CalRecycle

California Department of Resources Recycling and Recovery

2021 Disposal Facility-based Characterization of Solid Waste in California

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Executive Summary

In 2021, the California Department of Resources Recycling and Recovery (CalRecycle) completed its sixth statewide waste characterization study. CalRecycle contracted with Cascadia Consulting Group to characterize and quantify the disposed waste stream into 88 material types for the commercial, residential, self-haul, and mixed waste sectors in California.

CalRecycle and Cascadia designed a study that incorporated both representative, cost-effective sampling and processes for gathering data that were not disruptive to facility operators or their customers. The previous five statewide studies used a similar methodology. However, the 2021 study differed from the previous five in a few ways. First, the scope of materials for the 2021 study is updated to include new material types related to food service ware and packaging-related materials. Second, the 2021 study attempted to quantify the weight of liquid from select fiber material groups. Third, in order to rigorously assess the different quantities and types of food waste disposed in California landfills, the 2021 study measured eight categories of food waste, considering the potential donatability and edibility of this food. In particular, several 'potentially donatable' food categories were designated to quantify the recoverable food fit for human consumption that is disposed of in California landfills. The 2021 study's results can be used to construct and evaluate technology changes, new policies, and existing programs—such as the edible food baseline for SB 1383 (Lara, Statues of 2016) — that may increase diversion from disposal.

For calendar year 2021, organic materials continued to be a large part of the waste disposed in California landfills, and accounted for more than one-third of the statewide disposed waste stream (34 percent). Food - Not Donatable - Non-Meat was the most prevalent material type in the entire disposed waste stream at 9.5 percent (64 percent of all food material types). For more information regarding these material types, please see Appendix B: List and Definitions of Material Types.

CalRecycle continues to include the franchised single-family residential sector which includes waste generated from single family homes, however waste from the franchised multi-family sector is now combined with the franchised commercial sector. The self-haul sector remains unchanged from previous studies and includes all construction and demolition waste. Mixed waste is a new sector for the 2021 study and consists of materials commingled from various waste sectors at an intermediate facility (i.e. transfer stations) that are ultimately transported to a landfill for disposal.

The combined franchised commercial and multi-family sector generated 48 percent and the residential single-family sector generated 32 percent of the disposed waste stream statewide. The self-hauled sector generated 20 percent of the waste stream. The proportion of the mixed waste sector is not reported because the materials are sourced from other waste sectors.

Methods

To estimate statewide disposal, a stratified random sampling methodology was used to sample waste from subgroups (strata) to develop a waste composition profile for each stratum. Strata considered in this study included the waste sector (franchised residential, franchised commercial, self-hauled, or mixed waste), and the waste subsectors (single-family residential and multi-family residential). The strata were then combined based on each stratum's relative contribution to the overall waste stream, thus producing overall waste composition information.

To gather the data necessary to estimate waste composition in California, the material types within disposed waste were characterized at both landfills and multi-family housing units. Multi-family housing units were sampled because this study considered single-family residential waste separately from multi-family residential waste. Multi-family waste is typically collected along with commercial waste, and the two cannot be separated for sampling at solid waste sites. The study, therefore, captured multi-family waste at the point of generation (i.e., apartment complexes). Landfills disposing a higher proportion of California's waste stream were prioritized for inclusion in the study, but not all such landfills were able to be recruited. For logistical reasons, apartment complexes were targeted for study participation based on proximity to participating landfills. Appendix A: Detailed Methodology (Selection, Recruitment and Logistics for Sampling Sites) lists the included landfills. Specific apartment complexes are not listed due to privacy concerns.

Material type composition data were gathered from 556 waste samples, which represented 30 solid waste facilities (landfills) and 48 apartment complexes. While the total waste sample size may not be substantial relative to the vast amount of waste generated by California annually, the entire sampling scheme has been meticulously designed to ensure that samples collected from landfills and apartment complexes are representative of the entire state of California. Note that when calculating overall statewide disposal tonnage for this purpose, beneficial reuse, biosolids, and disaster debris were not included.

The methodology used to select samples for material type characterization differed slightly between landfills and apartment complexes. At landfills, arriving vehicles from each source sector (single-family residential waste, commercial waste, self-haul waste, and mixed waste) were selected randomly for sampling. At apartment complexes, disposal bins were not sampled randomly because there were not enough bins to sample randomly from. Details of the sampling methodology for landfills and apartment complexes are provided in Appendix A: Detailed Methodology (Selection, Recruitment and Logistics for Sampling Sites).

At both landfills and multi-family units, waste materials were sorted into one of 88 material types. Materials were hand-sorted. Details of this process are provided in

Appendix A: Detailed Methodology (Sorting Samples and Recording Data). Most material types were chosen and defined such that they can be compared to the material types used during California's 2018 Statewide Waste Characterization Study. These materials are specifically defined in Appendix B: List and Definitions of Material Types.

As part of the study, gate surveys were conducted with drivers at participating solid waste facilities to determine the waste-generating sector and the net weight of each load, among other data. Results from these surveys, along with data from CalRecycle's Recycling and Disposal Reporting System (RDRS), were used to estimate the portion of California's disposed waste derived from each waste sector and subsector.

In addition to the waste characterization, the study includes a moisture analysis of select fiber material groups. Composite samples were randomly collected throughout the study and sent to a centralized location. Samples were dried in ambient air and were being continuously weighed until reaching equilibrium at which point the weight of the sample did not change by more than one percent.

For more information regarding study methodology, please see Appendix A: Detailed Methodology.

Data Limitations

- The material type list of the 2021 study is not directly comparable to the material lists used in CalRecycle's previous waste characterization studies. For example, several material types from the 2018 study were separated into more granular material types in the 2021 study. Other materials were condensed into broader material types.
- This study emphasized facilities with the largest throughput. The results presented in this report should only be considered at a statewide level.
- Multi-family residential disposed waste composition estimates are not presented at the statewide level. These data are not intended to be extrapolated into a statewide estimate, but rather should be viewed as an assessment of the specific residences sampled.

Results

This report includes detailed findings for the following areas:

- Disposed waste composition and tonnage for the state's overall waste stream and the commercial, single-family residential, self-hauled, and mixed waste sectors;
- Disposed waste composition for selected samples from the multi-family residential waste subsector.

How Data are Presented

For the overall disposed waste stream, and for each waste sector and subsector, data are presented in three ways:

- First, an overview of waste composition by broad material class (e.g., paper, plastic, organics) is presented in both pie chart and table formats.
- Second, the 10 most prevalent of the 88 material types by weight are presented in a table.
- Lastly, a detailed table presents the full composition and quantity results for the 88 material types. Refer to Appendix B: List and Definitions of Material Types for a detailed list of material definitions used in the study.

Mean and Confidence Intervals

The statewide disposal data were analyzed to provide three kinds of information for each of the material types for total statewide disposal and by sector:

- The estimated annual weight of disposed material;
- The estimated contribution to disposal (percent-by-weight) of each material; and
- The confidence interval for the percentage composition estimates.

For the residential multi-family sector data, only the estimated contribution (percent-by-weight) is reported.

The reported values represent the mean component percentage. The confidence intervals presented were calculated at the 95th percentile, indicating that in repeated sampling, it's anticipated that 95% of the estimates will lie within the specified range. For detailed insights into the equations utilized for these computations, please refer to the "Description of Calculations and Statistical Procedures Used" section in Appendix A: Detailed Methodology

Rounding

Estimated tonnages presented in the tables are rounded to the nearest ton, and estimated percentages are rounded to the nearest tenth of a percent. Percentages less than 0.05 percent are shown as 0.0 percent. Due to this rounding, the tonnages presented in the report may not exactly match the subtotals and totals shown. Similarly, the percentages may not exactly add up to 100 percent.

The quantities presented in the tables were calculated using the unrounded percentages. Therefore, using the rounded percentages shown in the tables to calculate quantities will yield quantities that are different than those shown in the report.

Statewide Disposal at a Glance

Table 1 depicts each sector's estimated contribution to the overall waste stream, calculated using reported disposal tonnage and source sector data from CalRecycle's Recycling and Disposal Reporting System (RDRS).

Table 1: Estimated Contribution of Each Sector to California's Overall Disposed Waste Stream

Sector	Est. % of Disposed Waste	Est. Tons Disposed Statewide
Franchised Commercial and Multi-family Residential*	48.1%	19,206,354
Franchised Single-family Residential*	32.1%	12,810,213
Self-Hauled	19.7%	7,862,416
Totals**	100.0%	39,878,983

Mixed waste includes disposed waste from other source sectors and is not included in the estimated statewide disposal tonnage (23,930,321 tons).
*Includes waste collected by both private and public entities that provide service to residential and business customers.
**In all figures and tables, percentages may not total 100 due to rounding. For brevity, we do not include this statement in the following figures and tables.

Key Findings

- According to RDRS, the franchised single-family residential sector generated 32 percent and the franchised commercial and multi-family residential sectors generated 48 percent of the disposed waste stream statewide. The self-hauled sector generated the remaining 20 percent.
- Similar to earlier waste characterization studies, organic materials such as food waste, yard waste, and lumber continued to be a large part of the waste disposed in California landfills. As the largest material category, it accounted for more than one-fourth of the statewide disposed waste stream (28.4 percent, see Figure 1). Excluding *Mixed Residue*, *Food - Not Donatable - Non-Meat* was the most prevalent material type in the entire disposed waste stream (4.0 percent).
- The next largest material category was miscellaneous, which was 16.9 percent of all disposal. About 56 percent of this category was *mixed residue* (the largest material type disposed overall, Table 2), a catch-all material type that did not fit into any of the other 87 material types. Other material types in the miscellaneous category include: *textiles – cloth and clothing, diapers and sanitary products, personal protective equipment (PPE),* and *miscellaneous inorganics.*
- Paper was the third-largest material category, at approximately 15.5 percent of disposed waste. *Corrugated cardboard* was the most prevalent material type of this category.

Statewide Characterization Results

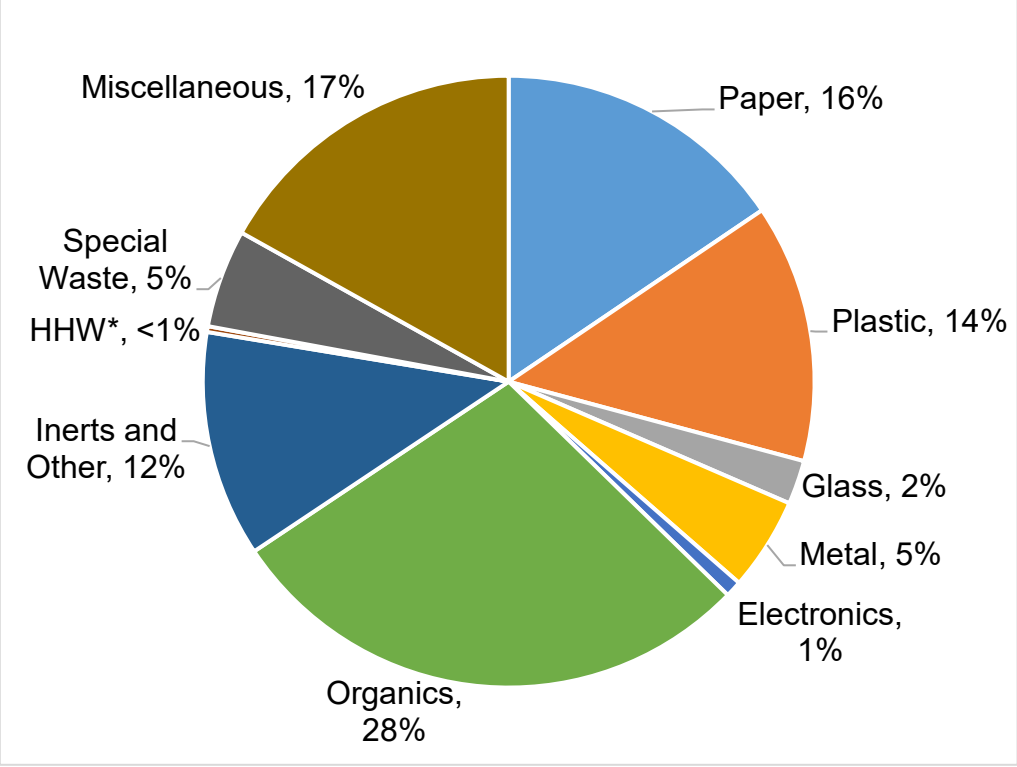
Overall Disposed Waste Stream

This section presents the characterization data for the disposed municipal solid waste stream for the entire state of California, combining all of the sectors considered elsewhere in this study.

Composition by Material Category

Composition estimates by material category for the overall waste stream are illustrated in Figure 1. The largest material category in the overall waste stream was organic, which accounted for more than one fourth (28.4 percent) of the waste stream by weight, followed by miscellaneous (16.9 percent) and paper (15.5 percent).

Figure 1: Material Categories in California's Overall Disposed Waste Stream



Material Category	Est. Percent
Organics	28.4%
Miscellaneous	16.9%
Paper	15.5%
Plastic	13.7%
Inerts and Other	12.0%
Special Waste	5.2%
Metal	4.9%
Glass	2.3%
Electronics	0.9%
HHW	0.3%
Total	**100%**

*HHW: Household Hazardous Waste

Ten Most Prevalent Material Types

The ten most prevalent material types in the overall waste stream by weight are presented in Table 2. Combined, these ten material types comprised approximately 40 percent of overall disposed waste.

Table 2: Ten Most Prevalent Material Types in California's Overall Disposed Waste Stream by Weight

Material	Estimated Percent	Cumulative Percent	Estimated Tons
Mixed Residue	9.5%	9.5%	3,790,656
Corrugated Cardboard	4.1%	13.6%	1,643,490
Food – Not Donatable – Non-meat	4.0%	17.6%	1,587,268
Bulky Items	3.6%	21.2%	1,433,777
Remainder/Composite Inerts and Others	3.6%	24.8%	1,428,928
Other Compostable Paper	3.5%	28.3%	1,407,596
Treated/Painted/Stained Wood	3.4%	31.7%	1,362,209
Other Plastic Packaging	3.1%	34.8%	1,247,468
Prunings and Trimmings	2.8%	37.6%	1,127,857
Clean Dimensional Lumber	2.8%	40.4%	1,118,977
Total	**40.4%**		**16,148,226**

Detailed Composition

The percentages by weight for each material type in California's overall disposed municipal solid waste stream are listed in Table 3.

