0%	0.0%	0.0%
Gasoline/Kerosene	1	0.0%	0.0%	0.0%
Motor Oil/Diesel Oil	35	0.1%	0.0%	0.2%
Asbestos	0	0.0%	0.0%	0.0%
Explosives	0	0.0%	0.0%	0.0%
Other Hazardous Chemicals	25	0.1%	0.0%	0.1%
Other NonHazardous Chemi	61	0.1%	0.1%	0.2%

4.5 By Service Area and Generator Type

Waste composition estimates were calculated for the single-family residences in both the north and the south. A total of 121 single-family samples were obtained in the north and a total of 120 samples were obtained in the south.

As shown in Figure 4-3, paper and organics comprise the bulk of the waste stream for both the single-family residences in the north (58.0%) and in the south (59.3%).

Figure 4-3 Composition Summary: by Service Area and Generator Type
(May 1998 – April 1999)



4.5.1 Largest Components

Four components accounted for approximately half of the waste stream for both the single-family north and the single-family south subpopulations as shown in Table 4-11.

Table 4-11 Largest Components by Service Area and Residence Type
(May 1998 – April 1999)

	Single-family North	Single-family South
Food	28.7%	33.4%
Mixed Low Grade Paper	10.0%	8.4%
Compostable/soiled Paper	6.7%	7.1%
Animal by-products	8.3%	
Disposable Diapers		6.3%
Sum of largest components	**53.7%**	**55.2%**

Table 4-13 and Table 4-14 present the detailed composition results for both the north and south single-family subpopulations.

4.5.2 Comparisons Between Single-family North and Single-family South

Eleven waste category groups (listed in Table 4-2 above) were compared between the single-family north and the single-family south subpopulations. As shown in Table 4-12, single-family residences in the north service area disposed significantly more curbside paper and OCC/kraft paper than did single-family residences in the south. South single-family residences, however, disposed more aluminum, curbside glass, food, and tin than residents in the north did. Variations on the amount of newspaper, curbside plastic, non-curbside plastic, yard debris, or household hazardous materials disposed by the two groups were not significant[12]. (Please see Appendix E for the calculation formulae.)

Table 4-12 Statistically Significant Differences Among Single-family Residences, by Service Area

	Mean Ratio *(Material Wt/Total Wt)*		**t-Statistic**	**p-Value** *(Cut-off for statistically valid difference = 0.0091)*
	SF North	*SF South*		
Curbside Paper	**10.97%**	8.99%	3.9877	0.0001 *
OCC/Kraft	**3.65%**	2.70%	4.5124	0.0000 *
Food	28.74%	**33.43%**	4.4796	0.0000 *
Curbside Glass	2.49%	**4.27%**	5.9488	0.0000 *
Tin	1.13%	**1.58%**	4.3409	0.0000 *
Aluminum	0.54%	**0.83%**	5.5809	0.0000 *
Non-Curbside Plastic	9.93%	9.39%	1.1500	0.2513
Newspaper	3.48%	2.72%	2.3902	0.0176
Yard Debris	1.69%	2.40%	1.3607	0.1749
Curbside Plastic	1.05%	1.21%	2.1487	0.0327
Household Hazardous	0.19%	0.30%	1.1788	0.2396
Number of Samples	*121*	*120*		

(May 1998 – April 1999)

[12] In Table 4-12, the higher composition percentage between the single-family north and south subpopulations is highlighted in bold. P-values highlighted with an "*" indicate significant differences.

Table 4-13 Composition by Weight: Single-family North
(May 1998 – April 1999)

Calculated with a 90% confidence interval

	Tons	Mean	Low	High
Paper	**14,060**	**27.6%**		
Newspaper	1,770	3.5%	3.0%	3.9%
OCC/Kraft, unwaxed	1,844	3.6%	3.4%	3.9%
OCC/Kraft, waxed	16	0.0%	0.0%	0.1%
Office Paper	404	0.8%	0.7%	0.9%
Computer Paper	8	0.0%	0.0%	0.0%
Mixed Low Grade	5,104	10.0%	9.4%	10.6%
Phone Books	66	0.1%	0.1%	0.2%
Milk/Juice Polycoats	414	0.8%	0.7%	0.9%
Frozen Food Polycoats	176	0.3%	0.3%	0.4%
Compostable/Soiled	3,401	6.7%	6.3%	7.0%
Paper/Other Materials	792	1.6%	1.3%	1.8%
Other Paper	66	0.1%	0.1%	0.2%
Plastic	**5,589**	**11.0%**		
PET Pop and Liquor	154	0.3%	0.3%	0.3%
Other PET Bottles	69	0.1%	0.1%	0.2%
HDPE Milk and Juice	92	0.2%	0.2%	0.2%
Other HDPE Bottles	218	0.4%	0.4%	0.5%
Other Plastic Bottles	95	0.2%	0.2%	0.2%
Jars and Tubs	312	0.6%	0.6%	0.7%
Expanded Polystyrene	425	0.8%	0.4%	1.3%
Other Rigid Packaging	630	1.2%	1.1%	1.3%
Grocery/Bread Bags	700	1.4%	1.3%	1.5%
Garbage Bags	622	1.2%	1.1%	1.4%
Other Film	1,407	2.8%	2.6%	2.9%
Plastic Products	409	0.8%	0.7%	0.9%
Plastic/Other Materials	454	0.9%	0.7%	1.1%
Glass	**1,458**	**2.9%**		
Clear Beverage	333	0.7%	0.5%	0.8%
Green Beverage	280	0.6%	0.4%	0.7%
Brown Beverage	260	0.5%	0.4%	0.6%
Container Glass	395	0.8%	0.7%	0.9%
Fluorescent Tubes	3	0.0%	0.0%	0.0%
Other Glass	188	0.4%	0.3%	0.5%
Metal	**1,928**	**3.8%**		
Aluminum Cans	134	0.3%	0.2%	0.3%
Alum. Foil/Containers	141	0.3%	0.2%	0.3%
Other Aluminum	8	0.0%	0.0%	0.0%
Other Nonferrous	21	0.0%	0.0%	0.1%
Tin Food Cans	573	1.1%	1.0%	1.3%
Empty Aerosol Cans	92	0.2%	0.2%	0.2%
Other Ferrous	409	0.8%	0.7%	0.9%
Mixed Metals/Materials	550	1.1%	0.6%	1.5%
Motor Oil Filters	0	0.0%	0.0%	0.0%
Total Tons	**50,898**			
Sample Total	**121**			

	Tons	Mean	Low	High
Organics	**15,488**	**30.4%**		
Pallets	0	0.0%	0.0%	0.0%
Crates/Boxes	1	0.0%	0.0%	0.0%
Leaves and Grass	658	1.3%	0.9%	1.7%
Prunings	200	0.4%	0.2%	0.5%
Food	14,630	28.7%	27.6%	29.9%
Other Materials	**9,767**	**19.2%**		
Textiles/Clothing	863	1.7%	1.5%	1.9%
Carpet/Upholstery	696	1.4%	1.0%	1.7%
Leather	81	0.2%	0.1%	0.2%
Disposable Diapers	2,187	4.3%	3.8%	4.8%
Animal By-Products	4,215	8.3%	7.4%	9.2%
Rubber Products	118	0.2%	0.2%	0.3%
Tires	55	0.1%	0.0%	0.3%
Ash	182	0.4%	0.1%	0.6%
Furniture	213	0.4%	0.0%	0.9%
Mattresses	0	0.0%	0.0%	0.0%
Small Appliances	121	0.2%	0.1%	0.3%
A/V Equipment	251	0.5%	0.2%	0.8%
Ceramics/Porcelain	131	0.3%	0.2%	0.4%
Non-distinct Fines	292	0.6%	0.4%	0.8%
Misc. Organics	178	0.3%	0.2%	0.5%
Misc. Inorganics	184	0.4%	0.3%	0.5%
CDL Wastes	**2,440**	**4.8%**		
Dimension Lumber	566	1.1%	0.6%	1.6%
Other Untreated Wood	128	0.3%	0.1%	0.4%
Treated Wood	316	0.6%	0.4%	0.8%
Contaminated Wood	145	0.3%	0.1%	0.4%
New Gypsum Scrap	0	0.0%	0.0%	0.0%
Demo Gypsum Scrap	101	0.2%	0.1%	0.3%
Fiberglass Insulation	1	0.0%	0.0%	0.0%
Rock/Concrete/Brick	558	1.1%	0.0%	2.4%
Asphaltic Roofing	128	0.3%	0.0%	0.5%
Other Construction Debris	175	0.3%	0.1%	0.6%
Sand/Soil/Dirt	322	0.6%	0.3%	1.0%
Hazardous	**167**	**0.3%**		
Latex Paints	32	0.1%	0.0%	0.1%
Hazardous Adhesives/Glues	4	0.0%	0.0%	0.0%
NonHazardous Adhesives/Gl	18	0.0%	0.0%	0.1%
Oil-based Paints/Solvents	0	0.0%	0.0%	0.0%
Cleaners	1	0.0%	0.0%	0.0%
Pesticides/Herbicides	1	0.0%	0.0%	0.0%
Dry-Cell Batteries	35	0.1%	0.0%	0.1%
Wet-Cell Batteries	0	0.0%	0.0%	0.0%
Gasoline/Kerosene	0	0.0%	0.0%	0.0%
Motor Oil/Diesel Oil	5	0.0%	0.0%	0.0%
Asbestos	1	0.0%	0.0%	0.0%
Explosives	0	0.0%	0.0%	0.0%
Other Hazardous Chemicals	16	0.0%	0.0%	0.1%
Other NonHazardous Chemi	54	0.1%	0.1%	0.1%

Table 4-14 Composition by Weight: Single-family South
(May 1998 – April 1999)

Calculated at the 90% confidence interval

	Tons	Mean	Low	High		Tons	Mean	Low	High
Paper	**7,599**	**23.4%**			***Organics***	**11,653**	**35.9%**		
Newspaper	883	2.7%	2.4%	3.0%	Pallets	0	0.0%	0.0%	0.0%
OCC/Kraft, unwaxed	876	2.7%	2.5%	2.9%	Crates/Boxes	17	0.1%	0.0%	0.1%
OCC/Kraft, waxed	2	0.0%	0.0%	0.0%	Leaves and Grass	684	2.1%	1.3%	2.9%
Office Paper	144	0.4%	0.4%	0.5%	Prunings	96	0.3%	0.2%	0.4%
Computer Paper	3	0.0%	0.0%	0.0%	Food	10,856	33.4%	32.1%	34.7%
Mixed Low Grade	2,716	8.4%	7.9%	8.9%	***Other Materials***	**5,743**	**17.7%**		
Phone Books	59	0.2%	0.1%	0.3%	Textiles/Clothing	654	2.0%	1.8%	2.2%
Milk/Juice Polycoats	168	0.5%	0.5%	0.6%	Carpet/Upholstery	475	1.5%	1.0%	1.9%
Frozen Food Polycoats	99	0.3%	0.3%	0.3%	Leather	68	0.2%	0.1%	0.3%
Compostable/Soiled	2,303	7.1%	6.8%	7.4%	Disposable Diapers	2,058	6.3%	5.8%	6.9%
Paper/Other Materials	332	1.0%	0.9%	1.1%	Animal By-Products	1,534	4.7%	4.0%	5.5%
Other Paper	14	0.0%	0.0%	0.1%	Rubber Products	60	0.2%	0.1%	0.3%
Plastic	**3,441**	**10.6%**			Tires	105	0.3%	0.0%	0.7%
PET Pop and Liquor	130	0.4%	0.4%	0.4%	Ash	108	0.3%	0.2%	0.5%
Other PET Bottles	52	0.2%	0.1%	0.2%	Furniture	139	0.4%	0.0%	0.8%
HDPE Milk and Juice	82	0.3%	0.2%	0.3%	Mattresses	0	0.0%	0.0%	0.0%
Other HDPE Bottles	128	0.4%	0.4%	0.4%	Small Appliances	104	0.3%	0.2%	0.5%
Other Plastic Bottles	59	0.2%	0.2%	0.2%	A/V Equipment	34	0.1%	0.1%	0.1%
Jars and Tubs	148	0.5%	0.4%	0.5%	Ceramics/Porcelain	51	0.2%	0.1%	0.2%
Expanded Polystyrene	241	0.7%	0.7%	0.8%	Non-distinct Fines	105	0.3%	0.2%	0.4%
Other Rigid Packaging	296	0.9%	0.8%	1.0%	Misc. Organics	123	0.4%	0.3%	0.5%
Grocery/Bread Bags	544	1.7%	1.6%	1.8%	Misc. Inorganics	124	0.4%	0.2%	0.6%
Garbage Bags	417	1.3%	1.2%	1.4%	***CDL Wastes***	**863**	**2.7%**		
Other Film	852	2.6%	2.5%	2.8%	Dimension Lumber	125	0.4%	0.3%	0.5%
Plastic Products	309	1.0%	0.8%	1.1%	Other Untreated Wood	54	0.2%	0.1%	0.3%
Plastic/Other Materials	182	0.6%	0.4%	0.7%	Treated Wood	120	0.4%	0.2%	0.5%
Glass	**1,512**	**4.7%**			Contaminated Wood	53	0.2%	0.0%	0.3%
Clear Beverage	496	1.5%	1.3%	1.8%	New Gypsum Scrap	3	0.0%	0.0%	0.0%
Green Beverage	246	0.8%	0.6%	0.9%	Demo Gypsum Scrap	122	0.4%	0.2%	0.6%
Brown Beverage	238	0.7%	0.6%	0.9%	Fiberglass Insulation	2	0.0%	0.0%	0.0%
Container Glass	407	1.3%	1.1%	1.4%	Rock/Concrete/Brick	97	0.3%	0.0%	0.6%
Fluorescent Tubes	4	0.0%	0.0%	0.0%	Asphaltic Roofing	58	0.2%	0.0%	0.3%
Other Glass	121	0.4%	0.3%	0.4%	Other Construction Debris	85	0.3%	0.1%	0.4%
Metal	**1,491**	**4.6%**			Sand/Soil/Dirt	143	0.4%	0.2%	0.7%
Aluminum Cans	166	0.5%	0.5%	0.6%	***Hazardous***	**174**	**0.5%**		
Alum. Foil/Containers	103	0.3%	0.3%	0.4%	Latex Paints	13	0.0%	0.0%	0.1%
Other Aluminum	21	0.1%	0.0%	0.1%	Hazardous Adhesives/Glues	1	0.0%	0.0%	0.0%
Other Nonferrous	26	0.1%	0.0%	0.1%	NonHazardous Adhesives/Gl	29	0.1%	0.0%	0.2%
Tin Food Cans	512	1.6%	1.5%	1.7%	Oil-based Paints/Solvents	2	0.0%	0.0%	0.0%
Empty Aerosol Cans	71	0.2%	0.2%	0.2%	Cleaners	3	0.0%	0.0%	0.0%
Other Ferrous	360	1.1%	0.3%	1.9%	Pesticides/Herbicides	0	0.0%	0.0%	0.0%
Mixed Metals/Materials	215	0.7%	0.4%	0.9%	Dry-Cell Batteries	29	0.1%	0.1%	0.1%
Motor Oil Filters	16	0.1%	0.0%	0.1%	Wet-Cell Batteries	0	0.0%	0.0%	0.0%
					Gasoline/Kerosene	1	0.0%	0.0%	0.0%
					Motor Oil/Diesel Oil	35	0.1%	0.0%	0.2%
					Asbestos	0	0.0%	0.0%	0.0%
					Explosives	0	0.0%	0.0%	0.0%
Total Tons	**32,477**				Other Hazardous Chemicals	14	0.0%	0.0%	0.1%
Sample Total	**120**				Other NonHazardous Chemi	46	0.1%	0.1%	0.2%

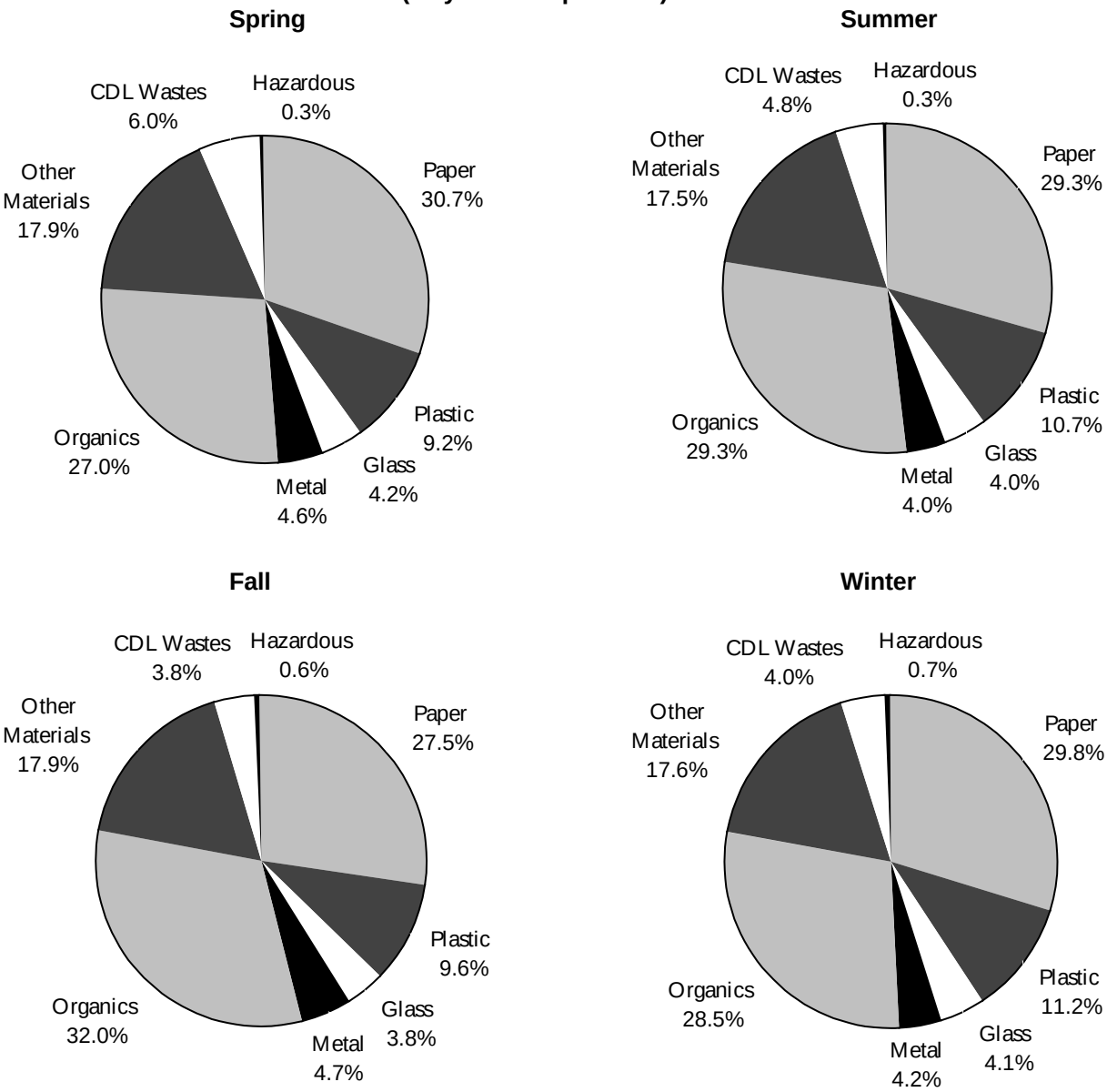
4.6 By Season

Waste composition results were examined for seasonal variations. Samples were classified into four seasons according to the month in which they were collected. The groupings and number of samples obtained in each were as follows:

- *Spring*: May 1998, March – April 1999 92 samples
- *Summer*: June – August 1999 85 samples
- *Fall*: September – November 1999 88 samples
- *Winter*: December 1998 – February 1999 95 samples

Although no tests for significance were performed on the composition results by season, the results appear to be quite similar across the seasons for both the broad waste categories and the largest components disposed. Figure 4-4 summarizes the results of the broad waste categories by season.

Figure 4-4 Composition Summary: by Season
(May 1998 – April 1999)



4.6.1 Largest Components

Food, mixed low grade paper, compostable/soiled paper, and animal by-products accounted for about half the waste stream each season, as illustrated in Table 4-15. The combined percentages of these four components ranged from 48.1% to 51.5%. In the spring, a high percentage of newspaper was also disposed (5.3%).

Table 4-15 Largest Components by Season
(May 1998 – April 1999)

	Spring	Summer	Fall	Winter
Food	24.3%	26.2%	29.6%	26.2%
Mixed Low Grade Paper	10.2%	11.2%	10.5%	10.4%
Compostable/soiled Paper	6.5%	5.8%	5.8%	6.4%
Animal by-products	7.1%	5.6%	5.6%	7.5%
Newspaper	5.3%			
Sum of largest components	**53.4%**	**48.8%**	**51.5%**	**50.5%**

The tables presenting the detailed composition results for each season are presented in Table 4-16 through Table 4-19.

Table 4-16 Composition by Weight: Spring
(May 1998 – April 1999)

Calculated with a 90% confidence interval

	Mean	Low	High		Mean	Low	High
Paper	**30.7%**			***Organics***	**27.0%**		
Newspaper	5.3%	4.6%	6.0%	Pallets	0.0%	0.0%	0.0%
OCC/Kraft, unwaxed	4.3%	3.5%	5.1%	Crates/Boxes	0.0%	0.0%	0.0%
OCC/Kraft, waxed	0.3%	0.0%	0.9%	Leaves and Grass	2.2%	1.5%	2.9%
Office Paper	0.8%	0.6%	1.0%	Prunings	0.5%	0.3%	0.7%
Computer Paper	0.0%	0.0%	0.1%	Food	24.3%	22.9%	25.7%
Mixed Low Grade	10.2%	9.5%	10.9%	***Other Materials***	**17.9%**		
Phone Books	0.8%	0.5%	1.1%	Textiles/Clothing	2.0%	1.7%	2.2%
Milk/Juice Polycoats	0.6%	0.5%	0.7%	Carpet/Upholstery	0.8%	0.6%	1.0%
Frozen Food Polycoats	0.3%	0.2%	0.3%	Leather	0.1%	0.1%	0.2%
Compostable/Soiled	6.5%	6.0%	7.0%	Disposable Diapers	3.6%	3.1%	4.2%
Paper/Other Materials	1.4%	1.2%	1.6%	Animal By-Products	7.1%	6.0%	8.2%
Other Paper	0.2%	0.1%	0.2%	Rubber Products	0.7%	0.2%	1.2%
Plastic	**9.2%**			Tires	0.2%	0.0%	0.5%
PET Pop and Liquor	0.3%	0.2%	0.3%	Ash	0.2%	0.1%	0.3%
Other PET Bottles	0.3%	0.3%	0.4%	Furniture	0.3%	0.2%	0.4%
HDPE Milk and Juice	0.2%	0.2%	0.3%	Mattresses	0.9%	0.1%	1.7%
Other HDPE Bottles	0.5%	0.4%	0.5%	Small Appliances	0.0%	0.0%	0.0%
Other Plastic Bottles	0.1%	0.1%	0.2%	A/V Equipment	0.3%	0.2%	0.5%
Jars and Tubs	0.5%	0.5%	0.6%	Ceramics/Porcelain	0.4%	0.0%	0.7%
Expanded Polystyrene	0.4%	0.4%	0.5%	Non-distinct Fines	0.3%	0.2%	0.4%
Other Rigid Packaging	0.9%	0.8%	1.0%	Misc. Organics	0.7%	0.4%	0.9%
Grocery/Bread Bags	1.2%	1.1%	1.3%	Misc. Inorganics	0.4%	0.2%	0.6%
Garbage Bags	1.4%	1.2%	1.6%	***CDL Wastes***	**6.0%**		
Other Film	2.1%	1.9%	2.3%	Dimension Lumber	1.2%	0.6%	1.7%
Plastic Products	0.9%	0.7%	1.1%	Other Untreated Wood	0.1%	0.0%	0.1%
Plastic/Other Materials	0.3%	0.2%	0.5%	Treated Wood	0.6%	0.4%	0.9%
Glass	**4.2%**			Contaminated Wood	0.3%	0.1%	0.4%
Clear Beverage	1.2%	1.0%	1.5%	New Gypsum Scrap	0.0%	0.0%	0.0%
Green Beverage	0.9%	0.7%	1.1%	Demo Gypsum Scrap	0.6%	0.1%	1.2%
Brown Beverage	0.7%	0.6%	0.9%	Fiberglass Insulation	0.1%	0.0%	0.2%
Container Glass	0.9%	0.7%	1.0%	Rock/Concrete/Brick	0.6%	0.1%	1.1%
Fluorescent Tubes	0.0%	0.0%	0.0%	Asphaltic Roofing	0.2%	0.1%	0.3%
Other Glass	0.5%	0.3%	0.7%	Other Construction Debris	0.4%	0.2%	0.7%
Metal	**4.6%**			Sand/Soil/Dirt	1.9%	1.1%	2.6%
Aluminum Cans	0.4%	0.4%	0.5%	***Hazardous***	**0.3%**		
Alum. Foil/Containers	0.3%	0.2%	0.3%	Latex Paints	0.0%	0.0%	0.0%
Other Aluminum	0.0%	0.0%	0.0%	Hazardous Adhesives/Glues	0.0%	0.0%	0.0%
Other Nonferrous	0.1%	0.0%	0.1%	NonHazardous Adhesives/Glues	0.0%	0.0%	0.1%
Tin Food Cans	1.1%	1.0%	1.2%	Oil-based Paints/Solvents	0.0%	0.0%	0.0%
Empty Aerosol Cans	0.2%	0.2%	0.2%	Cleaners	0.0%	0.0%	0.0%
Other Ferrous	1.3%	0.5%	2.0%	Pesticides/Herbicides	0.0%	0.0%	0.0%
Mixed Metals/Materials	1.3%	0.7%	1.8%	Dry-Cell Batteries	0.1%	0.1%	0.1%
Motor Oil Filters	0.0%	0.0%	0.0%	Wet-Cell Batteries	0.0%	0.0%	0.0%
				Gasoline/Kerosene	0.0%	0.0%	0.0%
				Motor Oil/Diesel Oil	0.0%	0.0%	0.0%
				Asbestos	0.0%	0.0%	0.0%
				Explosives	0.0%	0.0%	0.0%
				Other Hazardous Chemicals	0.0%	0.0%	0.1%
Sample Count	**92**			Other NonHazardous Chemical	0.1%	0.0%	0.1%

Table 4-17 Composition by Weight: Summer
(May 1998 – April 1999)