Table 3 Material Composition of California's Overall Disposed Waste Stream

Material	Estimated Proportion	Standard Deviation	Lower Bound (95%)	Upper Bound (95%)	Estimated Tonnage
Paper	15.5%				6,193,825
Corrugated Cardboard	4.1%	9.1%	3.4%	4.9%	1,643,490
Paper Grocery Bags	0.1%	0.2%	0.1%	0.1%	35,207
Other Paper Bags/Kraft Paper	0.4%	0.5%	0.3%	0.4%	149,019
Newspapers/Newspaper Inserts	0.3%	1.0%	0.2%	0.4%	111,208
White Office-type Paper and Mail	0.6%	1.0%	0.5%	0.7%	229,765
Magazines and Catalogs	0.4%	1.5%	0.2%	0.5%	145,977
Folding Cartons and Other Paperboard Packaging	1.2%	2.8%	1.0%	1.5%	495,138
Aseptic Containers	0.1%	0.4%	0.1%	0.1%	42,647
Gable-top Cartons	0.1%	0.4%	0.1%	0.2%	50,588
Paper/Fiber Food Service Ware	2.1%	2.5%	1.9%	2.3%	849,718
Other Recyclable Paper	1.3%	3.7%	1.0%	1.6%	501,164
Other Paper/Fiber - Packaging	0.8%	2.1%	0.6%	0.9%	308,575
Other Compostable Paper	3.5%	3.4%	3.2%	3.8%	1,407,596

Material	Estimated Proportion	Standard Deviation	Lower Bound (95%)	Upper Bound (95%)	Estimated Tonnage
Remainder/Composite Paper	0.6%	1.8%	0.4%	0.7%	223,734
Plastic	13.7%				5,445,299
PETE Beverage Containers - CRV	0.6%	0.8%	0.5%	0.7%	240,391
PETE Bottles and Jars - Non-CRV	0.2%	0.3%	0.2%	0.2%	84,250
HDPE Beverage Containers - CRV	0.1%	0.2%	0.0%	0.1%	24,042
HDPE Bottles and Jars - Non-CRV	0.4%	0.6%	0.4%	0.5%	161,107
Expanded Polystyrene Packaging	0.2%	0.8%	0.2%	0.3%	86,555
Plastic Trash Bags	1.5%	1.5%	1.4%	1.6%	591,581
Plastic Grocery and Other Merchandise Bags	0.6%	0.7%	0.5%	0.6%	231,072
Film Products- Non-Packaging	0.5%	3.0%	0.3%	0.8%	203,940
Flexible Plastic Pouches	0.0%	0.2%	0.0%	0.1%	15,464
Non-Bag Commercial and Industrial Packaging Film	1.4%	5.2%	1.0%	1.8%	557,528
Other Film Bags and Plastic Mailing Pouches	0.4%	0.9%	0.3%	0.5%	155,443
Rigid Plastic Food Service Ware	1.3%	1.5%	1.1%	1.4%	503,597
Other Plastic Packaging	3.1%	3.6%	2.8%	3.4%	1,247,468

Material	Estimated Proportion	Standard Deviation	Lower Bound (95%)	Upper Bound (95%)	Estimated Tonnage
Durable Plastic Items	2.3%	7.8%	1.6%	2.9%	901,707
Remainder/Composite Plastic	1.1%	2.5%	0.9%	1.3%	441,155
Glass	2.3%				926,822
Clear Glass Bottles and Containers - CRV	0.5%	1.0%	0.4%	0.6%	186,445
Clear Glass Bottles and Containers - Non-CRV	0.7%	1.1%	0.6%	0.7%	259,524
Green Glass Bottles and Containers - CRV	0.1%	0.4%	0.1%	0.2%	54,722
Brown Glass Bottles and Containers - CRV	0.2%	0.4%	0.2%	0.2%	80,504
Green and Brown Glass Bottles and Containers - Non-CRV	0.3%	0.7%	0.2%	0.4%	121,024
Other Colored Glass Bottles and Containers	0.1%	0.2%	0.0%	0.1%	20,431
Remainder/Composite Glass	0.5%	2.7%	0.3%	0.7%	204,172
Metal	4.9%				1,960,400
Tin/Steel Cans	0.4%	0.7%	0.4%	0.5%	166,573
Aluminum Cans - CRV	0.2%	0.4%	0.2%	0.3%	90,180
Aluminum Cans - Non-CRV	0.1%	0.1%	0.1%	0.1%	30,017
Major Appliances	0.4%	4.1%	0.1%	0.8%	163,294
Other Ferrous	2.4%	7.3%	1.8%	3.0%	962,863

Material	Estimated Proportion	Standard Deviation	Lower Bound (95%)	Upper Bound (95%)	Estimated Tonnage
Other Non-Ferrous	0.7%	2.1%	0.5%	0.8%	267,800
Remainder/Composite Metal	0.7%	2.7%	0.5%	0.9%	279,672
Electronics	0.9%				344,267
Covered Video Display Devices	0.2%	3.1%	0.0%	0.4%	64,725
Consumer Electronics and Small Equipment	0.5%	1.8%	0.3%	0.6%	182,716
Large Equipment	0.2%	2.2%	0.1%	0.4%	96,826
Organics	28.4%				11,305,710
Food - Potentially Donatable - Vegetative (Perishable/Fresh)	1.5%	5.6%	1.1%	2.0%	615,133
Food - Potentially Donatable - Eggs, Dairy, and Dairy Alternatives	0.2%	0.7%	0.2%	0.3%	98,000
Food - Potentially Donatable - Meat	0.3%	1.2%	0.2%	0.4%	111,229
Food - Potentially Donatable - Cooked/Baked/Prepared Perishable Items	0.3%	0.7%	0.2%	0.3%	114,977
Food - Potentially Donatable - Packaged Non-perishable	1.4%	4.0%	1.1%	1.8%	577,199
Food - Not Donatable - Meat	0.9%	1.5%	0.7%	1.0%	339,542

Material	Estimated Proportion	Standard Deviation	Lower Bound (95%)	Upper Bound (95%)	Estimated Tonnage
Food - Not Donatable - Non-meat	4.0%	5.4%	3.5%	4.4%	1,587,268
Food - Inedible	2.3%	3.6%	2.0%	2.6%	919,601
Leaves and Grass	2.2%	9.8%	1.4%	3.0%	883,892
Prunings and Trimmings	2.8%	11.6%	1.9%	3.8%	1,127,857
Branches and Stumps	1.0%	6.9%	0.4%	1.6%	399,439
Manures	0.7%	7.0%	0.1%	1.3%	279,604
Clean Dimensional Lumber	2.8%	10.2%	2.0%	3.7%	1,118,977
Clean Engineered Wood	1.9%	6.3%	1.4%	2.4%	751,487
Clean Pallets and Crates	1.4%	7.8%	0.8%	2.1%	569,758
Treated/Painted/Stained Wood	3.4%	10.3%	2.6%	4.3%	1,362,209
Other Recyclable Wood	0.2%	0.9%	0.1%	0.3%	79,780
Remainder/Composite Organic	0.9%	6.9%	0.4%	1.5%	369,758
Inerts and Other	12.0%				4,770,238
Concrete	1.9%	9.1%	1.1%	2.6%	738,847
Asphalt Roofing	1.4%	9.6%	0.6%	2.2%	543,279
Gypsum Board	1.8%	8.6%	1.1%	2.6%	732,835
Carpet	1.3%	8.3%	0.6%	2.0%	531,381
Rock, Soil and Fines	2.0%	10.4%	1.1%	2.9%	794,968
Remainder/Composite Inerts and Other	3.6%	12.1%	2.6%	4.6%	1,428,928
HHW	0.3%				121,346

Material	Estimated Proportion	Standard Deviation	Lower Bound (95%)	Upper Bound (95%)	Estimated Tonnage
Paint	0.1%	1.0%	0.1%	0.2%	59,006
Used Oil	0.0%	0.3%	0.0%	0.1%	10,504
Lead-acid (automotive) batteries	0.0%	0.3%	0.0%	0.0%	6,411
Other batteries	0.0%	0.1%	0.0%	0.0%	7,294
One-Pound or Less Propane Gas Cylinders	0.0%	0.0%	0.0%	0.0%	712
Pharmaceuticals	0.0%	0.2%	0.0%	0.1%	16,805
Remainder/Composite Household Hazardous	0.1%	0.4%	0.0%	0.1%	20,615
Special Waste	5.2%				2,071,294
Tires	0.1%	1.1%	0.0%	0.2%	42,806
Mattresses and Foundations	1.1%	8.5%	0.4%	1.8%	422,281
Bulky Items	3.6%	13.4%	2.5%	4.7%	1,433,777
Remainder/Composite Special Waste	0.4%	5.4%	0.0%	0.9%	172,430
Miscellaneous	16.9%				6,739,781
Textiles - Cloth and Clothing	2.5%	4.4%	2.1%	2.8%	982,659
Textiles - Shoes, Purses, Belts	0.5%	2.0%	0.3%	0.7%	201,634
Personal Protective Equipment (PPE)	0.5%	1.4%	0.4%	0.6%	188,168
Solar Panels	0.0%	0.0%	0.0%	0.0%	-

Material	Estimated Proportion	Standard Deviation	Lower Bound (95%)	Upper Bound (95%)	Estimated Tonnage
Diapers & Sanitary Products	2.4%	3.6%	2.1%	2.7%	961,992
Miscellaneous Inorganics	1.5%	5.7%	1.1%	2.0%	614,673
Mixed Residue	9.5%	9.1%	8.8%	10.3%	3,790,656
Total	**100.0%**				**39,878,983**

Franchised Commercial and Multi-family Residential Waste

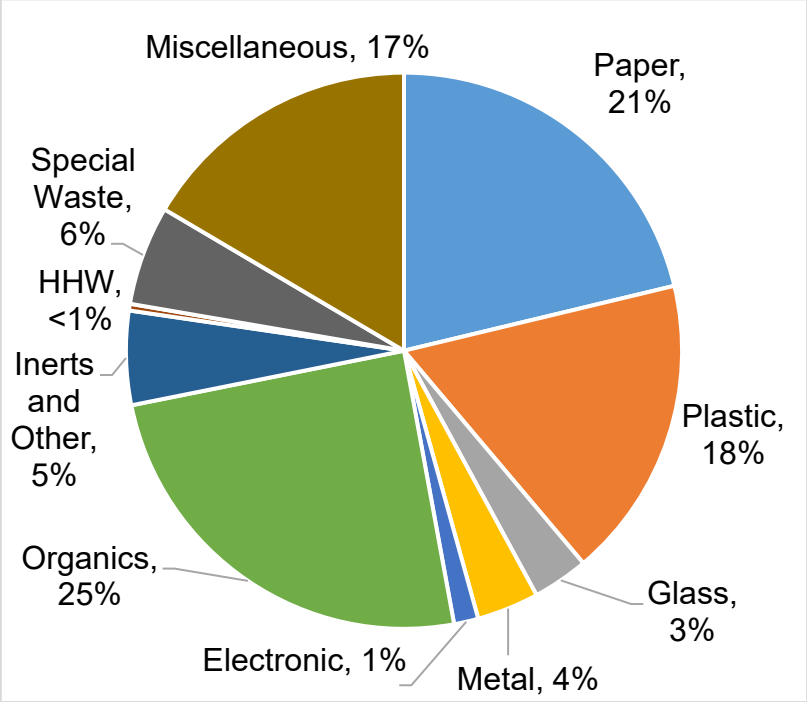
This section presents the characterization data for California's disposed waste from commercial and multi-family residential sources (excluding samples assessed from selected apartment complexes). Franchised commercial waste and multi-family residential is defined as waste disposed by businesses, industries, public organizations, and multi-dwelling units that are collected and transported by contracted or franchised waste haulers, both private and public (municipal). This includes waste delivered to disposal facilities by both packer trucks serving businesses and multi-family units on regular routes as well as loose or compacted drop boxes serving individual sites.

Overview and Analysis

As shown in Table 1, the franchised commercial sector accounted for approximately 48 percent of California's municipal solid waste stream. See Appendix A: Detailed Methodology for a description of the methods used in selecting, sorting, and analyzing samples.

Composition results by material category for franchised commercial and multi-family residential waste are illustrated in Figure 2 and described in detail in Table 5, below. The largest material category in the franchised commercial waste stream were organics and paper, which accounted for about 25 percent and 21 percent of the total, respectively.

Figure 2: Material Categories in Franchised Commercial and Multi-family Residential Disposed Waste



Material Category	Est. Percent
Organics	24.7%
Paper	21.2%
Plastic	17.6%
Miscellaneous	16.5%
Special Waste	5.8%
Inerts and Other	5.5%
Metal	3.6%
Glass	3.2%
Electronic	1.4%
HHW	0.4%
Total	**100%**

Ten Most Prevalent Materials

The ten most prevalent material types according to Table 4 below accounted for about 42 percent of franchised commercial waste.

Table 4: Ten Most Prevalent Material Types in Franchised Commercial and Multi-family Residential Disposed Waste by Weight

Material	Estimated Percent	Cumulative Percent	Estimated Tons
Mixed Residue	8.6%	8.6%	1,644,891
Corrugated Cardboard	6.9%	15.5%	1,320,833
Food – Not Donatable – Non-meat	4.9%	20.4%	942,642
Other Compostable Paper	4.1%	24.5%	786,188
Other Plastic Packaging	3.6%	28.1%	696,980
Bulky Items	3.1%	31.2%	590,101
Food – Inedible	2.9%	34.1%	551,381
Non-bag Commercial and Industrial Packaging Film	2.6%	36.7%	499,982
Durable Plastic Items	2.6%	39.3%	497,433
Paper/Fiber Food Service Ware	2.5%	41.8%	481,898
Total	**41.8%**		**8,012,149**

Detailed Composition

Table 5 presents detailed composition results for the franchised commercial waste stream.

Table 5: Material Composition of Franchised Commercial and Multi-family Residential Disposed Waste

Material	Estimated Proportion	Standard Deviation	Lower Bound (95%)	Upper Bound (95%)	Estimated Tonnage
Paper	21.2%				4,081,117
Corrugated Cardboard	6.9%	12.7%	5.1%	8.6%	1,320,833
Paper Grocery Bags	0.1%	0.3%	0.1%	0.2%	22,515
Other Paper Bags/Kraft Paper	0.4%	0.6%	0.4%	0.5%	85,702
Newspapers/Newspaper Inserts	0.4%	1.5%	0.2%	0.6%	75,355
White Office-type Paper and Mail	0.7%	1.2%	0.5%	0.9%	137,394
Magazines and Catalogs	0.3%	0.8%	0.2%	0.4%	55,173
Folding Cartons and Other Paperboard Packaging	1.7%	4.4%	1.1%	2.3%	319,390
Aseptic Containers	0.2%	0.7%	0.1%	0.3%	35,744
Gable-top Cartons	0.2%	0.6%	0.1%	0.3%	35,024
Paper/Fiber Food Service Ware	2.5%	2.6%	2.2%	2.9%	481,898
Other Recyclable Paper	1.7%	5.7%	1.0%	2.5%	332,873
Other Paper/Fiber - Packaging	1.3%	3.3%	0.8%	1.7%	246,548
Other Compostable Paper	4.1%	3.6%	3.6%	4.6%	786,188
Remainder/Composite Paper	0.8%	2.1%	0.5%	1.1%	146,480
Plastic	17.6%				3,378,755
PETE Beverage Containers - CRV	0.9%	1.1%	0.8%	1.1%	181,542
PETE Bottles and Jars - Non-CRV	0.2%	0.4%	0.2%	0.3%	46,131
HDPE Beverage Containers - CRV	0.1%	0.2%	0.0%	0.1%	14,497
HDPE Bottles and Jars - Non-CRV	0.6%	0.9%	0.5%	0.7%	111,060
Expanded Polystyrene Packaging	0.3%	1.1%	0.1%	0.4%	50,759
Plastic Trash Bags	2.0%	1.8%	1.7%	2.2%	378,487

Material	Estimated Proportion	Standard Deviation	Lower Bound (95%)	Upper Bound (95%)	Estimated Tonnage
Plastic Grocery and Other Merchandise Bags	0.6%	0.7%	0.5%	0.7%	112,722
Film Products- Non-Packaging	0.8%	4.7%	0.1%	1.4%	148,581
Flexible Plastic Pouches	0.0%	0.0%	0.0%	0.0%	5,296
Non-Bag Commercial and Industrial Packaging Film	2.6%	7.7%	1.5%	3.7%	499,982
Other Film Bags and Plastic Mailing Pouches	0.3%	0.6%	0.3%	0.4%	64,415
Rigid Plastic Food Service Ware	1.6%	1.8%	1.4%	1.9%	311,743
Other Plastic Packaging	3.6%	3.9%	3.1%	4.2%	696,980
Durable Plastic Items	2.6%	7.0%	1.6%	3.6%	497,433
Remainder/Composite Plastic	1.3%	3.4%	0.9%	1.8%	259,124
Glass	3.2%				623,567
Clear Glass Bottles and Containers - CRV	0.7%	1.3%	0.5%	0.9%	140,318
Clear Glass Bottles and Containers - Non-CRV	0.9%	1.5%	0.7%	1.1%	178,151
Green Glass Bottles and Containers - CRV	0.2%	0.5%	0.2%	0.3%	46,186
Brown Glass Bottles and Containers - CRV	0.3%	0.6%	0.2%	0.4%	54,037
Green and Brown Glass Bottles and Containers - Non-CRV	0.4%	0.8%	0.3%	0.5%	78,735
Other Colored Glass Bottles and Containers	0.1%	0.2%	0.0%	0.1%	12,420
Remainder/Composite Glass	0.6%	2.9%	0.2%	1.0%	113,720

Material	Estimated Proportion	Standard Deviation	Lower Bound (95%)	Upper Bound (95%)	Estimated Tonnage
Metal	3.6%				693,576
Tin/Steel Cans	0.4%	0.7%	0.3%	0.5%	79,740
Aluminum Cans - CRV	0.3%	0.5%	0.2%	0.4%	55,885
Aluminum Cans - Non-CRV	0.1%	0.1%	0.0%	0.1%	11,070
Major Appliances	0.3%	3.8%	0.0%	0.8%	59,393
Other Ferrous	1.5%	3.6%	1.0%	2.0%	287,328
Other Non-Ferrous	0.4%	0.6%	0.3%	0.5%	79,640
Remainder/Composite Metal	0.6%	3.6%	0.1%	1.1%	120,522
Electronic	1.4%				271,724
Covered Video Display Devices	0.4%	5.2%	0.0%	1.2%	86,229
Consumer Electronics and Small Equipment	0.6%	2.1%	0.3%	0.9%	108,708
Large Equipment	0.4%	3.4%	0.0%	0.9%	76,787
Organics	24.7%				4,751,847
Food - Potentially Donatable - Vegetative (Perishable/Fresh)	2.1%	5.7%	1.3%	2.9%	401,467
Food - Potentially Donatable - Eggs, Dairy, and Dairy Alternatives	0.4%	1.0%	0.3%	0.6%	81,376
Food - Potentially Donatable - Meat	0.4%	1.5%	0.2%	0.6%	81,611
Food - Potentially Donatable - Cooked/Baked/Prepared Perishable Items	0.4%	0.8%	0.3%	0.5%	70,095
Food - Potentially Donatable - Packaged Non-perishable	2.1%	6.0%	1.3%	2.9%	404,806
Food - Not Donatable - Meat	1.1%	1.8%	0.8%	1.3%	205,401

Material	Estimated Proportion	Standard Deviation	Lower Bound (95%)	Upper Bound (95%)	Estimated Tonnage
Food - Not Donatable - Non-meat	4.9%	5.6%	4.1%	5.7%	942,462
Food - Inedible	2.9%	4.6%	2.2%	3.5%	551,381
Leaves and Grass	1.2%	4.6%	0.6%	1.9%	237,692
Prunings and Trimmings	1.1%	4.4%	0.4%	1.7%	203,243
Branches and Stumps	0.2%	2.2%	0.0%	0.6%	47,686
Manures	0.8%	7.4%	0.0%	1.8%	152,013
Clean Dimensional Lumber	1.4%	7.9%	0.3%	2.5%	259,834
Clean Engineered Wood	1.3%	4.3%	0.7%	1.9%	246,374
Clean Pallets and Crates	1.9%	6.5%	1.0%	2.8%	355,674
Treated/Painted/Stained Wood	1.2%	4.6%	0.6%	1.8%	230,364
Other Recyclable Wood	0.2%	0.9%	0.0%	0.3%	32,873
Remainder/Composite Organic	1.3%	8.9%	0.1%	2.5%	247,495
Inerts and Other	5.5%				1,048,968
Concrete	1.0%	6.0%	0.2%	1.8%	188,851
Asphalt Roofing	0.1%	0.7%	0.0%	0.2%	15,590
Gypsum Board	0.6%	2.8%	0.2%	1.0%	111,369
Carpet	0.7%	6.8%	0.0%	1.6%	132,461
Rock, Soil and Fines	1.7%	9.3%	0.4%	3.0%	321,815
Remainder/Composite Inerts and Other	1.5%	6.3%	0.6%	2.3%	278,881
HHW	0.4%				74,353
Paint	0.2%	1.4%	0.0%	0.4%	43,930
Used Oil	0.0%	0.4%	0.0%	0.1%	8,663
Lead-acid (automotive) batteries	0.0%	0.0%	0.0%	0.0%	-
Other batteries	0.0%	0.2%	0.0%	0.0%	4,363

Material	Estimated Proportion	Standard Deviation	Lower Bound (95%)	Upper Bound (95%)	Estimated Tonnage
One-Pound or Less Propane Gas Cylinders	0.0%	0.0%	0.0%	0.0%	-
Pharmaceuticals	0.0%	0.2%	0.0%	0.1%	7,673
Remainder/Composite Household Hazardous	0.1%	0.3%	0.0%	0.1%	9,723
Special Waste	5.8%				1,110,993
Tires	0.1%	1.0%	0.0%	0.2%	21,732
Mattresses and Foundations	1.6%	12.2%	0.0%	3.2%	299,435
Bulky Items	3.1%	12.3%	1.4%	4.8%	590,101
Remainder/Composite Special Waste	1.0%	8.9%	0.0%	2.3%	199,724
Miscellaneous	16.5%				3,171,456
Textiles - Cloth and Clothing	2.3%	5.0%	1.7%	3.0%	449,653
Textiles - Shoes, Purses, Belts	0.7%	3.2%	0.2%	1.1%	132,323
Personal Protective Equipment (PPE)	0.9%	2.1%	0.6%	1.2%	178,894
Solar Panels	0.0%	0.0%	0.0%	0.0%	-
Diapers & Sanitary Products	2.0%	2.9%	1.6%	2.4%	387,721
Miscellaneous Inorganics	2.0%	5.7%	1.2%	2.8%	377,974
Mixed Residue	8.6%	7.4%	7.5%	9.6%	1,644,891
Total	**100.0%**				**19,206,355**

Franchised Single-family Residential Waste

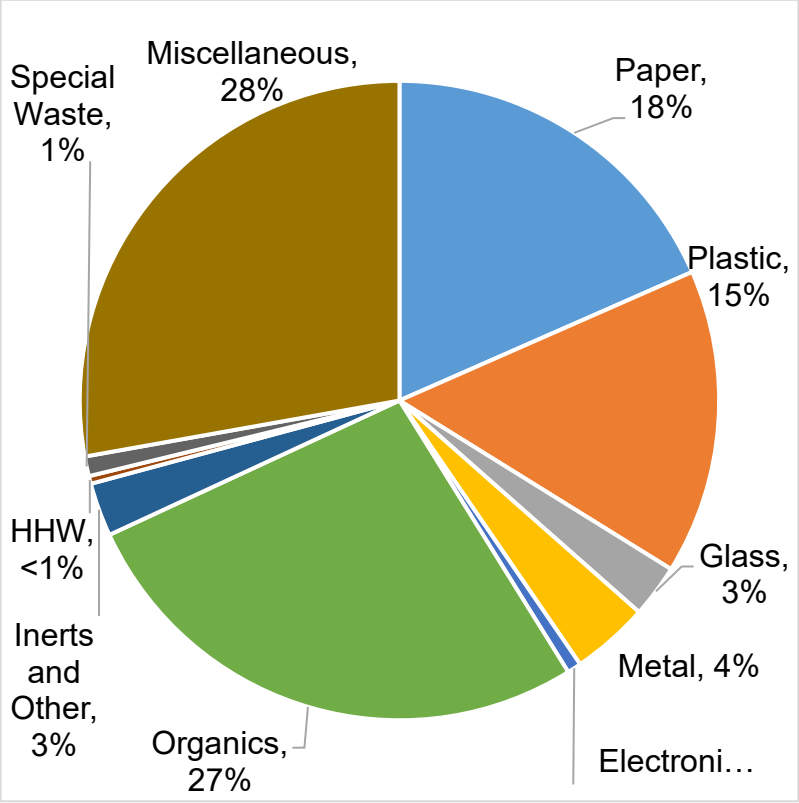
Franchised single-family residential waste is defined as waste disposed by single-family households that is collected and transported by contracted or franchised waste haulers, both private and public (municipal). This section presents composition findings for single-family residential waste.

Overview and Analysis

The franchised single-family residential sector accounted for approximately 32 percent of California's municipal solid waste stream.

Composition results by material category for single-family residential waste are illustrated in Figure 3 and described in detail in Table 7. The largest material category in the single-family residential waste stream was miscellaneous, which accounted for nearly 28 percent of the total by weight. Organics, the next largest material category, accounted for 27 percent.

Figure 3: Material Categories in Single-Family Residential Disposed Waste



Material Category	Est. Percent
Miscellaneous	27.8%
Organics	27.0%
Paper	18.4%
Plastic	15.4%
Metal	3.9%
Inerts and Other	2.7%
Glass	2.7%
Special Waste	1.0%
Electronics	0.7%
HHW	0.4%
Total	**100%**

Ten Most Prevalent Materials

The ten most prevalent material types according to Table 6 below accounted for about 55 percent of franchised residential single-family waste.

Table 6 Ten Most Prevalent Material Types in Single-Family Residential Disposed Waste by Weight

Material	Estimated Percent	Cumulative Percent	Estimated Tons
Mixed Residue	16.8%	16.8%	2,153,968
Food – Not Donatable – Non-meat	6.7%	23.5%	858,815
Other Compostable Paper	6.1%	29.6%	775,280
Diapers & Sanitary Products	5.4%	35.0%	697,125
Other Plastic Packaging	4.7%	39.7%	607,875
Food – Inedible	4.1%	43.8%	523,581
Paper/Fiber Food Service Ware	3.5%	47.3%	452,316
Textiles – Cloth and Clothing	3.3%	50.6%	425,979
Leaves and Grass	2.3%	52.9%	300,790
Prunings and Trimmings	2.1%	55.0%	269,876
Total	**55.0%**		**7,065,606**

Detailed Composition

Table 7 presents the detailed composition results for the single-family residential subsector.

Table 7: Material Composition of Single-Family Residential Disposed Waste

Material	Estimated Proportion	Standard Deviation	Lower Bound (95%)	Upper Bound (95%)	Estimated Tonnage
Paper	18.4%				2,358,482
Corrugated Cardboard	1.8%	3.0%	1.3%	2.2%	226,676
Paper Grocery Bags	0.1%	0.2%	0.1%	0.1%	15,361
Other Paper Bags/Kraft Paper	0.6%	0.4%	0.5%	0.6%	71,145
Newspapers/Newspaper Inserts	0.4%	0.6%	0.3%	0.5%	45,864
White Office-type Paper and Mail	0.8%	0.8%	0.7%	1.0%	105,282
Magazines and Catalogs	0.5%	0.8%	0.4%	0.6%	66,928
Folding Cartons and Other Paperboard Packaging	1.7%	0.9%	1.5%	1.8%	214,417
Aseptic Containers	0.1%	0.1%	0.1%	0.1%	14,868
Gable-top Cartons	0.2%	0.1%	0.1%	0.2%	20,911
Paper/Fiber Food Service Ware	3.5%	1.8%	3.2%	3.8%	452,316
Other Recyclable Paper	1.5%	1.5%	1.3%	1.8%	197,131
Other Paper/Fiber - Packaging	0.8%	0.8%	0.7%	0.9%	101,070
Other Compostable Paper	6.1%	2.5%	5.7%	6.4%	775,280
Remainder/Composite Paper	0.4%	1.1%	0.2%	0.6%	51,234
Plastic	15.4%				1,976,620
PETE Beverage Containers - CRV	0.7%	0.5%	0.6%	0.8%	88,242
PETE Bottles and Jars - Non-CRV	0.4%	0.3%	0.3%	0.4%	46,682
HDPE Beverage Containers - CRV	0.1%	0.3%	0.1%	0.1%	12,760

Material	Estimated Proportion	Standard Deviation	Lower Bound (95%)	Upper Bound (95%)	Estimated Tonnage
HDPE Bottles and Jars - Non-CRV	0.6%	0.5%	0.5%	0.6%	71,883
Expanded Polystyrene Packaging	0.3%	0.3%	0.2%	0.3%	32,858
Plastic Trash Bags	1.9%	0.8%	1.8%	2.0%	241,802
Plastic Grocery and Other Merchandise Bags	1.1%	0.7%	1.0%	1.2%	139,479
Film Products- Non-Packaging	0.3%	0.5%	0.2%	0.3%	33,704
Flexible Plastic Pouches	0.1%	0.1%	0.0%	0.1%	8,564
Non-Bag Commercial and Industrial Packaging Film	0.3%	0.6%	0.2%	0.4%	33,418
Other Film Bags and Plastic Mailing Pouches	0.8%	1.4%	0.6%	1.0%	104,418
Rigid Plastic Food Service Ware	1.9%	1.1%	1.7%	2.1%	243,918
Other Plastic Packaging	4.7%	2.0%	4.4%	5.1%	607,875
Durable Plastic Items	1.2%	1.7%	0.9%	1.5%	152,237
Remainder/Composite Plastic	1.2%	1.2%	1.1%	1.4%	158,780
Glass	2.7%				342,280
Clear Glass Bottles and Containers - CRV	0.5%	0.8%	0.4%	0.7%	67,445
Clear Glass Bottles and Containers - Non-CRV	0.9%	0.8%	0.8%	1.1%	117,736
Green Glass Bottles and Containers - CRV	0.1%	0.3%	0.1%	0.2%	15,688
Brown Glass Bottles and Containers - CRV	0.2%	0.4%	0.2%	0.3%	32,014

Material	Estimated Proportion	Standard Deviation	Lower Bound (95%)	Upper Bound (95%)	Estimated Tonnage
Green and Brown Glass Bottles and Containers - Non-CRV	0.4%	0.7%	0.3%	0.5%	54,856
Other Colored Glass Bottles and Containers	0.1%	0.2%	0.0%	0.1%	9,818
Remainder/Composite Glass	0.3%	0.5%	0.3%	0.4%	44,723
Metal	3.9%				593,571
Tin/Steel Cans	0.8%	0.6%	0.7%	0.8%	96,447
Aluminum Cans - CRV	0.3%	0.3%	0.3%	0.4%	41,728
Aluminum Cans - Non-CRV	0.2%	0.2%	0.1%	0.2%	22,101
Major Appliances	0.0%	0.4%	0.0%	0.1%	4,457
Other Ferrous	1.0%	1.8%	0.7%	1.3%	131,961
Other Non-Ferrous	0.6%	0.5%	0.5%	0.7%	80,521
Remainder/Composite Metal	1.0%	2.2%	0.6%	1.3%	125,864
Electronics	0.7%				90,493
Covered Video Display Devices	0.0%	0.0%	0.0%	0.0%	-
Consumer Electronics and Small Equipment	0.5%	1.5%	0.3%	0.8%	66,407
Large Equipment	0.2%	1.1%	0.0%	0.4%	24,086
Organics	27.0%				3,452,551
Food - Potentially Donatable - Vegetative (Perishable/Fresh)	2.0%	2.0%	1.6%	2.3%	251,163
Food - Potentially Donatable - Eggs, Dairy, and Dairy Alternatives	0.3%	0.5%	0.2%	0.4%	38,031

Material	Estimated Proportion	Standard Deviation	Lower Bound (95%)	Upper Bound (95%)	Estimated Tonnage
Food - Potentially Donatable - Meat	0.3%	0.7%	0.2%	0.4%	40,791
Food - Potentially Donatable - Cooked/Baked/Prepared Perishable Items	0.5%	0.8%	0.4%	0.7%	66,666
Food - Potentially Donatable - Packaged Non-perishable	2.1%	2.5%	1.7%	2.4%	262,713
Food - Not Donatable - Meat	1.4%	1.6%	1.2%	1.7%	183,677
Food - Not Donatable - Non-meat	6.7%	5.5%	5.8%	7.6%	858,815
Food - Inedible	4.1%	3.1%	3.6%	4.6%	523,581
Leaves and Grass	2.3%	6.5%	1.3%	3.4%	300,790
Prunings and Trimmings	2.1%	5.8%	1.2%	3.0%	269,876
Branches and Stumps	0.5%	2.6%	0.1%	0.9%	60,416
Manures	1.5%	10.4%	0.0%	3.1%	191,940
Clean Dimensional Lumber	0.4%	1.2%	0.2%	0.6%	48,012
Clean Engineered Wood	0.5%	1.6%	0.3%	0.8%	69,334
Clean Pallets and Crates	0.0%	0.2%	0.0%	0.1%	4,181
Treated/Painted/Stained Wood	1.3%	3.3%	0.8%	1.8%	166,935
Other Recyclable Wood	0.2%	0.6%	0.1%	0.3%	24,012
Remainder/Composite Organic	0.7%	1.5%	0.5%	0.9%	91,616
Inerts and Other	2.7%				347,021
Concrete	0.5%	2.7%	0.1%	1.0%	68,935
Asphalt Roofing	0.1%	0.9%	0.0%	0.3%	16,660