Calculated with a 90% confidence interval

	Mean	Low	High		Mean	Low	High
Paper	**29.3%**			***Organics***	**29.3%**		
Newspaper	4.2%	3.6%	4.8%	Pallets	0.0%	0.0%	0.0%
OCC/Kraft, unwaxed	4.6%	4.0%	5.1%	Crates/Boxes	0.1%	0.0%	0.2%
OCC/Kraft, waxed	0.1%	0.0%	0.2%	Leaves and Grass	2.9%	2.0%	3.9%
Office Paper	0.7%	0.5%	0.8%	Prunings	0.1%	0.0%	0.2%
Computer Paper	0.0%	0.0%	0.0%	Food	26.2%	24.7%	27.7%
Mixed Low Grade	11.2%	10.2%	12.2%	***Other Materials***	**17.5%**		
Phone Books	0.5%	0.2%	0.9%	Textiles/Clothing	2.2%	1.8%	2.6%
Milk/Juice Polycoats	0.6%	0.4%	0.8%	Carpet/Upholstery	2.5%	1.6%	3.4%
Frozen Food Polycoats	0.3%	0.3%	0.4%	Leather	0.1%	0.1%	0.2%
Compostable/Soiled	5.8%	5.3%	6.3%	Disposable Diapers	3.3%	2.6%	4.0%
Paper/Other Materials	1.2%	1.1%	1.4%	Animal By-Products	5.6%	4.6%	6.6%
Other Paper	0.1%	0.0%	0.1%	Rubber Products	0.2%	0.1%	0.3%
Plastic	**10.7%**			Tires	0.0%	0.0%	0.1%
PET Pop and Liquor	0.5%	0.4%	0.5%	Ash	0.4%	0.1%	0.7%
Other PET Bottles	0.1%	0.1%	0.1%	Furniture	0.7%	0.2%	1.2%
HDPE Milk and Juice	0.3%	0.2%	0.3%	Mattresses	0.0%	0.0%	0.0%
Other HDPE Bottles	0.4%	0.3%	0.4%	Small Appliances	0.3%	0.1%	0.4%
Other Plastic Bottles	0.2%	0.2%	0.2%	A/V Equipment	0.5%	0.2%	0.9%
Jars and Tubs	0.5%	0.4%	0.6%	Ceramics/Porcelain	0.3%	0.1%	0.6%
Expanded Polystyrene	1.1%	0.2%	2.0%	Non-distinct Fines	0.5%	0.3%	0.7%
Other Rigid Packaging	1.0%	0.9%	1.1%	Misc. Organics	0.3%	0.2%	0.4%
Grocery/Bread Bags	1.7%	1.5%	1.9%	Misc. Inorganics	0.5%	0.4%	0.7%
Garbage Bags	1.3%	1.1%	1.6%	***CDL Wastes***	**4.8%**		
Other Film	2.4%	2.2%	2.6%	Dimension Lumber	1.5%	0.6%	2.4%
Plastic Products	0.9%	0.8%	1.1%	Other Untreated Wood	0.3%	0.1%	0.5%
Plastic/Other Materials	0.4%	0.3%	0.6%	Treated Wood	0.9%	0.4%	1.3%
Glass	**4.0%**			Contaminated Wood	0.3%	0.1%	0.5%
Clear Beverage	1.1%	0.8%	1.3%	New Gypsum Scrap	0.0%	0.0%	0.0%
Green Beverage	0.8%	0.6%	1.0%	Demo Gypsum Scrap	0.7%	0.0%	1.3%
Brown Beverage	1.1%	0.4%	1.7%	Fiberglass Insulation	0.0%	0.0%	0.0%
Container Glass	0.8%	0.6%	0.9%	Rock/Concrete/Brick	0.5%	0.1%	0.9%
Fluorescent Tubes	0.0%	0.0%	0.0%	Asphaltic Roofing	0.1%	0.0%	0.2%
Other Glass	0.2%	0.2%	0.3%	Other Construction Debris	0.2%	0.0%	0.3%
Metal	**4.0%**			Sand/Soil/Dirt	0.3%	0.1%	0.6%
Aluminum Cans	0.6%	0.5%	0.6%	***Hazardous***	**0.3%**		
Alum. Foil/Containers	0.2%	0.1%	0.2%	Latex Paints	0.1%	0.0%	0.1%
Other Aluminum	0.0%	0.0%	0.0%	Hazardous Adhesives/Glues	0.0%	0.0%	0.0%
Other Nonferrous	0.0%	0.0%	0.1%	NonHazardous Adhesives/Glue	0.0%	0.0%	0.0%
Tin Food Cans	1.2%	1.0%	1.3%	Oil-based Paints/Solvents	0.0%	0.0%	0.0%
Empty Aerosol Cans	0.2%	0.1%	0.2%	Cleaners	0.0%	0.0%	0.0%
Other Ferrous	0.8%	0.6%	1.0%	Pesticides/Herbicides	0.0%	0.0%	0.0%
Mixed Metals/Materials	1.1%	0.5%	1.7%	Dry-Cell Batteries	0.1%	0.1%	0.1%
Motor Oil Filters	0.0%	0.0%	0.1%	Wet-Cell Batteries	0.0%	0.0%	0.0%
				Gasoline/Kerosene	0.0%	0.0%	0.0%
				Motor Oil/Diesel Oil	0.0%	0.0%	0.0%
				Asbestos	0.0%	0.0%	0.0%
				Explosives	0.0%	0.0%	0.0%
				Other Hazardous Chemicals	0.1%	0.0%	0.1%
Sample Count	**85**			Other NonHazardous Chemical	0.1%	0.0%	0.1%

Table 4-18 Composition by Weight: Fall
(May 1998 – April 1999)

Calculated with a 90% confidence interval

	Mean	Low	High		Mean	Low	High
Paper	**27.5%**			***Organics***	**32.0%**		
Newspaper	4.6%	3.9%	5.3%	Pallets	0.0%	0.0%	0.0%
OCC/Kraft, unwaxed	4.0%	3.7%	4.2%	Crates/Boxes	0.0%	0.0%	0.0%
OCC/Kraft, waxed	0.1%	0.0%	0.1%	Leaves and Grass	2.3%	1.2%	3.3%
Office Paper	0.6%	0.4%	0.8%	Prunings	0.1%	0.1%	0.2%
Computer Paper	0.0%	0.0%	0.0%	Food	29.6%	28.3%	30.8%
Mixed Low Grade	10.5%	9.7%	11.2%	***Other Materials***	**17.9%**		
Phone Books	0.1%	0.0%	0.2%	Textiles/Clothing	2.1%	1.8%	2.4%
Milk/Juice Polycoats	0.6%	0.5%	0.7%	Carpet/Upholstery	1.7%	1.3%	2.2%
Frozen Food Polycoats	0.3%	0.2%	0.3%	Leather	0.1%	0.0%	0.2%
Compostable/Soiled	5.8%	5.5%	6.2%	Disposable Diapers	4.5%	4.0%	5.1%
Paper/Other Materials	0.9%	0.7%	1.1%	Animal By-Products	5.6%	4.7%	6.5%
Other Paper	0.1%	0.0%	0.1%	Rubber Products	0.2%	0.1%	0.2%
Plastic	**9.6%**			Tires	0.0%	0.0%	0.0%
PET Pop and Liquor	0.4%	0.4%	0.5%	Ash	0.4%	0.1%	0.7%
Other PET Bottles	0.1%	0.1%	0.1%	Furniture	0.5%	0.0%	0.9%
HDPE Milk and Juice	0.3%	0.2%	0.3%	Mattresses	0.0%	0.0%	0.0%
Other HDPE Bottles	0.4%	0.3%	0.5%	Small Appliances	0.6%	0.4%	0.9%
Other Plastic Bottles	0.1%	0.1%	0.2%	A/V Equipment	0.6%	0.0%	1.2%
Jars and Tubs	0.4%	0.3%	0.4%	Ceramics/Porcelain	0.1%	0.0%	0.2%
Expanded Polystyrene	0.5%	0.4%	0.5%	Non-distinct Fines	0.7%	0.5%	0.9%
Other Rigid Packaging	0.8%	0.7%	0.9%	Misc. Organics	0.6%	0.3%	1.0%
Grocery/Bread Bags	1.2%	1.1%	1.3%	Misc. Inorganics	0.1%	0.1%	0.2%
Garbage Bags	1.1%	1.0%	1.2%	***CDL Wastes***	**3.8%**		
Other Film	2.7%	2.5%	2.9%	Dimension Lumber	0.5%	0.2%	0.8%
Plastic Products	0.7%	0.6%	0.8%	Other Untreated Wood	0.5%	0.2%	0.7%
Plastic/Other Materials	0.8%	0.5%	1.2%	Treated Wood	0.8%	0.4%	1.1%
Glass	**3.8%**			Contaminated Wood	0.2%	0.1%	0.3%
Clear Beverage	0.9%	0.7%	1.1%	New Gypsum Scrap	0.0%	0.0%	0.0%
Green Beverage	0.7%	0.5%	0.9%	Demo Gypsum Scrap	0.1%	0.0%	0.3%
Brown Beverage	1.0%	0.7%	1.3%	Fiberglass Insulation	0.0%	0.0%	0.1%
Container Glass	0.9%	0.8%	1.0%	Rock/Concrete/Brick	0.2%	0.1%	0.3%
Fluorescent Tubes	0.0%	0.0%	0.0%	Asphaltic Roofing	0.3%	0.0%	0.6%
Other Glass	0.3%	0.2%	0.4%	Other Construction Debris	0.3%	0.0%	0.5%
Metal	**4.7%**			Sand/Soil/Dirt	1.0%	0.1%	1.8%
Aluminum Cans	0.5%	0.4%	0.6%	***Hazardous***	**0.6%**		
Alum. Foil/Containers	0.2%	0.2%	0.2%	Latex Paints	0.0%	0.0%	0.1%
Other Aluminum	0.1%	0.0%	0.1%	Hazardous Adhesives/Glues	0.0%	0.0%	0.0%
Other Nonferrous	0.1%	0.0%	0.2%	NonHazardous Adhesives/Glue	0.1%	0.0%	0.2%
Tin Food Cans	1.2%	1.1%	1.4%	Oil-based Paints/Solvents	0.0%	0.0%	0.0%
Empty Aerosol Cans	0.2%	0.2%	0.2%	Cleaners	0.0%	0.0%	0.0%
Other Ferrous	1.5%	0.3%	2.7%	Pesticides/Herbicides	0.0%	0.0%	0.0%
Mixed Metals/Materials	0.8%	0.4%	1.3%	Dry-Cell Batteries	0.2%	0.0%	0.3%
Motor Oil Filters	0.0%	0.0%	0.1%	Wet-Cell Batteries	0.0%	0.0%	0.0%
				Gasoline/Kerosene	0.0%	0.0%	0.0%
				Motor Oil/Diesel Oil	0.1%	0.0%	0.2%
				Asbestos	0.0%	0.0%	0.0%
				Explosives	0.0%	0.0%	0.0%
				Other Hazardous Chemicals	0.0%	0.0%	0.0%
Sample Count	**88**			Other NonHazardous Chemical	0.2%	0.0%	0.4%