Material	Estimated Proportion	Standard Deviation	Lower Bound (95%)	Upper Bound (95%)	Estimated Tonnage
Gypsum Board	0.1%	0.3%	0.1%	0.2%	14,982
Carpet	0.6%	1.9%	0.3%	0.9%	71,837
Rock, Soil and Fines	0.7%	3.7%	0.1%	1.3%	93,570
Remainder/Composite Inerts and Other	0.6%	1.5%	0.4%	0.9%	81,037
HHW	0.4%				50,247
Paint	0.1%	0.8%	0.0%	0.3%	17,132
Used Oil	0.0%	0.2%	0.0%	0.0%	2,468
Lead-acid (automotive) batteries	0.1%	0.5%	0.0%	0.1%	7,483
Other batteries	0.0%	0.1%	0.0%	0.0%	3,754
One-Pound or Less Propane Gas Cylinders	0.0%	0.0%	0.0%	0.0%	679
Pharmaceuticals	0.1%	0.2%	0.1%	0.1%	11,108
Remainder/Composite Household Hazardous	0.1%	0.2%	0.0%	0.1%	7,623
Special Waste	1.0%				127,697
Tires	0.0%	0.0%	0.0%	0.0%	-
Mattresses and Foundations	0.3%	2.8%	0.0%	0.8%	41,165
Bulky Items	0.6%	2.7%	0.2%	1.0%	76,245
Remainder/Composite Special Waste	0.1%	0.4%	0.0%	0.1%	10,287
Miscellaneous	27.8%				3,561,745
Textiles - Cloth and Clothing	3.3%	2.9%	2.9%	3.8%	425,979
Textiles - Shoes, Purses, Belts	0.6%	0.9%	0.5%	0.8%	82,894

Material	Estimated Proportion	Standard Deviation	Lower Bound (95%)	Upper Bound (95%)	Estimated Tonnage
Personal Protective Equipment (PPE)	0.3%	0.5%	0.2%	0.4%	35,696
Solar Panels	0.0%	0.0%	0.0%	0.0%	-
Diapers & Sanitary Products	5.4%	4.6%	4.7%	6.2%	697,125
Miscellaneous Inorganics	1.3%	2.0%	1.0%	1.6%	166,082
Mixed Residue	16.8%	7.8%	15.6%	18.0%	2,153,968
Total	**100.0%**				**12,810,213**

Franchised Multi-family Residential Waste

Multi-family residential waste is waste collected by haulers from apartments or condominiums of four or more units. Due to the nature of collection routes, pure franchised multi-family residential waste was collected on-site. These values do not reflect a statewide estimate, but rather a snapshot of selected multi-family residences.

Detailed Composition

Table 8 presents the detailed composition results for the multi-family residential subsector.

Table 8 Material Composition of Multi-Family Residential Disposed Waste

Material	Estimated Proportion
Paper	18.4%
Corrugated Cardboard	2.4%
Paper Grocery Bags	0.3%
Other Paper Bags/Kraft Paper	0.6%
Newspapers/Newspaper Inserts	1.1%
White Office-type Paper and Mail	0.8%
Magazines and Catalogs	0.4%
Folding Cartons and Other Paperboard Packaging	1.9%
Aseptic Containers	0.1%
Gable-top Cartons	0.2%
Paper/Fiber Food Service Ware	3.4%
Other Recyclable Paper	1.1%
Other Paper/Fiber – Packaging	0.7%
Other Compostable Paper	4.9%
Remainder/Composite Paper	0.3%
Plastic	14.8%
PETE Beverage Containers – CRV	1.7%
PETE Bottles and Jars - Non-CRV	0.5%
HDPE Beverage Containers – CRV	0.2%
HDPE Bottles and Jars - Non-CRV	0.8%
Expanded Polystyrene Packaging	0.2%
Plastic Trash Bags	1.4%
Plastic Grocery and Other Merchandise Bags	1.2%
Film Products- Non-Packaging	0.1%
Flexible Plastic Pouches	0.1%
Non-Bag Commercial and Industrial Packaging Film	0.1%

Material	Estimated Proportion
Other Film Bags and Plastic Mailing Pouches	0.5%
Rigid Plastic Food Service Ware	1.9%
Other Plastic Packaging	4.0%
Durable Plastic Items	1.2%
Remainder/Composite Plastic	0.9%
Glass	6.7%
Clear Glass Bottles and Containers – CRV	1.3%
Clear Glass Bottles and Containers - Non-CRV	2.5%
Green Glass Bottles and Containers – CRV	0.4%
Brown Glass Bottles and Containers – CRV	0.7%
Green and Brown Glass Bottles and Containers - Non-CRV	0.9%
Other Colored Glass Bottles and Containers	0.2%
Remainder/Composite Glass	0.8%
Metal	2.7%
Tin/Steel Cans	0.6%
Aluminum Cans – CRV	0.4%
Aluminum Cans - Non-CRV	0.1%
Major Appliances	0.0%
Other Ferrous	0.7%
Other Non-Ferrous	0.4%
Remainder/Composite Metal	0.5%
Electronics	1.8%
Covered Video Display Devices	0.3%
Consumer Electronics and Small Equipment	1.1%
Large Equipment	0.5%
Organics	27.8%
Food - Potentially Donatable - Vegetative (Perishable/Fresh)	3.1%
Food - Potentially Donatable - Eggs, Dairy, and Dairy Alternatives	0.9%
Food - Potentially Donatable – Meat	1.0%
Food - Potentially Donatable - Cooked/Baked/Prepared Perishable Items	0.9%
Food - Potentially Donatable - Packaged Non-perishable	4.3%
Food - Not Donatable – Meat	1.6%
Food - Not Donatable - Non-meat	8.3%
Food – Inedible	3.7%

Material	Estimated Proportion
Leaves and Grass	0.5%
Prunings and Trimmings	0.2%
Branches and Stumps	0.0%
Manures	0.0%
Clean Dimensional Lumber	0.3%
Clean Engineered Wood	0.2%
Clean Pallets and Crates	0.3%
Treated/Painted/Stained Wood	1.7%
Other Recyclable Wood	0.1%
Remainder/Composite Organic	0.8%
Inerts and Other	2.2%
Concrete	0.3%
Asphalt Roofing	0.2%
Gypsum Board	0.2%
Carpet	0.1%
Rock, Soil and Fines	0.4%
Remainder/Composite Inerts and Other	1.0%
HHW	0.3%
Paint	0.1%
Used Oil	0.0%
Lead-acid (automotive) batteries	0.0%
Other batteries	0.0%
One-Pound or Less Propane Gas Cylinders	0.0%
Pharmaceuticals	0.1%
Remainder/Composite Household Hazardous	0.0%
Special Waste	2.0%
Tires	0.1%
Mattresses and Foundations	0.0%
Bulky Items	1.8%
Remainder/Composite Special Waste	0.1%
Miscellaneous	23.4%
Textiles - Cloth and Clothing	3.2%
Textiles - Shoes, Purses, Belts	1.3%
Personal Protective Equipment (PPE)	0.2%
Solar Panels	0.0%

Material	Estimated Proportion
Diapers & Sanitary Products	4.4%
Miscellaneous Inorganics	2.4%
Mixed Residue	11.9%
Total	**100.0%**

Self-Hauled Waste

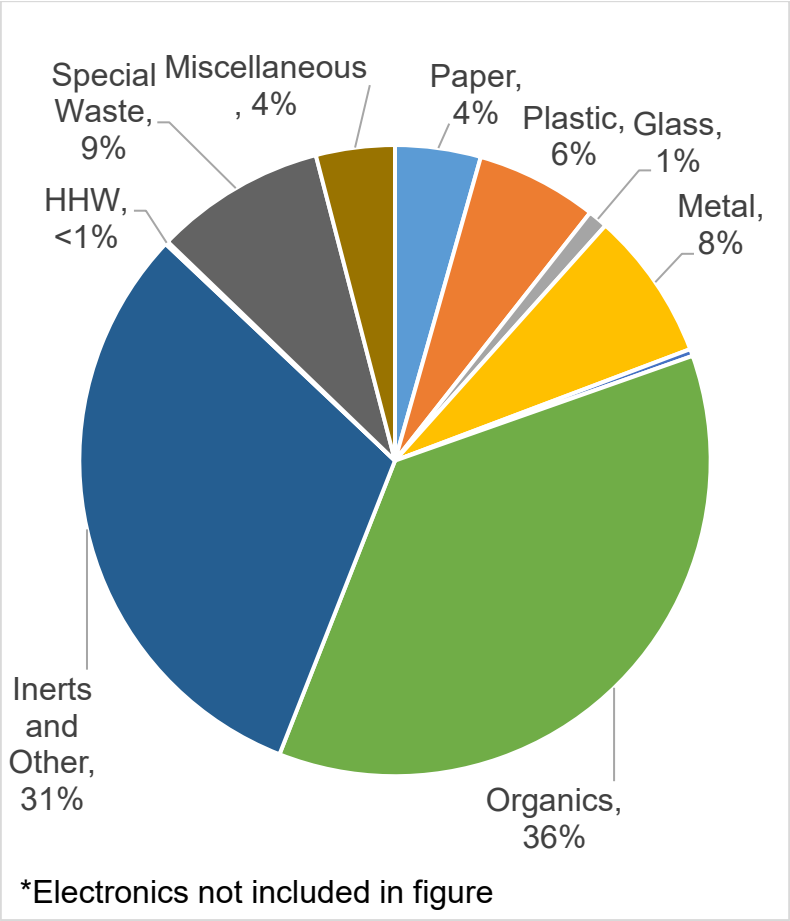
Self-hauled waste is transported to a solid waste disposal site by someone other than a contracted or franchised hauler. This section presents composition findings for the statewide self-hauled sector as a whole.

Overview and Analysis

As shown in Table 1, the self-hauled waste sector accounted for approximately 20 percent of California's municipal solid waste stream.

Composition results by material category for self-hauled waste are illustrated in Figure 4 and described in detail in Table 10 below. Approximately 36 percent of the self-hauled waste stream was made up of organics.

Figure 4: Material Categories in Overall Self-Hauled Disposed Waste



*Electronics not included in figure

Material Category	Est. Percent
Organics	36.4%
Inerts and Other	31.1%
Special Waste	8.8%
Metal	7.6%
Plastic	6.2%
Paper	4.4%
Miscellaneous	4.0%
Glass	1.0%
Electronics	0.4%
HHW	0.2%
Total	**100%**

Ten Most Prevalent Materials

The ten most prevalent material types in the self-haul waste stream by weight are presented in Table 9. These ten material types according to Table 9, below, comprised approximately 70 percent of overall self-hauled disposed waste.

Table 9: Ten Most Prevalent Material Types in Overall Self-Hauled Disposed Waste

Material	Estimated Percent	Cumulative Percent	Estimated Tons
Remainder/Composite Inerts and Others	9.7%	9.7%	766,065
Treated/Painted/Stained Wood	8.5%	18.2%	667,208
Bulky Items	7.4%	25.6%	584,065
Clean Dimensional Lumber	7.3%	32.9%	570,338
Prunings and Trimmings	6.2%	39.1%	483,851
Gypsum Board	5.4%	44.5%	425,507
Other Ferrous	4.9%	49.4%	384,798
Asphalt Roofing	4.5%	53.9%	355,798
Concrete	4.4%	58.3%	349,296
Rocks, Soil and Fines	4.1%	62.4%	320,258
Total	**62.4%**		**4,907,284**

Detailed Composition

Table 10 presents the detailed composition results for the overall self-hauled sector.

Table 10: Material Composition of Overall Self-Hauled Disposed Waste

Material	Estimated Proportion	Standard Deviation	Lower Bound (95%)	Upper Bound (95%)	Estimated Tonnage
Paper	4.4%				344,798
Corrugated Cardboard	2.3%	7.1%	1.1%	3.4%	178,617
Paper Grocery Bags	0.0%	0.0%	0.0%	0.0%	599
Other Paper Bags/Kraft Paper	0.1%	0.4%	0.0%	0.1%	7,037
Newspapers/Newspaper Inserts	0.0%	0.0%	0.0%	0.0%	482
White Office-type Paper and Mail	0.1%	0.5%	0.0%	0.2%	6,456
Magazines and Catalogs	0.3%	2.7%	0.0%	0.8%	25,814
Folding Cartons and Other Paperboard Packaging	0.1%	0.5%	0.0%	0.2%	9,586
Aseptic Containers	0.0%	0.0%	0.0%	0.0%	242
Gable-top Cartons	0.0%	0.0%	0.0%	0.0%	274
Paper/Fiber Food Service Ware	0.3%	1.9%	0.0%	0.6%	23,120
Other Recyclable Paper	0.4%	1.8%	0.1%	0.7%	31,087
Other Paper/Fiber – Packaging	0.1%	0.3%	0.0%	0.2%	7,775
Other Compostable Paper	0.3%	1.1%	0.1%	0.5%	23,931
Remainder/Composite Paper	0.4%	2.0%	0.1%	0.7%	29,778
Plastic	6.2%				489,491
PETE Beverage Containers - CRV	0.1%	0.3%	0.0%	0.1%	7,516
PETE Bottles and Jars - Non-CRV	0.0%	0.1%	0.0%	0.0%	1,590
HDPE Beverage Containers - CRV	0.0%	0.0%	0.0%	0.0%	75
HDPE Bottles and Jars - Non-CRV	0.0%	0.1%	0.0%	0.1%	2,546
Expanded Polystyrene Packaging	0.1%	0.7%	0.0%	0.2%	9,519

Material	Estimated Proportion	Standard Deviation	Lower Bound (95%)	Upper Bound (95%)	Estimated Tonnage
Plastic Trash Bags	0.2%	0.5%	0.1%	0.3%	17,011
Plastic Grocery and Other Merchandise Bags	0.0%	0.1%	0.0%	0.0%	2,337
Film Products- Non-Packaging	0.4%	1.8%	0.1%	0.7%	30,837
Flexible Plastic Pouches	0.0%	0.0%	0.0%	0.0%	176
Non-Bag Commercial and Industrial Packaging Film	0.9%	4.2%	0.3%	1.6%	72,421
Other Film Bags and Plastic Mailing Pouches	0.0%	0.0%	0.0%	0.0%	1,087
Rigid Plastic Food Service Ware	0.2%	0.7%	0.0%	0.3%	12,218
Other Plastic Packaging	0.7%	3.5%	0.1%	1.2%	51,260
Durable Plastic Items	3.1%	12.3%	1.1%	5.0%	243,060
Remainder/Composite Plastic	0.5%	2.1%	0.2%	0.8%	37,836
Glass	1.0%				79,249
Clear Glass Bottles and Containers – CRV	0.1%	0.7%	0.0%	0.2%	8,770
Clear Glass Bottles and Containers - Non-CRV	0.1%	0.8%	0.0%	0.2%	7,646
Green Glass Bottles and Containers – CRV	0.0%	0.1%	0.0%	0.0%	1,825
Brown Glass Bottles and Containers – CRV	0.0%	0.2%	0.0%	0.1%	3,025
Green and Brown Glass Bottles and Containers - Non-CRV	0.1%	0.7%	0.0%	0.2%	4,791

Material	Estimated Proportion	Standard Deviation	Lower Bound (95%)	Upper Bound (95%)	Estimated Tonnage
Other Colored Glass Bottles and Containers	0.0%	0.1%	0.0%	0.0%	992
Remainder/Composite Glass	0.7%	4.0%	0.0%	1.3%	52,202
Metal	7.6%				600,161
Tin/Steel Cans	0.1%	0.8%	0.0%	0.2%	9,078
Aluminum Cans – CRV	0.0%	0.1%	0.0%	0.1%	3,115
Aluminum Cans - Non-CRV	0.0%	0.0%	0.0%	0.0%	350
Major Appliances	0.9%	6.4%	0.0%	1.9%	72,310
Other Ferrous	4.9%	12.5%	2.9%	6.9%	384,798
Other Non-Ferrous	1.1%	4.0%	0.5%	1.7%	87,585
Remainder/Composite Metal	0.5%	2.2%	0.2%	0.9%	42,925
Electronics	0.4%				28,294
Covered Video Display Devices	0.0%	0.0%	0.0%	0.0%	-
Consumer Electronics and Small Equipment	0.3%	2.0%	0.0%	0.6%	24,760
Large Equipment	0.0%	0.6%	0.0%	0.1%	3,535
Organics	36.4%				2,858,072
Food - Potentially Donatable - Vegetative (Perishable/Fresh)	0.7%	8.1%	0.0%	2.0%	58,585
Food - Potentially Donatable - Eggs, Dairy, and Dairy Alternatives	0.0%	0.1%	0.0%	0.0%	885
Food - Potentially Donatable - Meat	0.1%	1.1%	0.0%	0.3%	7,157

Material	Estimated Proportion	Standard Deviation	Lower Bound (95%)	Upper Bound (95%)	Estimated Tonnage
Food - Potentially Donatable - Cooked/Baked/Prepared Perishable Items	0.0%	0.1%	0.0%	0.0%	835
Food - Potentially Donatable - Packaged Non-perishable	0.2%	1.4%	0.0%	0.4%	12,470
Food - Not Donatable – Meat	0.1%	0.7%	0.0%	0.2%	6,624
Food - Not Donatable - Non-meat	0.5%	2.9%	0.1%	1.0%	40,441
Food – Inedible	0.1%	0.8%	0.0%	0.3%	11,732
Leaves and Grass	2.7%	14.3%	0.4%	5.0%	212,595
Prunings and Trimmings	6.2%	20.4%	2.9%	9.4%	483,851
Branches and Stumps	2.5%	12.5%	0.5%	4.5%	198,123
Manures	0.0%	0.0%	0.0%	0.0%	-
Clean Dimensional Lumber	7.3%	16.3%	4.7%	9.8%	570,338
Clean Engineered Wood	3.9%	10.3%	2.3%	5.5%	306,701
Clean Pallets and Crates	2.5%	12.8%	0.5%	4.6%	198,576
Treated/Painted/Stained Wood	8.5%	17.6%	5.7%	11.3%	667,208
Other Recyclable Wood	0.2%	1.1%	0.0%	0.4%	15,571
Remainder/Composite Organic	0.8%	8.1%	0.0%	2.1%	66,379
Inerts and Other	31.1%				2,444,009
Concrete	4.4%	15.2%	2.0%	6.9%	349,296
Asphalt Roofing	4.5%	17.9%	1.7%	7.4%	355,798
Gypsum Board	5.4%	15.4%	3.0%	7.9%	425,507
Carpet	2.9%	13.5%	0.7%	5.0%	226,985
Rock, Soil and Fines	4.1%	16.2%	1.5%	6.7%	320,358

Material	Estimated Proportion	Standard Deviation	Lower Bound (95%)	Upper Bound (95%)	Estimated Tonnage
Remainder/Composite Inerts and Other	9.7%	20.6%	6.5%	13.0%	766,065
HHW	0.2%				12,216
Paint	0.1%	0.6%	0.0%	0.2%	6,148
Used Oil	0.0%	0.2%	0.0%	0.0%	1,153
Lead-acid (automotive) batteries	0.0%	0.0%	0.0%	0.0%	-
Other batteries	0.0%	0.0%	0.0%	0.0%	182
One-Pound or Less Propane Gas Cylinders	0.0%	0.0%	0.0%	0.0%	-
Pharmaceuticals	0.0%	0.0%	0.0%	0.0%	61
Remainder/Composite Household Hazardous	0.1%	0.6%	0.0%	0.1%	4,673
Special Waste	8.8%				688,634
Tires	0.1%	1.3%	0.0%	0.3%	11,432
Mattresses and Foundations	1.1%	6.8%	0.0%	2.2%	89,202
Bulky Items	7.4%	20.3%	4.2%	10.7%	584,065
Remainder/Composite Special Waste	0.1%	0.6%	0.0%	0.1%	3,935

Miscellaneous	4.0%				317,491
Textiles - Cloth and Clothing	1.3%	5.1%	0.5%	2.1%	105,371
Textiles - Shoes, Purses, Belts	0.1%	0.5%	0.0%	0.2%	7,093
Personal Protective Equipment (PPE)	0.0%	0.2%	0.0%	0.1%	3,574
Solar Panels	0.0%	0.0%	0.0%	0.0%	-
Diapers & Sanitary Products	0.0%	0.2%	0.0%	0.1%	2,794
Miscellaneous Inorganics	1.1%	8.1%	0.0%	2.4%	85,021
Mixed Residue	1.4%	4.0%	0.8%	2.1%	113,638
Total	**100.0%**				**7,862,416**

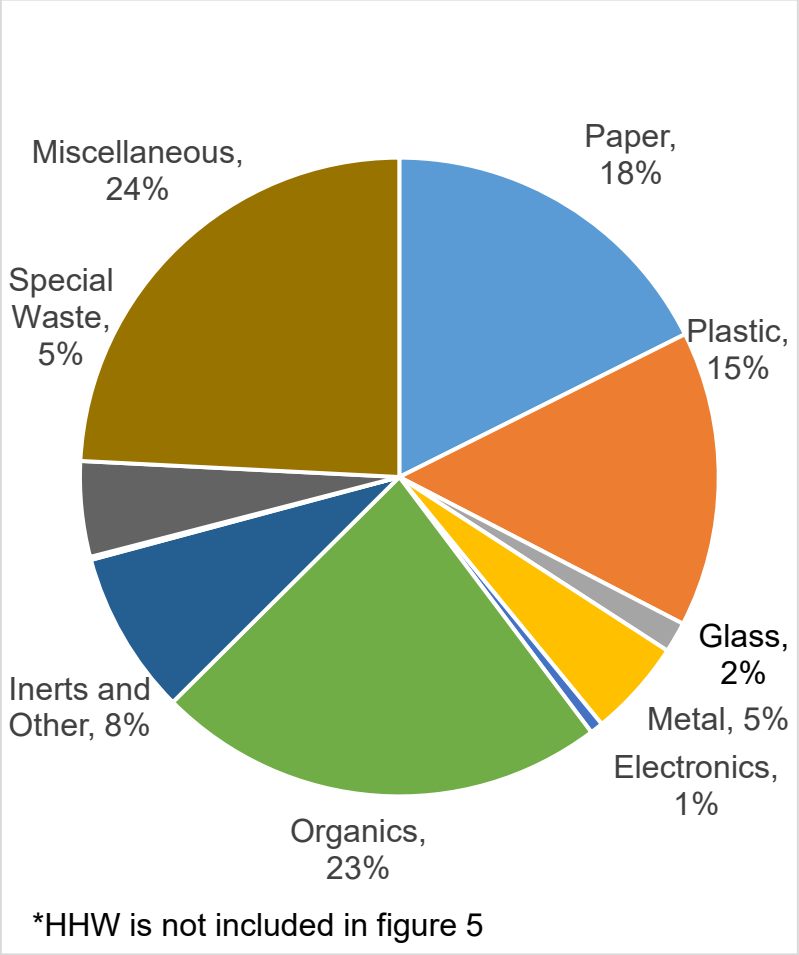
Mixed Waste

Mixed waste is defined as waste from the previous categories that has been commingled at an intermediate facility or location (e.g., a transfer station) and has been transported to a disposal facility for disposal. This section presents composition findings for mixed waste.

Overview and Analysis

Composition results by material category for mixed waste are illustrated in Figure 5 and described in detail in Table 12, below. The largest material category in the mixed waste stream was miscellaneous, which accounted for more than 24 percent of the total by weight. Organics, the next largest material category, accounted for roughly 23 percent.

Figure 5: Material Categories in Overall Mixed Disposed Waste



Material Category	Est. Percent
Miscellaneous	24.2%
Organics	22.8%
Paper	17.6%
Plastic	15.0%
Inerts and Other	8.3%
Metal	4.9%
Special Waste	4.8%
Glass	1.6%
Electronics	0.7%
HHW	0.2%
Total	**100%**

Ten Most Prevalent Materials

The ten most prevalent material types in the mixed waste stream by weight are presented in Table 11. These ten material types, according to Table 11, below, comprised approximately 48.3 percent of overall disposed mixed waste.

Table 11: Ten Most Prevalent Material Types in Overall Mixed Disposed Waste

Material	Estimated Percent	Cumulative Percent	Estimated Tons
Mixed Residue	15.4%	15.4%	3,691,355
Corrugated Cardboard	5.9%	21.3%	1,402,563
Leaves and Grass	4.3%	25.6%	1,021,034
Textiles – Cloth and Clothing	3.7%	29.3%	894,924
Other Plastic Packaging	3.7%	33.0%	884,055
Treated/Painted/Stained Wood	3.4%	36.4%	808,249
Other Compostable Paper	3.3%	39.7%	801,662
Bulky Items	3.2%	42.9%	771,674
Other Ferrous	2.8%	45.7%	671,132
Clean Dimensional Lumber	2.6%	48.3%	613,696
Total	**48.3%**		**11,560,344**

Detailed Composition

Table 12 presents the detailed composition results for the overall mixed waste sector.

Table 12 Material Composition of Overall Mixed Disposed Waste

Material	Estimated Proportion	Standard Deviation	Lower Bound (95%)	Upper Bound (95%)	Estimated Tonnage
Paper	17.6%				4,216,910
Corrugated Cardboard	5.9%	5.0%	4.5%	7.2%	1,402,563
Paper Grocery Bags	0.1%	0.4%	0.0%	0.2%	28,803
Other Paper Bags/Kraft Paper	0.4%	0.5%	0.2%	0.5%	93,326
Newspapers/Newspaper Inserts	0.4%	0.5%	0.3%	0.5%	98,010
White Office-type Paper and Mail	0.8%	0.9%	0.5%	1.0%	183,442
Magazines and Catalogs	0.3%	0.5%	0.2%	0.5%	76,301
Folding Cartons and Other Paperboard Packaging	1.6%	1.4%	1.2%	2.0%	389,855
Aseptic Containers	0.1%	0.1%	0.1%	0.1%	18,320
Gable-top Cartons	0.2%	0.3%	0.1%	0.2%	40,066
Paper/Fiber Food Service Ware	1.9%	2.0%	1.4%	2.5%	456,814
Other Recyclable Paper	1.1%	1.0%	0.8%	1.4%	262,406
Other Paper/Fiber – Packaging	0.7%	0.6%	0.5%	0.9%	174,482
Other Compostable Paper	3.3%	2.2%	2.7%	4.0%	801,662
Remainder/Composite Paper	0.8%	1.4%	0.4%	1.2%	190,859
Plastic	15.0%				3,584,138
PETE Beverage Containers – CRV	0.5%	0.4%	0.4%	0.6%	120,818
PETE Bottles and Jars - Non-CRV	0.2%	0.2%	0.1%	0.3%	49,570
HDPE Beverage Containers – CRV	0.1%	0.2%	0.0%	0.1%	14,188
HDPE Bottles and Jars - Non-CRV	0.4%	0.4%	0.3%	0.5%	84,305
Expanded Polystyrene Packaging	0.2%	0.2%	0.1%	0.3%	47,419
Plastic Trash Bags	2.1%	1.6%	1.7%	2.6%	512,159

Material	Estimated Proportion	Standard Deviation	Lower Bound (95%)	Upper Bound (95%)	Estimated Tonnage
Plastic Grocery and Other Merchandise Bags	0.7%	0.6%	0.5%	0.8%	158,374
Film Products- Non-Packaging	0.6%	1.8%	0.1%	1.1%	138,663
Flexible Plastic Pouches	0.1%	0.6%	0.0%	0.3%	26,076
Non-Bag Commercial and Industrial Packaging Film	1.5%	2.0%	0.9%	2.0%	354,885
Other Film Bags and Plastic Mailing Pouches	0.4%	0.4%	0.3%	0.6%	107,660
Rigid Plastic Food Service Ware	1.2%	0.9%	1.0%	1.5%	291,608
Other Plastic Packaging	3.7%	2.7%	2.9%	4.5%	884,055
Durable Plastic Items	1.7%	2.0%	1.1%	2.2%	406,221
Remainder/Composite Plastic	1.6%	1.9%	1.1%	2.1%	388,138
Glass	1.6%				371,388
Clear Glass Bottles and Containers – CRV	0.3%	0.5%	0.2%	0.5%	74,620
Clear Glass Bottles and Containers - Non-CRV	0.4%	0.6%	0.2%	0.6%	95,683
Green Glass Bottles and Containers – CRV	0.1%	0.3%	0.0%	0.2%	27,257
Brown Glass Bottles and Containers – CRV	0.2%	0.4%	0.1%	0.3%	55,543
Green and Brown Glass Bottles and Containers - Non-CRV	0.2%	0.4%	0.1%	0.3%	55,304
Other Colored Glass Bottles and Containers	0.0%	0.1%	0.0%	0.1%	8,823
Remainder/Composite Glass	0.2%	0.3%	0.1%	0.3%	54,157

Material	Estimated Proportion	Standard Deviation	Lower Bound (95%)	Upper Bound (95%)	Estimated Tonnage
Metal	4.9%				1,178,624
Tin/Steel Cans	0.3%	0.3%	0.2%	0.4%	76,804
Aluminum Cans – CRV	0.2%	0.2%	0.2%	0.3%	54,492
Aluminum Cans - Non-CRV	0.1%	0.1%	0.0%	0.1%	15,284
Major Appliances	0.4%	2.9%	0.0%	1.2%	97,611
Other Ferrous	2.8%	4.8%	1.5%	4.1%	671,132
Other Non-Ferrous	0.5%	0.6%	0.3%	0.6%	117,414
Remainder/Composite Metal	0.6%	1.1%	0.3%	0.9%	145,887
Electronics	0.7%				157,152
Covered Video Display Devices	0.0%	0.0%	0.0%	0.0%	-
Consumer Electronics and Small Equipment	0.3%	0.8%	0.0%	0.5%	66,042
Large Equipment	0.4%	1.6%	0.0%	0.8%	91,111
Organics	22.8%				5,459,622
Food - Potentially Donatable - Vegetative (Perishable/Fresh)	0.5%	0.8%	0.3%	0.7%	116,034
Food - Potentially Donatable - Eggs, Dairy, and Dairy Alternatives	0.1%	0.2%	0.0%	0.1%	20,759
Food - Potentially Donatable – Meat	0.1%	0.3%	0.0%	0.2%	34,050
Food - Potentially Donatable - Cooked/Baked/Prepared Perishable Items	0.1%	0.3%	0.0%	0.2%	27,326
Food - Potentially Donatable - Packaged Non-perishable	0.9%	1.3%	0.5%	1.2%	206,844
Food - Not Donatable – Meat	0.5%	0.9%	0.3%	0.8%	125,658

Material	Estimated Proportion	Standard Deviation	Lower Bound (95%)	Upper Bound (95%)	Estimated Tonnage
Food - Not Donatable - Non-meat	2.5%	3.2%	1.6%	3.3%	587,573
Food – Inedible	1.1%	1.3%	0.8%	1.5%	273,110
Leaves and Grass	4.3%	15.3%	0.0%	8.5%	1,021,034
Prunings and Trimmings	2.0%	3.3%	1.1%	3.0%	488,397
Branches and Stumps	1.0%	3.2%	0.1%	1.9%	248,019
Manures	0.0%	0.2%	0.0%	0.1%	7,168
Clean Dimensional Lumber	2.6%	4.3%	1.4%	3.7%	613,696
Clean Engineered Wood	2.3%	4.0%	1.2%	3.4%	546,373
Clean Pallets and Crates	0.7%	1.7%	0.2%	1.1%	159,155
Treated/Painted/Stained Wood	3.4%	3.9%	2.3%	4.5%	808,249
Other Recyclable Wood	0.4%	0.7%	0.2%	0.5%	86,375
Remainder/Composite Organic	0.4%	0.5%	0.2%	0.5%	89,804
Inerts and Other	8.3%				1,979,678
Concrete	1.5%	5.1%	0.1%	2.9%	358,316
Asphalt Roofing	0.7%	2.4%	0.0%	1.3%	159,803
Gypsum Board	1.3%	4.7%	0.0%	2.6%	309,550
Carpet	1.6%	4.1%	0.4%	2.7%	371,494
Rock, Soil and Fines	0.8%	1.6%	0.4%	1.2%	193,752
Remainder/Composite Inerts and Other	2.5%	4.0%	1.3%	3.6%	586,763
HHW	0.2%				37,049
Paint	0.1%	0.3%	0.0%	0.2%	18,883
Used Oil	0.0%	0.1%	0.0%	0.0%	1,924
Lead-acid (automotive) batteries	0.0%	0.0%	0.0%	0.0%	-
Other batteries	0.0%	0.0%	0.0%	0.0%	3,679