Table 4-19 Composition by Weight: Winter
(May 1998 – April 1999)

Calculated with a 90% confidence interval

	Mean	Low	High		Mean	Low	High
Paper	**29.8%**			***Organics***	**28.5%**		
Newspaper	4.6%	4.1%	5.1%	Pallets	0.1%	0.0%	0.3%
OCC/Kraft, unwaxed	4.4%	3.8%	5.0%	Crates/Boxes	0.0%	0.0%	0.0%
OCC/Kraft, waxed	0.0%	0.0%	0.0%	Leaves and Grass	1.5%	0.6%	2.4%
Office Paper	1.2%	0.8%	1.5%	Prunings	0.7%	0.5%	1.0%
Computer Paper	0.0%	0.0%	0.1%	Food	26.2%	25.0%	27.4%
Mixed Low Grade	10.4%	9.6%	11.1%	***Other Materials***	**17.6%**		
Phone Books	0.2%	0.1%	0.3%	Textiles/Clothing	1.9%	1.7%	2.2%
Milk/Juice Polycoats	0.7%	0.7%	0.8%	Carpet/Upholstery	1.0%	0.5%	1.4%
Frozen Food Polycoats	0.3%	0.2%	0.3%	Leather	0.3%	0.2%	0.4%
Compostable/Soiled	6.4%	6.0%	6.8%	Disposable Diapers	4.2%	3.7%	4.7%
Paper/Other Materials	1.4%	1.2%	1.6%	Animal By-Products	7.5%	6.1%	8.9%
Other Paper	0.1%	0.0%	0.1%	Rubber Products	0.2%	0.1%	0.3%
Plastic	**11.2%**			Tires	0.0%	0.0%	0.0%
PET Pop and Liquor	0.4%	0.3%	0.5%	Ash	0.1%	0.0%	0.1%
Other PET Bottles	0.1%	0.1%	0.1%	Furniture	0.5%	0.0%	1.1%
HDPE Milk and Juice	0.3%	0.2%	0.3%	Mattresses	0.5%	0.0%	1.2%
Other HDPE Bottles	0.3%	0.2%	0.3%	Small Appliances	0.3%	0.2%	0.5%
Other Plastic Bottles	0.2%	0.2%	0.2%	A/V Equipment	0.2%	0.1%	0.3%
Jars and Tubs	0.6%	0.6%	0.7%	Ceramics/Porcelain	0.2%	0.1%	0.4%
Expanded Polystyrene	0.7%	0.6%	0.7%	Non-distinct Fines	0.1%	0.0%	0.2%
Other Rigid Packaging	1.2%	1.1%	1.3%	Misc. Organics	0.2%	0.1%	0.2%
Grocery/Bread Bags	1.6%	1.5%	1.7%	Misc. Inorganics	0.3%	0.2%	0.4%
Garbage Bags	1.2%	1.1%	1.4%	***CDL Wastes***	**4.0%**		
Other Film	2.6%	2.3%	2.8%	Dimension Lumber	0.6%	0.3%	0.9%
Plastic Products	0.9%	0.8%	1.1%	Other Untreated Wood	0.3%	0.1%	0.5%
Plastic/Other Materials	1.1%	0.8%	1.3%	Treated Wood	0.4%	0.2%	0.5%
Glass	**4.1%**			Contaminated Wood	0.0%	0.0%	0.1%
Clear Beverage	0.9%	0.7%	1.1%	New Gypsum Scrap	0.0%	0.0%	0.0%
Green Beverage	0.9%	0.6%	1.1%	Demo Gypsum Scrap	0.3%	0.1%	0.5%
Brown Beverage	0.7%	0.5%	0.9%	Fiberglass Insulation	0.0%	0.0%	0.0%
Container Glass	1.0%	0.9%	1.1%	Rock/Concrete/Brick	1.2%	0.0%	2.7%
Fluorescent Tubes	0.0%	0.0%	0.0%	Asphaltic Roofing	0.0%	0.0%	0.0%
Other Glass	0.6%	0.4%	0.8%	Other Construction Debris	0.3%	0.0%	0.5%
Metal	**4.2%**			Sand/Soil/Dirt	0.9%	0.5%	1.4%
Aluminum Cans	0.5%	0.4%	0.6%	***Hazardous***	**0.7%**		
Alum. Foil/Containers	0.3%	0.3%	0.4%	Latex Paints	0.1%	0.0%	0.2%
Other Aluminum	0.0%	0.0%	0.0%	Hazardous Adhesives/Glues	0.0%	0.0%	0.0%
Other Nonferrous	0.1%	0.0%	0.1%	NonHazardous Adhesives/Glue	0.0%	0.0%	0.0%
Tin Food Cans	1.6%	1.4%	1.8%	Oil-based Paints/Solvents	0.0%	0.0%	0.0%
Empty Aerosol Cans	0.2%	0.1%	0.2%	Cleaners	0.0%	0.0%	0.0%
Other Ferrous	0.9%	0.6%	1.3%	Pesticides/Herbicides	0.0%	0.0%	0.0%
Mixed Metals/Materials	0.5%	0.4%	0.7%	Dry-Cell Batteries	0.1%	0.1%	0.1%
Motor Oil Filters	0.0%	0.0%	0.0%	Wet-Cell Batteries	0.0%	0.0%	0.0%
				Gasoline/Kerosene	0.0%	0.0%	0.0%
				Motor Oil/Diesel Oil	0.0%	0.0%	0.0%
				Asbestos	0.0%	0.0%	0.0%
				Explosives	0.0%	0.0%	0.0%
				Other Hazardous Chemicals	0.4%	0.0%	1.0%
Sample Count	**95**			Other NonHazardous Chemical	0.1%	0.0%	0.1%

4.7 By Demographics

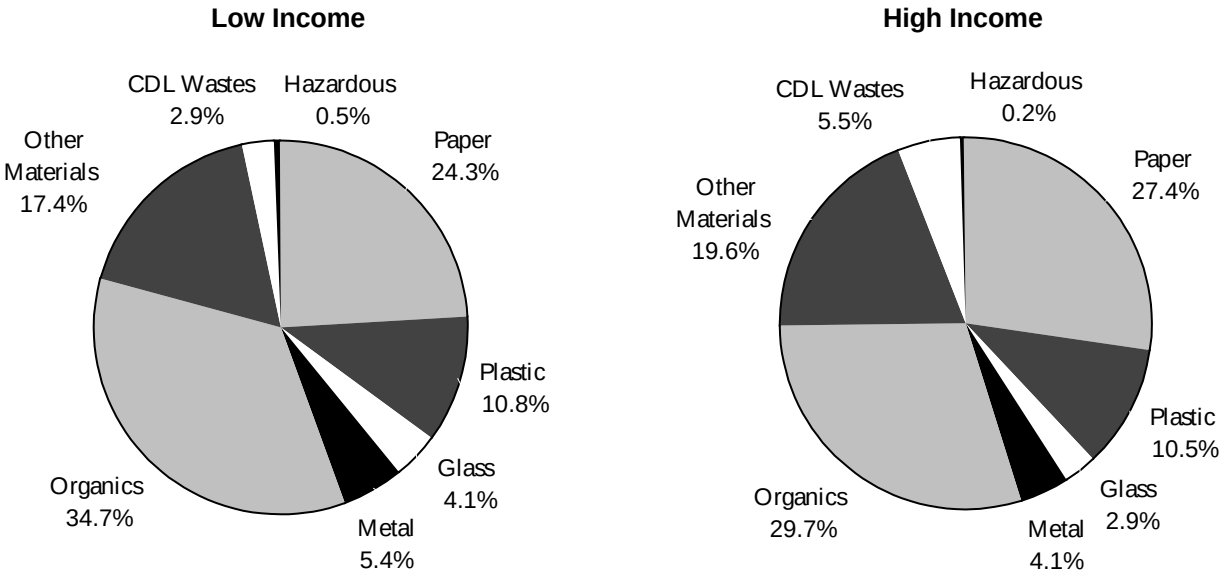
The single-family samples were grouped according to household income and size using Census tract information corresponding to the collection routes. The median income and the average household size was calculated for each route by first determining the proportion of each census block group area incorporated in the route. Then, the median household income and the average household size of each block group within the routes were identified, and a weighted average based on the population of each block group was used to calculate the median income and average household size for each route.