Material	Estimated Proportion	Standard Deviation	Lower Bound (95%)	Upper Bound (95%)	Estimated Tonnage
One-Pound or Less Propane Gas Cylinders	0.0%	0.0%	0.0%	0.0%	874
Pharmaceuticals	0.0%	0.1%	0.0%	0.1%	9,642
Remainder/Composite Household Hazardous	0.0%	0.0%	0.0%	0.0%	2,047
Special Waste	4.8%				1,155,039
Tires	0.3%	2.1%	0.0%	0.9%	71,004
Mattresses and Foundations	1.1%	6.4%	0.0%	2.8%	257,345
Bulky Items	3.2%	7.6%	1.1%	5.3%	771,674
Remainder/Composite Special Waste	0.2%	1.1%	0.0%	0.5%	55,015
Miscellaneous	24.2%				5,790,722
Textiles - Cloth and Clothing	3.7%	3.2%	2.9%	4.6%	894,924
Textiles - Shoes, Purses, Belts	0.6%	1.0%	0.3%	0.9%	143,216
Personal Protective Equipment (PPE)	0.5%	0.8%	0.3%	0.7%	122,462
Solar Panels	0.0%	0.0%	0.0%	0.0%	-
Diapers & Sanitary Products	1.9%	2.1%	1.4%	2.5%	466,383
Miscellaneous Inorganics	2.0%	4.2%	0.8%	3.1%	472,383
Mixed Residue	15.4%	8.0%	13.2%	17.7%	3,691,355
Total	100.0%				23,930,322

Selected Materials

In light of policy changes since the 2018 study, this report highlights statewide disposal estimates for material types related to SB 1383 (Lara, Statues of 2016), which aims to reduce organic materials reaching landfills, and SB 1335 (Allen, Statutes of 2018), which aims to reduce the amount of food service ware and packaging thrown away. Please refer to Table 13 and Table 14, respectively.

Table 13: Composition of California's Overall Disposed Waste Stream – SB1383-related Materials

Material	Estimated Proportion	Estimated Tonnage
Paper	15.5%	6,193,825
Corrugated Cardboard	4.1%	1,643,490
Paper Grocery Bags	0.1%	35,207
Other Paper Bags/Kraft Paper	0.4%	149,019
Newspapers/Newspaper Inserts	0.3%	111,208
White Office-type Paper and Mail	0.6%	229,765
Magazines and Catalogs	0.4%	145,977
Folding Cartons and Other Paperboard Packaging	1.2%	495,138
Aseptic Containers	0.1%	42,647
Gable-top Cartons	0.1%	50,588
Paper/Fiber Food Service Ware	2.1%	849,718
Other Recyclable Paper	1.3%	501,164
Remainder/Composite Paper	0.6%	223,734
Other Paper/Fiber – Packaging	0.8%	308,575
Other Compostable Paper	3.5%	1,407,596
Organic	28.4%	11,305,710
Food - Potentially Donatable - Vegetative (Perishable/Fresh)	1.5%	615,133
Food - Potentially Donatable - Eggs, Dairy, and Dairy Alternatives	0.2%	98,000
Food - Potentially Donatable - Meat	0.3%	111,229
Food - Potentially Donatable - Cooked/Baked/Prepared Perishable Items	0.3%	114,977
Food - Potentially Donatable - Packaged Non-perishable	1.4%	577,199
Food - Not Donatable - Meat	0.9%	339,542

Food - Not Donatable - Non-meat	4.0%	1,587,268
Food – Inedible	2.3%	919,601
Leaves and Grass	2.2%	883,892
Prunings and Trimmings	2.8%	1,127,857
Branches and Stumps	1.0%	399,439
Manures	0.7%	279,604
Clean Dimensional Lumber	2.8%	1,118,977
Clean Engineered Wood	1.9%	751,487
Clean Pallets and Crates	1.4%	569,758
Treated/Painted/Stained Wood	3.4%	1,362,209
Other Recyclable Wood	0.2%	79,780
Remainder/Composite Organic	0.9%	369,758
Inerts and Others	1.3%	531,381
Carpet	1.3%	531,381
Miscellaneous	3.0%	1,184,293
Textiles - Cloth and Clothing	2.5%	982,659
Textiles - Shoes, Purses, Belts	0.5%	201,634
Total	**48.2%**	**19,053,586**

Table 14: Composition of California's Overall Disposed Waste Stream – SB1335-related Materials

Material	Estimated Proportion	Estimated Tonnage
Paper	13.7%	5,483,142
Corrugated Cardboard	4.1%	1,643,490
Paper Grocery Bags	0.1%	35,207
Other Paper Bags/Kraft Paper	0.4%	149,019
Folding Cartons and Other Paperboard Packaging	1.2%	495,138
Aseptic Containers	0.1%	42,647
Gable-top Cartons	0.1%	50,588
Paper/Fiber Food Service Ware	2.1%	849,718
Other Recyclable Paper	1.3%	501,164
Other Paper/Fiber - Packaging	0.8%	308,575
Other Compostable Paper	3.5%	1,407,596
Plastic	9.4%	3,748,072
PETE Beverage Containers – CRV	0.6%	240,391

Material	Estimated Proportion	Estimated Tonnage
PETE Bottles and Jars - Non-CRV	0.2%	84,250
HDPE Beverage Containers – CRV	0.1%	24,042
HDPE Bottles and Jars - Non-CRV	0.4%	161,107
Expanded Polystyrene Packaging	0.2%	86,555
Plastic Grocery and Other Merchandise Bags	0.6%	231,072
Flexible Plastic Pouches	0.0%	15,464
Non-Bag Commercial and Industrial Packaging Film	1.4%	557,528
Other Film Bags and Plastic Mailing Pouches	0.4%	155,443
Rigid Plastic Food Service Ware	1.3%	503,597
Other Plastic Packaging	3.1%	1,247,468
Remainder/Composite Plastic	1.1%	441,155
Glass	1.8%	722,650
Clear Glass Bottles and Containers – CRV	0.5%	186,445
Clear Glass Bottles and Containers - Non-CRV	0.7%	259,524
Green Glass Bottles and Containers – CRV	0.1%	54,722
Brown Glass Bottles and Containers – CRV	0.2%	80,504
Green and Brown Glass Bottles and Containers - Non-CRV	0.3%	121,024
Other Colored Glass Bottles and Containers	0.1%	20,431
Metal	0.7%	286,771
Tin/Steel Cans	0.4%	166,573
Aluminum Cans – CRV	0.2%	90,180
Aluminum Cans - Non-CRV	0.1%	30,017
Organic	1.4%	569,758
Clean Pallets and Crates	1.4%	569,758
Total	**27.1%**	**10,810,392**

Moisture Analysis

This section presents the data from the moisture analysis of selected fiber material groups. Samples were randomly collected throughout the study and dried at a central location. Samples were weighed prior to drying and weighed again once dried to measure the average moisture content during disposal. See Appendix A: Detailed Methodology for more information.

Detailed Results

Table 15 below presents the results of the moisture analysis for ten different fiber material groups collected for this portion of the study.

Table 15: Moisture Analysis Results of Fiber Material Groups

Material Type	Avg. Moisture Content (by weight)	Constituent(s)
Corrugated Cardboard	2.1%	*Corrugated Cardboard*
Folding Cartons	12.5%	*Folding Cartons and Other Paperboard Packaging*
Magazines & Catalogs	3.0%	*Magazines and Catalogs*
Newspapers	13.4%	*Newspapers/Newspaper Inserts*
Other Compostable Paper	38.1%	*Other Compostable Paper*
Other Paper - Packaging	15.2%	*Other Paper/Fiber - Packaging*
Other Recyclable Paper	7.7%	*Other Recyclable Paper*
Paper Bags	13.4%	*Paper Grocery Bags; Other Paper Bags/Kraft Paper*
Paper Food Service	24.8%	*Paper/Fiber Food Service Ware*
White Office Paper	5.8%	*White Office-type Paper and Mail*

Appendix A: Detailed Methodology

Overview

This document describes the major elements of the methodology for the facility-based study to characterize waste sent for disposal statewide, including the selection of locations for sampling and surveying, the waste sampling, vehicle surveying procedures, moisture analysis, and the data analysis approach.

Definitions of Waste Sectors and Subsectors

Descriptions and definitions of the waste sectors and subsectors used to stratify data collection for the 2021 study are presented in the following sections.

Waste Sectors and Subsectors

The study characterized waste from the four sectors and six subsectors listed in Table 16.

Table 16: Overview of Waste Disposal Sectors, Subsectors and Corresponding Waste Characteristics

Sector	Subsector	Description
Franchised Commercial and Multi-Family Residential Waste		Waste in this sector must meet all the following criteria to be included: • It is destined for landfill disposal. • It is generated by businesses, industries (e.g., factories, farms), institutions, public areas (e.g., roads, parks) or multi-family units. • It is not significantly mixed with waste from other sectors other than multi-family residential. • It is collected and transported by contracted or franchised waste haulers, both private and public (municipal). • It is not construction and demolition debris. This sector includes route trucks or packer trucks that collect from dumpsters; closed drop boxes/compactors; open-top drop boxes; and residuals from the processing of loads that meet these criteria.
Franchised Residential Waste		Waste in this sector must meet all the following criteria to be included: • It is destined for landfill disposal. • It is generated by households. • It is collected and transported by contracted or franchised waste haulers, both private and public (municipal). • It is collected on regular residential collection routes. • It is not construction and demolition debris.

Sector	Subsector	Description
Franchised Residential Waste	Single-family Residential Waste	This subsector includes waste that meets the sector criteria and is collected in packer trucks from either single-family residences or buildings that include no more than four living units. This subsector also includes residuals from the processing of loads that meet these criteria.
Franchised Residential Waste	Multi-family Residential Waste	This subsector includes waste that meets the sector criteria and is collected from multi-unit buildings with four or more living units. This includes route trucks or packer trucks that collect from dumpsters; closed drop boxes/compactors; and open-top drop boxes. This subsector also includes residuals from the processing of loads that meet these criteria.
Self-Haul/Other Waste		Waste in this sector must meet all the following criteria to be included: • It does not meet the Franchised Commercial or Franchised Residential sector definitions. • It is unprocessed or lightly processed. Lightly processed means some high value and/or bulky materials may be manually separated on the tip floor. Loads that are mechanically separated on a processing line are not included in this sector. This sector includes waste hauled by individuals, businesses, or government agencies that haul their own garbage. Thus, the self-haul sector can include materials from residential and commercial sources. The self-haul sector also includes all construction related waste, regardless of the hauler.
Mixed Waste		Waste in this sector must meet all the following criteria: • It is destined for disposal. • It is mixed waste from multiple or unknown sectors. • It was originally tipped at a transfer station.

Throughout this document the franchised commercial and multi-family residential, franchised residential, self-haul, and mixed waste sectors will be collectively referred to as “primarily unprocessed waste.”

Selection, Recruitment, and Logistics for Sampling Sites

CalRecycle staff were responsible for all sampling site selection, recruitment, and the compilation of initial site data. After staff recruited and confirmed participation of the sampling sites, CalRecycle transferred all facility contacts and information gathered from site interviews to the Cascadia project team. The project team then coordinated final logistics and scheduling with each site. The procedures for conducting site recruitment for the 30 primarily unprocessed waste facilities and 48 multi-family sites are outlined below.

Primarily Unprocessed Waste Sites

Selecting Primarily Unprocessed Waste Sites

CalRecycle's goal was to recruit disposal facilities receiving the largest portion of waste in the State. These facilities included landfills that accepted unprocessed inbound direct-hauled waste from at least three sectors. The first phase in the site selection process was identifying what sites to sample from. CalRecycle determined the landfills using the following steps:

1. Estimate the disposed tonnage from top 45 disposal facilities in the state for 2019

The disposed tons from each facility were based on data from RDRS and the electronic Disposal Reporting System (eDRS). Disposal tons are summarized in Table 17. Disposed tons were obtained for 2019 because while the characterization study was scheduled for 2021, planning for the study began before 2020 disposal data were available.

Table 17. 2019 Disposal Facility Summary from CalRecycle's RDRS and eDRS

Rank	Facility	Total 2019 Disposal Tonnage	Proportion of Disposed Waste (2019)
1	El Sobrante Landfill	3,415,360	8%
2	Frank R. Bowerman Sanitary Landfill	2,475,090	6%
3	Sunshine Canyon City/County Landfill	2,276,508	6%
4	Olinda Alpha Landfill	2,085,723	5%
5	Chiquita Canyon Sanitary Landfill	1,693,580	4%
6	Simi Valley Landfill and Recycling Center	1,451,778	4%
7	Otay Landfill	1,402,763	3%

Rank	Facility	Total 2019 Disposal Tonnage	Proportion of Disposed Waste (2019)
8	Recology Ostrom Road Landfill Inc.	1,165,578	3%
9	Mid-Valley Sanitary Landfill	1,135,648	3%
10	Altamont Landfill and Resource Recovery	1,101,932	3%
11	Sycamore Landfill	970,393	2%
12	Potrero Hills Landfill	948,038	2%
13	Sacramento County Landfill (Kiefer)	915,504	2%
14	Badlands Sanitary Landfill	885,857	2%
15	West Miramar Sanitary Landfill	857,660	2%
16	Forward Landfill, Inc.	833,904	2%
17	Keller Canyon Landfill	768,380	2%
18	Monterey Peninsula Landfill	732,125	2%
19	Recology Hay Road	666,134	2%
20	American Avenue Disposal Site	653,818	2%
21	Antelope Valley Public Landfill	637,280	2%
22	Newby Island Sanitary Landfill	613,057	2%
23	Corinda Los Trancos Landfill (Ox Mtn)	611,514	2%
24	Anderson Landfill, Inc.	611,185	2%
25	Lamb Canyon Sanitary Landfill	597,083	1%
26	Calabasas Landfill	573,393	1%
27	Prima Deshecha Landfill	550,996	1%
28	Neal Road Recycling and Waste Facility	478,235	1%
29	Scholl Canyon Landfill	468,483	1%
30	Bakersfield Metropolitan (Bena) Sanitary Landfill	451,105	1%
31	H.M. Holloway Inc.	440,598	1%
32	Toland Road Landfill	427,199	1%
33	Central Disposal Site	349,095	1%
34	Victorville Sanitary Landfill	338,860	1%
35	Visalia Disposal Site	333,753	1%
36	Highway 59 Landfill	329,763	1%
37	John Smith Road Landfill	297,536	1%
38	Foothill Sanitary Landfill	291,148	1%
39	Western Regional Landfill	289,745	1%
40	San Timoteo Sanitary Landfill	276,517	1%
41	Azusa Land Reclamation Co. Landfill	267,911	1%

Rank	Facility	Total 2019 Disposal Tonnage	Proportion of Disposed Waste (2019)
42	Vasco Road Sanitary Landfill	248,968	1%
43	Kirby Canyon Recycling and Disposal Facility	238,839	1%
44	Southeast Resource Recovery Facility	185,603	<1%
45	Covanta Stanislaus, Inc.	130,651	<1%
	Total	**36,474,290**	**90%**

2. Rank each landfill by tons disposed

Using 2019 RDRS and eDRS data, staff ranked the top 45 landfills by total tonnage disposed. The landfill rankings (by disposed tons) are summarized above in Table 17

Table 18. Number of Samples Allocated to Each Sector

Sector	Allocated Samples	Proportion of Allocated Samples
Franchised Commercial and Multi-Family	173	31%
Franchised Single-family Residential	133	24%
Self-Haul	149	27%
Mixed Waste	50	9%
Multi-Family Residential	50	9%
Total	**556**	**100%**

3. Allocate sampling days per sector per landfill

The number of samples was allocated to each source sector based on the sorting capacity of the contractor, proportion of each landfill's inbound traffic by source sector, and the operator's willingness to participate. The number of days allocated to each site are shown in Table 19.