4.7.1 Income

The broad material categories for the low and high income households are shown below in Figure 4-5. The income levels were determined by first identifying the median household income for each route, then dividing the routes into quartiles. The low income group represents samples obtained from routes in the lowest quartile and the high income group represents samples obtained from routes in the uppermost quartile. A total of 56 samples were obtained from the low income routes and 59 samples were obtained from the high income routes.

The waste composition of both the low and the high income groups consisted mostly of paper and organics. Combined, these two categories accounted for 59.0% of the waste among the low income routes and 57.1% of the waste among the high income groups. Although no tests for significance were performed between the two subpopulations, a higher percentage of organics appears to be disposed among the low income routes while more CDL waste and paper were disposed among the high income routes.

Figure 4-5 Composition Summary: by Household Income
(May 1998- April 1999)



4.7.1.1 Largest Components

Table 4-20 below shows the largest components for both the low and high income groupings. Food, mixed low grade paper, composatable/soiled paper, and animal by-products accounted for about half of the waste stream for both the low (58.5%) and the high (52.3%) income groups. The waste stream of the low income subpopulation also included a large percentage of disposable diapers.

Table 4-20 Largest Components by Income
(May 1998 – April 1999)

	Low	High
Food	32.8%	27.6%
Mixed Low Grade Paper	8.1%	9.7%
Compostable/soiled Paper	6.7%	6.6%
Animal by-products	5.1%	8.4%
Disposable Diapers	5.8%	
Sum of largest components	**58.5%**	**52.3%**

Table 4-21 and Table 4-22 present the detailed composition results for the low and high income subpopulations.

Table 4-21 Composition by Weight: Low Income (May 1998 – April 1999)

Calculated with a 90% confidence interval

	Mean	Low	High		Mean	Low	High
Paper	**24.3%**			***Organics***	**34.7%**		
Newspaper	3.3%	2.8%	3.9%	Pallets	0.0%	0.0%	0.0%
OCC/Kraft, unwaxed	3.0%	2.6%	3.3%	Crates/Boxes	0.1%	0.0%	0.3%
OCC/Kraft, waxed	0.0%	0.0%	0.0%	Leaves and Grass	1.5%	0.9%	2.1%
Office Paper	0.6%	0.5%	0.7%	Prunings	0.2%	0.1%	0.4%
Computer Paper	0.0%	0.0%	0.0%	Food	32.8%	30.7%	35.0%
Mixed Low Grade	8.1%	7.4%	8.8%	***Other Materials***	**17.4%**		
Phone Books	0.2%	0.0%	0.4%	Textiles/Clothing	1.9%	1.6%	2.2%
Milk/Juice Polycoats	0.6%	0.5%	0.7%	Carpet/Upholstery	1.1%	0.6%	1.5%
Frozen Food Polycoats	0.3%	0.3%	0.4%	Leather	0.2%	0.1%	0.3%
Compostable/Soiled	6.7%	6.2%	7.1%	Disposable Diapers	5.8%	4.9%	6.6%
Paper/Other Materials	1.3%	1.1%	1.5%	Animal By-Products	5.1%	3.9%	6.2%
Other Paper	0.1%	0.0%	0.1%	Rubber Products	0.3%	0.1%	0.5%
Plastic	**10.8%**			Tires	0.2%	0.0%	0.6%
PET Pop and Liquor	0.4%	0.4%	0.5%	Ash	0.2%	0.0%	0.4%
Other PET Bottles	0.2%	0.1%	0.2%	Furniture	0.9%	0.0%	2.0%
HDPE Milk and Juice	0.3%	0.2%	0.3%	Mattresses	0.0%	0.0%	0.0%
Other HDPE Bottles	0.4%	0.3%	0.4%	Small Appliances	0.4%	0.2%	0.6%
Other Plastic Bottles	0.2%	0.1%	0.2%	A/V Equipment	0.1%	0.0%	0.2%
Jars and Tubs	0.5%	0.4%	0.6%	Ceramics/Porcelain	0.1%	0.1%	0.2%
Expanded Polystyrene	0.8%	0.7%	0.9%	Non-distinct Fines	0.5%	0.2%	0.8%
Other Rigid Packaging	1.0%	0.9%	1.1%	Misc. Organics	0.4%	0.3%	0.6%
Grocery/Bread Bags	1.7%	1.5%	1.9%	Misc. Inorganics	0.3%	0.1%	0.4%
Garbage Bags	1.3%	1.1%	1.4%	***CDL Wastes***	**2.9%**		
Other Film	2.5%	2.3%	2.7%	Dimension Lumber	0.6%	0.3%	0.8%
Plastic Products	0.9%	0.7%	1.1%	Other Untreated Wood	0.1%	0.0%	0.2%
Plastic/Other Materials	0.8%	0.4%	1.2%	Treated Wood	0.3%	0.1%	0.6%
Glass	**4.1%**			Contaminated Wood	0.2%	0.0%	0.5%
Clear Beverage	1.3%	0.9%	1.7%	New Gypsum Scrap	0.0%	0.0%	0.0%
Green Beverage	0.7%	0.5%	0.8%	Demo Gypsum Scrap	0.2%	0.1%	0.4%
Brown Beverage	0.7%	0.5%	0.8%	Fiberglass Insulation	0.0%	0.0%	0.0%
Container Glass	1.0%	0.8%	1.2%	Rock/Concrete/Brick	0.3%	0.0%	0.6%
Fluorescent Tubes	0.0%	0.0%	0.0%	Asphaltic Roofing	0.3%	0.0%	0.6%
Other Glass	0.4%	0.3%	0.6%	Other Construction Debris	0.4%	0.0%	0.9%
Metal	**5.4%**			Sand/Soil/Dirt	0.4%	0.1%	0.7%
Aluminum Cans	0.4%	0.4%	0.5%	***Hazardous***	**0.5%**		
Alum. Foil/Containers	0.4%	0.3%	0.4%	Latex Paints	0.0%	0.0%	0.1%
Other Aluminum	0.0%	0.0%	0.1%	Hazardous Adhesives/Glues	0.0%	0.0%	0.0%
Other Nonferrous	0.1%	0.0%	0.2%	NonHazardous Adhesives/Glues	0.2%	0.0%	0.5%
Tin Food Cans	1.5%	1.3%	1.6%	Oil-based Paints/Solvents	0.0%	0.0%	0.0%
Empty Aerosol Cans	0.1%	0.1%	0.2%	Cleaners	0.0%	0.0%	0.0%
Other Ferrous	1.6%	0.0%	3.1%	Pesticides/Herbicides	0.0%	0.0%	0.0%
Mixed Metals/Materials	1.2%	0.6%	1.8%	Dry-Cell Batteries	0.1%	0.1%	0.1%
Motor Oil Filters	0.0%	0.0%	0.1%	Wet-Cell Batteries	0.0%	0.0%	0.0%
				Gasoline/Kerosene	0.0%	0.0%	0.0%
				Motor Oil/Diesel Oil	0.0%	0.0%	0.1%
				Asbestos	0.0%	0.0%	0.0%
				Explosives	0.0%	0.0%	0.0%
				Other Hazardous Chemicals	0.1%	0.0%	0.1%
Sample Count	**56**			Other NonHazardous Chemicals	0.1%	0.0%	0.1%

Table 4-22 Composition by Weight: High Income
(May 1998 – April 1999)