Recruiting Primarily Unprocessed Waste Sites

CalRecycle staff contacted each ranked facility to ask for their participation in the study. If the facility agreed to participate, staff conducted an interview to determine eligibility (see questionnaire in Appendix C: Forms Used in the Study).

A facility needed to meet the following minimum criteria:

- The site handled waste destined for final disposal. This does not include waste subjected to extensive mechanical separation or diversion techniques, like processing residuals
- It was possible to obtain estimated tonnage data from all four waste sectors (franchised commercial and multi-family residential, franchised single-family residential, self-haul and mixed waste) at the site
- It was possible to survey, sample, and sort at the site

If a facility met the minimum criteria, the following additional information was obtained through the interview:

- Written directions to the facility
- The facility's days and hours of operation
- Contact information for: facility owner, an employee with the authority to permit use of the facility, an employee who can provide site data, and an employee for day-of coordination assistance and logistics
- An agreed upon plan and location for performing the surveying, sampling, and sorting at the facility
- Availability of a loader and operator to assist with moving samples
- A plan for the use of facility scales and the cooperation of gatehouse personnel to obtain vehicle net weights
- The number of scales at the facility and the process by which vehicles are directed to the scales (e.g., whether commercial haulers use a scale separate from self-haul or cash customers)
- Approximate daily and weekly load counts and tonnage by waste sector, subsector, and total for the facility
- Estimated vehicle traffic expected for each sector on weekdays and weekends, and daily traffic patterns for each sector
- Any facility-specific standards used for recording the net weight of vehicles and for recording alternate minimum weights for small vehicles
- Information about existing recycling or recovery operations at the facility, and how the study team may obtain samples of waste after any recycling or recovery operations have already been applied to the waste
- Tips about any unusual conditions (e.g., weather, anomalies in traffic patterns) that might affect data collection

If the selected facility was unwilling or unable to accommodate the study conditions, the facility that received the next greatest amount of waste was recruited.

The final list of participating facilities is shown in Table 19.

Table 19. Final List of Participating Waste Facilities

County	Facility	City	# of Sampling Days
Solano	Potrero Hills Landfill	Suisun City	2
Alameda	Altamont Landfill & Resource Recovery Facility	Livermore	2
Alameda	Vasco Road Landfill	Livermore	2
Sonoma	Central Disposal Site	Petaluma	2
Marin	Redwood Landfill	Novato	1
Solano	Recology Hay Road	Vacaville	2
Monterey	Monterey Peninsula Landfill	Salinas	2
Monterey	Johnson Canyon Sanitary Landfill	Gonzalez	1
Los Angeles	Calabasas Landfill	Agoura Hills	1
Los Angeles	Scholl Canyon Landfill	Glendale	1
Los Angeles	Sunshine Canyon	Sylmar	2
Los Angeles	Chiquita Canyon	Castaic	2
Los Angeles	Antelope Valley Recycling & Disposal Facility	Palmdale	2
Orange	Frank R. Bowerman Sanitary Landfill	Irvine	2
Orange	Olinda Alpha Sanitary Landfill	Brea	2
Orange	Prima Deshecha Sanitary Landfill	San Juan Capistrano	1
Riverside	El Sobrante Landfill	Corona	3
San Diego	West Miramar Sanitary Landfill	San Diego	2
San Diego	Otay Landfill	Chula Vista	2
San Diego	Sycamore Landfill	Santee	2
Ventura	Toland Road Landfill	Santa Paula	1
Ventura	Simi Valley Landfill and Recycling Center	Simi Valley	2
Kern	Bakersfield Metro (Bena) Sanitary Landfill	Bakersfield	1
Fresno	American Ave Disposal Site	Kerman	1
Butte	Neal Road Recycling and Waste Facility	Butte	2
San Joaquin	Forward Landfill	Manteca	2
Madera	Fairmead Landfill	Chowchilla	1

County	Facility	City	# of Sampling Days
Shasta	Anderson Landfill	Anderson	1
Yuba	Recology Ostrom Road	Wheatland	1
Sacramento	Sacramento County Kiefer Landfill	Sacramento	2

Primarily Unprocessed Waste Site Scheduling and Logistics

After recruiting the facilities, Cascadia staff coordinated with facility operators to collect information necessary for planning the waste sampling. Waste sampling occurred from May to October 2021.

The sampling dates for each facility are shown in Table 20.

Table 20. Facility Survey and Sampling Dates

County	Facility	City	Sampling Dates (2021)
Solano	Potrero Hills Landfill	Suisun City	5/27-5/28
Alameda	Altamont Landfill & Resource Recovery Facility	Livermore	6/17-6/18
Alameda	Vasco Road Landfill	Livermore	6/21-6/22
Sonoma	Central Disposal Site	Petaluma	6/14-6/15
Marin	Redwood Landfill	Novato	6/16
Solano	Recology Hay Road	Vacaville	5/25-5/26
Monterey	Monterey Peninsula Landfill	Salinas	6/23-6/24
Monterey	Johnson Canyon Sanitary Landfill	Gonzalez	6/25
Los Angeles	Calabasas Landfill	Agoura Hills	9/24
Los Angeles	Scholl Canyon Landfill	Glendale	10/4
Los Angeles	Sunshine Canyon	Sylmar	9/20-9/21
Los Angeles	Chiquita Canyon	Castaic	9/16-9/17
Los Angeles	Antelope Valley Recycling & Disposal Facility	Palmdale	9/13-9/14
Orange	Frank R. Bowerman Sanitary Landfill	Irvine	10/7-10/8
Orange	Olinda Alpha Sanitary Landfill	Brea	10/5-10/6
Orange	Prima Deshecha Sanitary Landfill	San Juan Capistrano	10/14
Riverside	El Sobrante Landfill	Corona	10/11-10/13
San Diego	West Miramar Sanitary Landfill	San Diego	10/15;10/18

County	Facility	City	Sampling Dates (2021)
San Diego	Otay Landfill	Chula Vista	10/21-10/22
San Diego	Sycamore Landfill	Santee	10/19-10/20
Ventura	Toland Road Landfill	Santa Paula	9/15
Ventura	Simi Valley Landfill and Recycling Center	Simi Valley	9/22-9/23
Kern	Bakersfield Metro (Bena) Sanitary Landfill	Bakersfield	5/10
Fresno	American Ave Disposal Site	Kerman	5/11
Butte	Neal Road Recycling and Waste Facility	Butte	5/18-5/19
San Joaquin	Forward Landfill	Manteca	5/13-5/14
Madera	Fairmead Landfill	Chowchilla	5/21
Shasta	Anderson Landfill	Anderson	5/17
Yuba	Recology Ostrom Road	Wheatland	5/20
Sacramento	Sacramento County Kiefer Landfill	Sacramento	5/21; 5/24

Multi-family Waste Sites

Selecting Multi-Family Sites

Multi-family site sampling was done in conjunction with facility sampling, with multi-family samples collected and characterized during the days spent at select primarily unprocessed waste facilities. CalRecycle developed a list of multi-family apartment buildings to recruit for the study, with a multi-family site defined as a building consisting of four or more dwelling units. To reduce travel times, a list of potential multi-family sampling locations was created for each of the 30 waste facilities using the ReferenceUSAGov database:

- Search for all apartments (specific business group in database) within a twenty-mile radius of each waste sampling facility recruited for the study
- Randomize the order of listings and sort the random numbers from least to greatest

Recruiting Multi-Family Properties

After creating the list, CalRecycle began contacting multi-family sites based on the randomized ordering to determine their willingness to participate in the study. If the contact information provided by ReferenceUSAGov was not valid, staff used any contact information available from online searches. Once in contact, staff spoke to a manager, asked for their participation, and the determined if the site was eligible. For a site to be eligible it needed to:

- Generate over 200 pounds of trash between waste pickups (amount required for sample);
- Have dumpsters the sampling team could access during business hours;
- Experience no-to-minimal illegal dumping (managers knew if this was an issue). Due to this requirement, many of the sites chosen were gated or had gated dumpsters that were not accessible to non-residents.

Willingness to participate in the multi-family sampling was very low, often due to difficulty in reaching a manager at a site (many contacts ended with a voicemail), privacy concerns, and perceived effort needed to get approval from corporate management or coordinate with sampling team. Combined with the eligibility requirements, it was not uncommon for staff to contact 50-75 facilities to recruit one eligible multi-family site.

The field sampling team chose 50 sites to collect a single sample, generally based on estimated amount of trash available on the planned sampling day and the distance of the site from the waste facility. Ultimately 48 sites were sampled due to the lack of material at two multi-family sites.

Multi-family Site Scheduling and Logistics

Fifty multi-family samples were collected from 48 sites in conjunction with the waste facility sampling from May - October 2021.

After a multi-family site was confirmed eligible, staff collected additional information to: (1) determine logistics for collecting the waste sample and (2) quantify disposal patterns at the site. The information collected included:

- General Information
- Name and physical address of the property
- Names and contact information for the person(s) who could grant permission for participation in the study, the person(s) who could supply data related to waste disposal practices and quantities, and the person(s) who could assist directly with on-site measurement and sampling visits
- Number and approximate size of containers for landfill waste (trash bins or dumpsters)

- Days and times of scheduled waste collection
- Name of hauling company that serves the location
- Total number of units and the number of occupied units
- Use of compactors or roll-off containers for landfill waste
- Hours that waste containers are accessible to contractors and presence of any barriers (gates, locks, guards, etc.)
- Layout of the site and location of waste containers (and site a map if available)
- Steps needed to access waste containers when not easily accessible

Participants were informed that all study data would be recorded anonymously and identifying information would not be published.

Sample Allocations - All Sectors

The number of samples allocated to each facility by waste sector is presented in Table 21. The field crew planned to complete at least two single-family, commercial, and self-haul samples per day at each primarily unprocessed waste facility. One mixed waste load each day was planned to be sampled. Due to logistics, actual sample counts varied. In general, the number of expected samples was allocated to each site depending on the number of sampling days. Some facilities did not accept certain loads, so the source sector allocations were increased at other facilities to ensure that the overall sample target was achieved.

Table 21. Sample Allocations by Facility and Sector

Facility	Single-Family	Commercial	Self-Haul	Mixed Waste
Potrero Hills Landfill	6	5	7	2
of 556	5	6	7	2
Vasco Road Landfill	6	5	7	2
Central Disposal Site	7	5	6	2
Redwood Landfill	3	4	2	1
Recology Hay Road	5	7	6	2
Monterey Peninsula Landfill	4	8	6	2
Johnson Canyon Sanitary Landfill	2	4	3	1
Calabasas Landfill	3	3	4	0
Scholl Canyon Landfill	3	3	4	0
Sunshine Canyon	4	6	6	4

Facility	Single-Family	Commercial	Self-Haul	Mixed Waste
Chiquita Canyon	6	8	2	4
Antelope Valley Recycling & Disposal Facility	4	8	6	2
Frank R. Bowerman Sanitary Landfill	4	8	6	2
Olinda Alpha Sanitary Landfill	4	8	6	0
Prima Deshecha Sanitary Landfill	2	3	4	1
El Sobrante Landfill	6	12	6	4
West Miramar Sanitary Landfill	7	7	6	1
Otay Landfill	5	7	6	2
Sycamore Landfill	6	6	6	2
Toland Road Landfill	2	3	4	1
Simi Valley Landfill and Recycling Center	4	8	6	2
Bakersfield Metro (Bena) Sanitary Landfill	3	3	3	1
American Ave Disposal Site	2	4	3	1
Neal Road Recycling and Waste Facility	3	6	10	1
Forward Landfill	6	11	0	3
Fairmead Landfill	2	4	3	1
Anderson Landfill	3	2	4	1
Recology Ostrom Road	2	4	3	1
Sacramento County Kiefer Landfill	5	10	3	2
Total	**133**	**173**	**149**	**50**

Vehicle Identification

Cascadia staff surveyed all vehicles coming through one entrance of the facility and collected tonnage and source sector data for one complete day (open to close). If the facility had multiple gates, then the Cascadia surveyor rotated hourly among the gates. This information was used to identify loads from a particular source sector.

Prior to beginning the day's survey, the surveyor verified the scale house's procedures:

- The procedure for obtaining vehicle net and gross weights;
- Any rules the facility used for assigning a minimum net weight to certain types of vehicles, such as those carrying residential self-hauled loads; and
- Any rules governing the assignment of net volume estimates instead of net weights.

For each vehicle, the surveyor collected the following information:

- The location from which the trash originated;
- The waste sector (franchised residential, franchised commercial and multi-family residential, self-haul, or mixed waste); and
- The vehicle type (e.g., front loader)

An example of the *Gate Survey Form* that was used to collect the data is included in Appendix C: Forms Used in the Study.

At most of the facilities, the surveyor obtained net and gross weights for vehicles by observing the weighing process at the scale house and recording the weight at that time. In other cases, the surveyor coordinated with scale house personnel to obtain weight tickets (transaction receipts) corresponding to every load of waste brought to the facility.

All vehicles carrying materials destined for disposal to that facility were surveyed. However, the survey did not include loads of material destined for recycling, recovery, or alternate daily cover.

Data Quality Control

The field team implemented several protocols to ensure the integrity of the data collected in the field, including checking survey forms in the field at the end of each day to ensure accuracy and that all appropriate information was gathered. The project manager performed an additional check of the surveys to confirm that all the required data was properly entered.

Staff Numbers and Training

Staff Numbers

Cascadia staff managed all field work. The field data collection team consisted of:

- Two Cascadia professional staff, one to supervise sorting and weighing and one to supervise load and sample selection. These staff have prior waste characterization supervisory experience.
- Four sorting staff from local temporary labor agencies (with industrial sector experience). To the extent possible, the same sorting staff were used throughout the study.

Staff Training

Cascadia staff spent two days prior to the start of sampling reviewing and training any new personnel in the sampling and sorting protocols. All sorting staff received ongoing feedback and training designed to maximize the accuracy, precision, and efficiency of field operations during the study.

Equipment

The items listed below were brought to each facility for sampling and sorting waste.

Set Up	**Safety Gear**	**Tools**
Cargo Van	Tyvek Suits	Shovels
Sort Table (4'x8'base with legs)	Hard Hats	Brooms
18 Gallon Sort Bins	Safety Vests	Digital Cameras
30 Gallon Sort Bins	Safety Glasses	Toughbook Computer
40 Gallon Carry Barrels	Dust Masks	Clipboards
96 Gallon Toters	Puncture Resistant Gloves	Replacement Batteries
Digital Scales (weighs to 0.1lb)	Glove Liners	Marking Paint
Tarps	Steel Toed Boots	Stapler
Plastic Sheeting (10'x10')	Safety/Medical Kit	Duct Tape
	Hand Wipes / Sanitizer	
	Sunblock	
	Cooler with Drinks	

Obtaining and Sorting Samples

Sampling Primarily Unprocessed Waste Facilities

Diverting Selected Loads

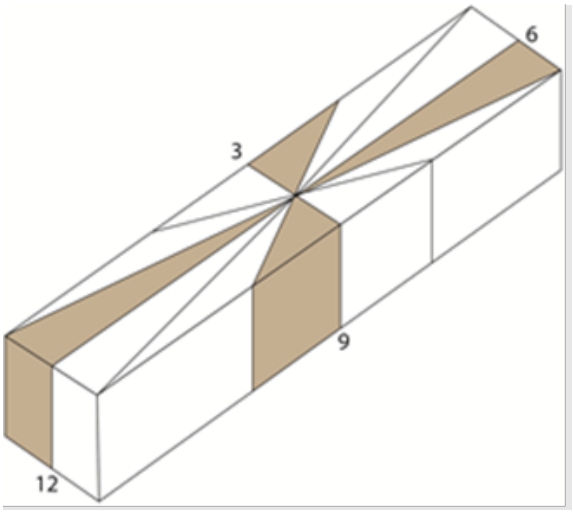
A systematic selection procedure was used to choose which vehicles to sample. First, a sampling interval for each waste sector was established to determine vehicle sampling frequency. Sampling intervals were determined by dividing the total number of trucks from each sector arriving at the facility each day—estimated from information obtained from operators during recruitment—by the number of samples needed each day. The resulting number is the sampling frequency. For example, if the vehicle survey found that approximately 50 trucks with residential franchised waste arrive, on average, per day and 5 samples were needed, it would be approximated that every 10th vehicle be diverted for sampling. This strategy is termed "selecting every n^{th} vehicle" within a waste sector. Every time one of the selected n^{th} vehicles in each waste sector arrived, the sorting staff directed the driver to the sampling area. This method was followed for most facilities but see Appendix D: *Special Considerations* for information regarding other scenarios. The vehicle information, including any unusual circumstances associated with the load or the sample, was recorded using a cloud-based data management tool.