Calculated with a 90% confidence interval

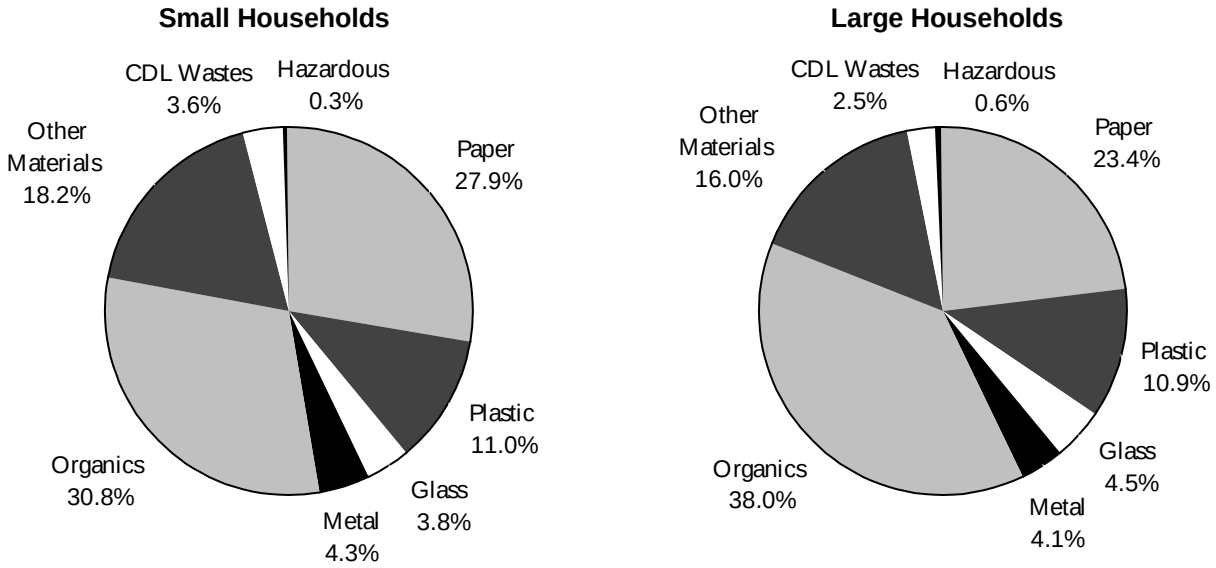
	Mean	Low	High		Mean	Low	High
Paper	**27.4%**			***Organics***	**29.7%**		
Newspaper	3.6%	2.9%	4.2%	Pallets	0.0%	0.0%	0.0%
OCC/Kraft, unwaxed	3.9%	3.5%	4.3%	Crates/Boxes	0.0%	0.0%	0.0%
OCC/Kraft, waxed	0.0%	0.0%	0.1%	Leaves and Grass	1.7%	1.0%	2.4%
Office Paper	0.9%	0.7%	1.1%	Prunings	0.4%	0.2%	0.6%
Computer Paper	0.0%	0.0%	0.0%	Food	27.6%	25.7%	29.5%
Mixed Low Grade	9.7%	9.0%	10.5%	***Other Materials***	**19.6%**		
Phone Books	0.2%	0.0%	0.3%	Textiles/Clothing	1.8%	1.5%	2.0%
Milk/Juice Polycoats	0.8%	0.7%	0.9%	Carpet/Upholstery	1.9%	1.2%	2.6%
Frozen Food Polycoats	0.3%	0.3%	0.4%	Leather	0.2%	0.1%	0.2%
Compostable/Soiled	6.6%	6.1%	7.2%	Disposable Diapers	4.2%	3.3%	5.0%
Paper/Other Materials	1.2%	1.0%	1.4%	Animal By-Products	8.4%	7.1%	9.7%
Other Paper	0.1%	0.1%	0.2%	Rubber Products	0.3%	0.2%	0.4%
Plastic	**10.5%**			Tires	0.0%	0.0%	0.0%
PET Pop and Liquor	0.3%	0.3%	0.3%	Ash	0.9%	0.3%	1.5%
Other PET Bottles	0.1%	0.1%	0.2%	Furniture	0.2%	0.0%	0.3%
HDPE Milk and Juice	0.2%	0.1%	0.2%	Mattresses	0.0%	0.0%	0.0%
Other HDPE Bottles	0.5%	0.3%	0.6%	Small Appliances	0.2%	0.1%	0.3%
Other Plastic Bottles	0.2%	0.1%	0.2%	A/V Equipment	0.3%	0.1%	0.6%
Jars and Tubs	0.6%	0.5%	0.7%	Ceramics/Porcelain	0.3%	0.1%	0.4%
Expanded Polystyrene	1.0%	0.1%	1.9%	Non-distinct Fines	0.3%	0.2%	0.5%
Other Rigid Packaging	1.1%	1.0%	1.3%	Misc. Organics	0.4%	0.1%	0.6%
Grocery/Bread Bags	1.2%	1.1%	1.4%	Misc. Inorganics	0.4%	0.2%	0.5%
Garbage Bags	1.1%	1.0%	1.3%	***CDL Wastes***	**5.5%**		
Other Film	2.6%	2.4%	2.8%	Dimension Lumber	0.8%	0.5%	1.0%
Plastic Products	0.8%	0.6%	0.9%	Other Untreated Wood	0.4%	0.1%	0.7%
Plastic/Other Materials	0.7%	0.5%	1.0%	Treated Wood	0.5%	0.3%	0.8%
Glass	**2.9%**			Contaminated Wood	0.3%	0.0%	0.5%
Clear Beverage	0.5%	0.4%	0.7%	New Gypsum Scrap	0.0%	0.0%	0.0%
Green Beverage	0.8%	0.6%	1.0%	Demo Gypsum Scrap	0.4%	0.0%	0.7%
Brown Beverage	0.5%	0.3%	0.6%	Fiberglass Insulation	0.0%	0.0%	0.0%
Container Glass	0.8%	0.7%	1.0%	Rock/Concrete/Brick	1.6%	0.0%	4.2%
Fluorescent Tubes	0.0%	0.0%	0.0%	Asphaltic Roofing	0.4%	0.0%	0.9%
Other Glass	0.3%	0.2%	0.4%	Other Construction Debris	0.4%	0.1%	0.8%
Metal	**4.1%**			Sand/Soil/Dirt	0.7%	0.2%	1.3%
Aluminum Cans	0.3%	0.2%	0.3%	***Hazardous***	**0.2%**		
Alum. Foil/Containers	0.2%	0.2%	0.3%	Latex Paints	0.0%	0.0%	0.1%
Other Aluminum	0.1%	0.0%	0.2%	Hazardous Adhesives/Glues	0.0%	0.0%	0.0%
Other Nonferrous	0.1%	0.0%	0.1%	NonHazardous Adhesives/Glues	0.0%	0.0%	0.0%
Tin Food Cans	1.2%	0.9%	1.4%	Oil-based Paints/Solvents	0.0%	0.0%	0.0%
Empty Aerosol Cans	0.2%	0.2%	0.2%	Cleaners	0.0%	0.0%	0.0%
Other Ferrous	1.0%	0.7%	1.4%	Pesticides/Herbicides	0.0%	0.0%	0.0%
Mixed Metals/Materials	1.0%	0.3%	1.8%	Dry-Cell Batteries	0.1%	0.0%	0.1%
Motor Oil Filters	0.0%	0.0%	0.0%	Wet-Cell Batteries	0.0%	0.0%	0.0%
				Gasoline/Kerosene	0.0%	0.0%	0.0%
				Motor Oil/Diesel Oil	0.0%	0.0%	0.0%
				Asbestos	0.0%	0.0%	0.0%
				Explosives	0.0%	0.0%	0.0%
				Other Hazardous Chemicals	0.0%	0.0%	0.0%
Sample Count	**59**			Other NonHazardous Chemicals	0.1%	0.0%	0.2%

4.7.2 Household Size

Figure 4-6 summarizes the broad waste categories for small (<2.13 people) and large (>2.56 people) households. The groupings were determined by first identifying the average household size for each route, then by dividing the routes into quartiles. The grouping of small households represents samples obtained from the routes in the lowest quartile and the grouping of large households represents samples obtained in the uppermost quartile. A total of 48 samples were obtained from the small household routes and 73 samples were obtained from the large household routes.

Paper and organics accounted for the majority of waste for both household size groupings (58.7% for the small households and 61.4% for the large households.) Although no statistical tests were performed between the large and small household size subpopulations, smaller households appeared to dispose more paper and less organics than larger households did.

Figure 4-6 Composition Summary: by Household Size
(May 1998 – April 1999)



4.7.2.1 Largest components

As shown in Table 4-23, food was the largest component disposed by both the small and large households, followed by mixed low grade paper and compostable/soiled paper. For both the small and large households, it is estimated that four components accounted for slightly more than half of their respective waste streams.

Table 4-23 Largest Components by Household Size
(May 1998 – April 1999)

	Small	Large
Food	28.3%	35.8%
Mixed Low Grade Paper	10.4%	8.5%
Compostable/soiled Paper	6.7%	7.2%
Animal by-products	8.2%	
Disposable Diapers		6.2%
Sum of largest components	**53.6%**	**57.7%**

Table 4-24 and Table 4-25 present the detailed composition results for the small and large households.

Table 4-24 Composition by Weight: Small Households
(May 1998 – April 1999)

Calculated with a 90% confidence interval

	Mean	Low	High		Mean	Low	High
Paper	**27.9%**			***Organics***	**30.8%**		
Newspaper	3.7%	3.0%	4.4%	Pallets	0.0%	0.0%	0.0%
OCC/Kraft, unwaxed	3.3%	2.9%	3.7%	Crates/Boxes	0.0%	0.0%	0.0%
OCC/Kraft, waxed	0.0%	0.0%	0.0%	Leaves and Grass	2.0%	1.2%	2.8%
Office Paper	0.6%	0.5%	0.8%	Prunings	0.4%	0.1%	0.7%
Computer Paper	0.1%	0.0%	0.1%	Food	28.3%	26.9%	29.8%
Mixed Low Grade	10.4%	9.4%	11.3%	***Other Materials***	**18.2%**		
Phone Books	0.2%	0.0%	0.4%	Textiles/Clothing	1.7%	1.3%	2.0%
Milk/Juice Polycoats	0.8%	0.7%	0.9%	Carpet/Upholstery	1.3%	0.8%	1.7%
Frozen Food Polycoats	0.3%	0.3%	0.4%	Leather	0.1%	0.0%	0.2%
Compostable/Soiled	6.7%	6.2%	7.2%	Disposable Diapers	3.7%	3.2%	4.2%
Paper/Other Materials	1.6%	1.3%	2.0%	Animal By-Products	8.2%	7.0%	9.4%
Other Paper	0.2%	0.1%	0.3%	Rubber Products	0.2%	0.1%	0.3%
Plastic	**11.0%**			Tires	0.3%	0.0%	0.7%
PET Pop and Liquor	0.3%	0.3%	0.4%	Ash	0.1%	0.0%	0.1%
Other PET Bottles	0.2%	0.2%	0.2%	Furniture	0.8%	0.0%	2.0%
HDPE Milk and Juice	0.2%	0.2%	0.2%	Mattresses	0.0%	0.0%	0.0%
Other HDPE Bottles	0.4%	0.3%	0.5%	Small Appliances	0.3%	0.1%	0.5%
Other Plastic Bottles	0.2%	0.1%	0.2%	A/V Equipment	0.3%	0.0%	0.7%
Jars and Tubs	0.6%	0.5%	0.7%	Ceramics/Porcelain	0.3%	0.1%	0.4%
Expanded Polystyrene	0.6%	0.5%	0.7%	Non-distinct Fines	0.5%	0.3%	0.8%
Other Rigid Packaging	1.1%	1.0%	1.2%	Misc. Organics	0.2%	0.1%	0.2%
Grocery/Bread Bags	1.5%	1.3%	1.6%	Misc. Inorganics	0.4%	0.2%	0.6%
Garbage Bags	1.4%	1.2%	1.7%	***CDL Wastes***	**3.6%**		
Other Film	2.7%	2.4%	2.9%	Dimension Lumber	1.0%	0.4%	1.6%
Plastic Products	0.8%	0.7%	0.9%	Other Untreated Wood	0.2%	0.0%	0.3%
Plastic/Other Materials	1.0%	0.5%	1.6%	Treated Wood	0.6%	0.2%	0.9%
Glass	**3.8%**			Contaminated Wood	0.1%	0.0%	0.3%
Clear Beverage	0.9%	0.7%	1.1%	New Gypsum Scrap	0.0%	0.0%	0.0%
Green Beverage	0.8%	0.6%	1.0%	Demo Gypsum Scrap	0.2%	0.0%	0.3%
Brown Beverage	0.8%	0.6%	1.0%	Fiberglass Insulation	0.0%	0.0%	0.0%
Container Glass	0.9%	0.7%	1.1%	Rock/Concrete/Brick	0.1%	0.0%	0.1%
Fluorescent Tubes	0.0%	0.0%	0.0%	Asphaltic Roofing	0.1%	0.0%	0.3%
Other Glass	0.5%	0.3%	0.6%	Other Construction Debris	0.7%	0.1%	1.2%
Metal	**4.3%**			Sand/Soil/Dirt	0.7%	0.2%	1.1%
Aluminum Cans	0.4%	0.3%	0.4%	***Hazardous***	**0.3%**		
Alum. Foil/Containers	0.2%	0.2%	0.3%	Latex Paints	0.0%	0.0%	0.1%
Other Aluminum	0.0%	0.0%	0.0%	Hazardous Adhesives/Glues	0.0%	0.0%	0.0%
Other Nonferrous	0.0%	0.0%	0.1%	NonHazardous Adhesives/Glues	0.0%	0.0%	0.0%
Tin Food Cans	1.3%	1.2%	1.5%	Oil-based Paints/Solvents	0.0%	0.0%	0.0%
Empty Aerosol Cans	0.2%	0.1%	0.2%	Cleaners	0.0%	0.0%	0.0%
Other Ferrous	0.9%	0.7%	1.1%	Pesticides/Herbicides	0.0%	0.0%	0.0%
Mixed Metals/Materials	1.2%	0.6%	1.9%	Dry-Cell Batteries	0.1%	0.0%	0.1%
Motor Oil Filters	0.0%	0.0%	0.0%	Wet-Cell Batteries	0.0%	0.0%	0.0%
				Gasoline/Kerosene	0.0%	0.0%	0.0%
				Motor Oil/Diesel Oil	0.0%	0.0%	0.0%
				Asbestos	0.0%	0.0%	0.0%
				Explosives	0.0%	0.0%	0.0%
				Other Hazardous Chemicals	0.0%	0.0%	0.0%
Sample Count	**48**			Other NonHazardous Chemicals	0.1%	0.0%	0.2%

Table 4-25 Composition by Weight: Large Households
(May 1998 – April 1999)

Calculated with a 90% confidence interval

	Mean	Low	High		Mean	Low	High
Paper	**23.4%**			***Organics***	**38.0%**		
Newspaper	2.8%	2.4%	3.1%	Pallets	0.0%	0.0%	0.0%
OCC/Kraft, unwaxed	2.5%	2.3%	2.7%	Crates/Boxes	0.1%	0.0%	0.2%
OCC/Kraft, waxed	0.0%	0.0%	0.0%	Leaves and Grass	1.9%	0.8%	3.0%
Office Paper	0.5%	0.4%	0.6%	Prunings	0.2%	0.1%	0.4%
Computer Paper	0.0%	0.0%	0.0%	Food	35.8%	34.2%	37.4%
Mixed Low Grade	8.5%	7.8%	9.2%	***Other Materials***	**16.0%**		
Phone Books	0.1%	0.0%	0.2%	Textiles/Clothing	1.9%	1.7%	2.2%
Milk/Juice Polycoats	0.5%	0.5%	0.6%	Carpet/Upholstery	1.4%	0.9%	2.0%
Frozen Food Polycoats	0.3%	0.2%	0.3%	Leather	0.2%	0.1%	0.3%
Compostable/Soiled	7.2%	6.7%	7.6%	Disposable Diapers	6.2%	5.5%	7.0%
Paper/Other Materials	1.1%	0.9%	1.2%	Animal By-Products	3.8%	3.0%	4.6%
Other Paper	0.0%	0.0%	0.1%	Rubber Products	0.1%	0.0%	0.1%
Plastic	**10.9%**			Tires	0.0%	0.0%	0.0%
PET Pop and Liquor	0.4%	0.4%	0.5%	Ash	0.4%	0.1%	0.6%
Other PET Bottles	0.2%	0.1%	0.2%	Furniture	0.4%	0.1%	0.7%
HDPE Milk and Juice	0.3%	0.2%	0.3%	Mattresses	0.0%	0.0%	0.0%
Other HDPE Bottles	0.4%	0.3%	0.4%	Small Appliances	0.3%	0.2%	0.5%
Other Plastic Bottles	0.2%	0.1%	0.2%	A/V Equipment	0.1%	0.1%	0.2%
Jars and Tubs	0.5%	0.4%	0.5%	Ceramics/Porcelain	0.2%	0.1%	0.2%
Expanded Polystyrene	0.8%	0.8%	0.9%	Non-distinct Fines	0.3%	0.1%	0.4%
Other Rigid Packaging	0.9%	0.8%	1.0%	Misc. Organics	0.4%	0.3%	0.5%
Grocery/Bread Bags	1.9%	1.7%	2.0%	Misc. Inorganics	0.3%	0.2%	0.4%
Garbage Bags	1.3%	1.2%	1.4%	***CDL Wastes***	**2.5%**		
Other Film	2.6%	2.4%	2.8%	Dimension Lumber	0.3%	0.1%	0.4%
Plastic Products	0.9%	0.7%	1.2%	Other Untreated Wood	0.3%	0.1%	0.5%
Plastic/Other Materials	0.6%	0.4%	0.8%	Treated Wood	0.4%	0.1%	0.6%
Glass	**4.5%**			Contaminated Wood	0.2%	0.0%	0.3%
Clear Beverage	1.6%	1.2%	1.9%	New Gypsum Scrap	0.0%	0.0%	0.0%
Green Beverage	0.7%	0.6%	0.9%	Demo Gypsum Scrap	0.6%	0.2%	0.9%
Brown Beverage	0.7%	0.5%	0.8%	Fiberglass Insulation	0.0%	0.0%	0.0%
Container Glass	1.1%	1.0%	1.3%	Rock/Concrete/Brick	0.3%	0.0%	0.7%
Fluorescent Tubes	0.0%	0.0%	0.0%	Asphaltic Roofing	0.2%	0.0%	0.4%
Other Glass	0.4%	0.3%	0.4%	Other Construction Debris	0.2%	0.0%	0.4%
Metal	**4.1%**			Sand/Soil/Dirt	0.1%	0.0%	0.2%
Aluminum Cans	0.5%	0.5%	0.6%	***Hazardous***	**0.6%**		
Alum. Foil/Containers	0.3%	0.3%	0.4%	Latex Paints	0.0%	0.0%	0.1%
Other Aluminum	0.0%	0.0%	0.1%	Hazardous Adhesives/Glues	0.0%	0.0%	0.0%
Other Nonferrous	0.1%	0.0%	0.2%	NonHazardous Adhesives/Glues	0.1%	0.0%	0.4%
Tin Food Cans	1.5%	1.4%	1.7%	Oil-based Paints/Solvents	0.0%	0.0%	0.0%
Empty Aerosol Cans	0.2%	0.1%	0.2%	Cleaners	0.0%	0.0%	0.0%
Other Ferrous	0.5%	0.3%	0.7%	Pesticides/Herbicides	0.0%	0.0%	0.0%
Mixed Metals/Materials	0.8%	0.5%	1.2%	Dry-Cell Batteries	0.1%	0.1%	0.1%
Motor Oil Filters	0.0%	0.0%	0.1%	Wet-Cell Batteries	0.0%	0.0%	0.0%
				Gasoline/Kerosene	0.0%	0.0%	0.0%
				Motor Oil/Diesel Oil	0.2%	0.0%	0.4%
				Asbestos	0.0%	0.0%	0.0%
				Explosives	0.0%	0.0%	0.0%
				Other Hazardous Chemicals	0.1%	0.0%	0.1%
Sample Count	**73**			Other NonHazardous Chemicals	0.1%	0.0%	0.2%