See Appendix C: Forms Used in the Study for an example of a *Vehicle Selection Form* that specifies the intervals chosen for a particular day of sampling.

Obtaining Waste Samples, Adequate Sample Weights

Loads from residential and commercial sectors were tipped into an elongated pile in the designated area. A representative sample weighing at least 200 pounds was collected from each selected load based on a systematic "grab" from the perimeter of the load. Essentially, four subsamples of approximately 50 pounds were collected by systematically rotating around each load as shown in Figure 6 and the subsamples were then combined. If the tipped pile was viewed from the top as a clock face with 12 o'clock being the part of the load closest to the front of the truck, the first sample would be taken at the 12 o'clock position. Subsequent samples would be collected from 3 o'clock, 6 o'clock, and 9 o'clock. For the next four loads, the extraction point would shift to 1 o'clock, 4 o'clock, 7 o'clock, 10 o'clock, and so on. Samples were removed from the pile either by hand or with the assistance of a loader operator at the site. Samples were then placed on a tarp or in toters.

Figure 6: Systematic Sampling Procedure for Incoming Loads



Sampling Multi-Family Sites

The field data collection team completed two tasks during each multi-family site visit: measuring the total quantity of waste set out for collection which was destined for disposal and obtaining a representative sample of this material. The details of these two procedures are described below.

Quantifying Disposed Waste

The field team observed and recorded the volume of all waste material destined for disposal that was present at the multifamily site shortly before scheduled collection by the hauler. Field staff recorded the length, width, and height to the nearest inch for all disposed waste in dumpsters at each site to calculate the volume of disposed waste. The dimensions were recorded on a *Multi-family Site Visit Form*. (See Appendix C: Forms Used in the Study for an example of a *Multi-family Site Visit Form*.)

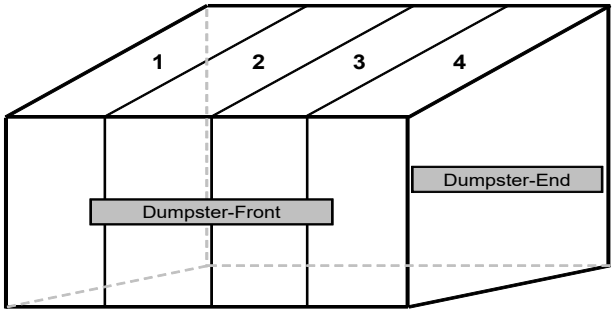
Collecting Waste Samples

Field staff inspected all the site's waste containers to determine whether any substantial differences existed. If clear differences were observed, then subsamples from multiple containers were collected to ensure a representative sample. In most cases, the waste sample was taken from a single container, chosen at random.

To collect a sample, the field crew randomly chose a vertical cross section, or "slice", of the container contents. An illustration of the slices is shown in Figure 7, below. The sample needed to weigh at least 200 pounds, but if the entire container had less than 200 pounds of waste, field staff took waste from other containers until the 200-pound sample requirement was met. If a multi-family site had considerably less than 200 pounds of waste at the time of the visit, the field crew collected all material available and then returned later to collect enough material for their sample. The crew returned to the

solid waste facility and hand-sorted the multi-family sample using the same protocol as the samples of waste from other sectors.

Figure 7: Example Dumpster with Slices Illustrated



Note: In some cases, the field staff coordinated unique sampling arrangements with the multi-family to ensure that suitable samples were available for selection and sorting. For example, if the site used a compactor, the field staff provided rolling carts for the site to place their waste and then selected samples from the material that accumulated in the rolling containers.

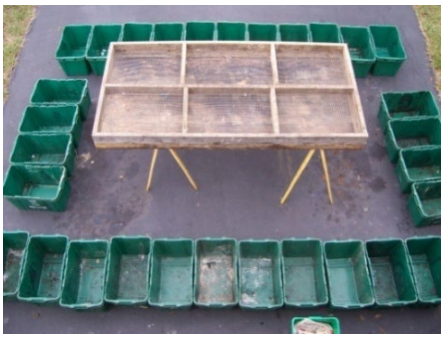
Sorting Samples and Recording Data

Hand Sort Procedure

Figure 8: Example of a sample to be sorted

After a sample was collected and placed on a tarp or in toters, the field crew photographed the sample with the sample ID visible. The material was sorted by hand into the defined material types (see Appendix B: *List and Definitions of Material Types*). Sorting crew members sorted the contents of each sample and placed each material type in the appropriate area or tub (see Figure 9 for a typical table and tub sorting arrangement). Each team member was typically assigned to extract items belonging to a single material class, such as paper or plastic.

Figure 9: Sort Table and Tubs



The field crew supervisor monitored the consistency and accuracy of sorting and directed re-sorting if there were improperly classified materials. If two items were discarded together, but could be easily and reasonably separated (e.g., plastic bag with pretzels inside), then the field crew would separate them. If an item could not be separated, then the category was determined by the dominant material type.

The tubs holding each material category were weighed (accounting for each tub's tare weight) on a set of scales that were calibrated to an accuracy within one-fifth of a pound. The field crew supervisor recorded composition weights and the information obtained from the driver on the cloud-based data management tool.

Field Work Quality Assurance/Quality Control

The data collection crew used many strategies to ensure accuracy and efficiency in the data collection process. The steps taken included:

- Interviewing the drivers of selected vehicles for sampling when the vehicle arrives (i.e., after staff at the gatehouse have directed the vehicle to the sampling crew) to verify sample information, such as generating sector and the type of waste load.
- Maintaining clear lines of communication between the sorting crew and gatehouse personnel through two-way radios or cell phones with text messaging to immediately resolve any questions about vehicle selection.
- Pre-weighing the sample to make sure it met the minimum weight criterion before sorting.
- Training the entire sampling crew in the definitions of each material and referring to the written definitions as often as needed during sorting.
- Assigning one dedicated field crew member to read and record the weight of each material weighed after sorting.

Moisture Analysis

The field team was tasked with collecting select fiber materials and shipping them to a central location for analysis. The lead was responsible for receiving, preparing, and weighing materials shipped.

Composite Sample Collection

Days for moisture analysis were randomly assigned using a random number generator, with at least one sample collected per week. On each day selected for moisture analysis composite sample collection, the photographer collected sorted material from each of the 10 moisture analysis material types (Table 15). Each composite sample was comprised of up to 20 pounds of each moisture analysis material type. The photographer placed the material into heavy-duty contractor bags (one material type per bag) and assign a unique composite sample ID to each composite sample. The composite sample collection protocol is detailed below.

1. Collection of the sample material:
    - For material types expected to accumulate more than 20 pounds per day, the photographer collected material from the first disposal facility sample sorted that day and recorded the weight of the collected material and the sector. They did not collect material again until a sample from a different sector was sorted. This repeated until material from every sector being sorted that day was collected. No more than five pounds from any sample were added to the composite sample until material from each sector had been added to the composite sample. Once material from each sector had been added, materials from every sample were collected regardless of the sector. The photographer weighed the composite sample throughout the day using a digital scale to ensure the maximum sample weight was not exceeded.
    - For material types expected to accumulate less than 20 pounds per day, the photographer collected all material from every sample to maximize the amount of material in the composite sample.
2. Collection of up to 20 pounds of each material type:
    - The photographer stopped collecting a particular moisture analysis material type once they had aggregated 20 pounds of that material type or when there were no more samples to be sorted that day.
3. Identification of each sample:
    - The photographer tracked the sample IDs that constituted each composite sample and the weight of each material type that was included in a composite sample. They tracked the data on a moisture analysis tracking Form along with the unique composite sample ID.

4. Shipment of the samples:
    - No later than one week after collecting moisture analysis samples, the photographer shipped the composite samples to the Moisture Analysis Lead and included a copy of the moisture analysis tracking form in the shipment. A moisture analysis sample placard was attached to each composite sample. The Moisture Analysis Lead (Lead) received the shipment, confirmed the information on the moisture analysis tracking form, and prepared the composite samples for drying.

Moisture Measurement Method

On the day the Lead received a shipment of composite samples, they did the following:

- Recorded the weight of each composite sample;
- Recorded the ambient humidity in the moisture analysis storage space;
- Photographed the composite samples before processing;
- Spread the composite samples onto stacked, ventilated drying racks (similar to a food dehumidifier) or other similar drying apparatus, one composite sample per rack.

Several fans and dehumidifiers were operating in the space to speed up the drying process. Additionally, an ozone generator was run to mitigate the strong odor that accompanied the drying process. The Lead returned each day and weighed the materials in each composite sample, recording the weight (using a scale accurate to 0.01 pounds) and ambient humidity each time. The Lead continued the drying and weighing process for each composite sample until the weight of the composite sample changed by less than one percent from the previous weighing. Once a sample had completely dried, the Lead noted the final weight and photographed the dried composite sample.

Description of Calculations and Statistical Procedures Used

Data from vehicle surveys, facility tonnage reports (RDRS), and the sorting of waste samples were analyzed to yield estimates of percentages and tonnages of material types in California's waste stream. This section describes the methodology used to obtain each estimate and its associated confidence interval (error range).

The general calculation strategy involved the use of ratio estimators to determine the composition percentages of the waste stream. A ratio estimator involves the ratio of two quantities, both of which are random variables. For the analysis, the basic ratio estimator was derived as the ratio of the weight of material in a given sample over the total weight of the sample.

Quantifying Disposed Waste

Disposed waste from each sector was quantified using vehicle surveys and tonnage reports at the facilities participating in the study. The calculation method is described below.

Aggregating Survey and RDRS Records to Produce Sector Tonnage Estimates Statewide

For a given facility on a given day, each vehicle that was included in the gatehouse survey had its net weight of waste assigned to one or more of the established waste sectors, according to the response of the driver. Thus, the tonnage from each vehicle was assigned or apportioned to one or more of the franchised commercial and multi-family residential, franchised single-family residential, self-haul, or mixed waste sectors. The tons allocated to each sector were divided by the total vehicle survey tons to calculate the portion of tons from each sector. These proportions were multiplied by a landfill facility's total solid waste disposal for 2021—which was acquired from RDRS—to determine the final tons disposed at a landfill in 2021 from each source sector. Note that the total landfill solid waste disposal for 2021 did not include disaster debris, as the field team did not sample disaster-related waste. The landfill disposal information was obtained from the facilities themselves, from county databases, or from information reported to CalRecycle through landfill or station reports as part of RDRS.

Estimating Composition of Entire Statewide Disposed Waste Stream

Waste composition estimates were calculated using a method that gave equal weighting or "importance" to each sample within a given stratum. Given the relatively small sample size of this study compared to the vast volume of waste generated annually in California, we have utilized the Monte Carlo method to generate a robust estimate for waste composition. Monte Carlo simulations represent a category of computational algorithms leveraging random sampling to estimate the behavior of intricate systems. By executing numerous iterations of the simulation, each with varied random inputs, Monte Carlo simulations generate a spectrum of potential outcomes. In employing this method,

waste composition estimates were derived using an approach that afforded equal weighting or "importance" to every sample within a specified stratum. Confidence intervals were computed based on the normality in the composition estimates, with normality being established through an extensive number of draws in the Monte Carlo process The results are then analyzed statistically to estimate the probabilities and potential outcomes of different scenarios. In the descriptions of calculation methods, the following variables are used frequently:

- *i* denotes an individual sample
- *j* denotes the material type
- c_j is the weight of the material type *j* in a sample
- *w* is the weight of an entire sample
- r_j is the composition estimate for material *j* (*r* stands for *ratio*)
- *n* denotes the number of samples in the particular group that is being analyzed at that step

ESTIMATING THE COMPOSITION

The following method was used to estimate the composition of waste belonging to the single-family residential, commercial and multi-family residential, self-hauled, and mixed waste sectors.

For a given stratum (that is, for the samples belonging to the same waste sector), the composition estimate denoted by r_j represents the ratio of the component's weight to the total weight of all the samples in the stratum. This estimate was derived by summing each component's weight across all of the selected samples belonging to a given stratum and dividing by the sum of the total weight of waste for all of the samples in that stratum, as shown in the following equation:

$$r_j = \frac{\sum_i c_{ij}}{\sum_i w_i} \qquad (1)$$

where:

- *c* = weight of particular component
- *w* = sum of all component weights
- *i* = 1 to *n*, where *n* = number of selected samples
- *j* = 1 to *m*, where *m* = number of components

For example, the following simplified scenario involves three samples. For the purposes of this example, only the weights of the component *carpet* are shown.

	Sample 1	Sample 2	Sample 3
Weight (*c*) of Carpet	5	3	4
Total Sample Weight (*w*)	80	70	90

$$r_{Carpet} = \sum \frac{5+3+4}{80+70+90} = 0.05$$

To find the composition estimate for the component *carpet*, the weights for that material are added for all selected samples and divided by the total sample weights of those samples. The resulting composition is 0.05, or 5 percent. In other words, 5 percent of the sampled material by weight is *carpet*. This finding is then projected onto the stratum being examined in this step of the analysis.

Precision levels at the 95 percent confidence level were calculated for a component's mean as follows:

$$r_j \pm \left(z\sqrt{\mathrm{Var}(r_j)}\right) \qquad (2)$$

where *z* = the value of the *z*-statistic (1.96) corresponding to a 95 percent confidence level.

Composition results for all waste sectors were combined, using a weighted averaging method, to estimate the composition of the entire statewide disposed waste stream. The relative tonnages associated with each sector served as the weighting factors. The calculation was performed as follows:

$$O_j = \left(p_1 * r_{j1}\right) + \left(p_2 * r_{j2}\right) + \left(p_3 * r_{j3}\right) + \ldots \qquad (3)$$

where:

- *p* = the proportion of tonnage contributed by the noted waste sector (the weighting factor)
- *r* = ratio of component weight to total waste weight in the noted waste sector (the composition percent for the given material component)
- *j* = 1 to *m*, where *m* = number of material components.

The following scenario illustrates the above equation. This example involves the component *carpet* in three waste sectors.

	Waste Sector 1	Waste Sector 2	Waste Sector 3
Ratio of Carpet (*r*)	0.05	0.10	0.15
Proportion of Tonnage (*p*)	0.50	0.25	0.25

$$O_{Carpet} = (0.50 * 0.05) + (0.25 * 0.10) + (0.25 * 0.15) = 0.0875$$

So, it is estimated that 0.0875 or 8.75% of the entire waste stream is composed of *carpet*.

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Appendix B: List and Definitions of Material Types

This table includes the list and definitions of material types used for this study that the Contractor used to sort materials into, along with providing examples of each material type

Running Total	Category Name and #	Material Type and Definition	Examples
	P1 (Paper)	**Corrugated Cardboard** means a paper laminate usually composed of three layers. The center wavy layer is sandwiched between the two outer layers. It can be uncoated or have a (glossy) coating on the inside or outside. This type does not include paperboard boxes such as cereal and tissue boxes. **Excludes** waxed cardboard.	• cardboard packaging and containers • shipping and moving boxes • computer packaging cartons • sheets and pieces used as dividers in boxes • boxes used for primary packaging of various consumer goods
2	P2 (Paper)	**Paper Grocery Bags** means bags (usually brown) made from Kraft paper generally designed to carry out groceries from stores and that can be clearly identified as coming from a grocery store.	• paper grocery bags
3	P3 (Paper)	**Other Paper Bags/Kraft Paper** means bags made from Kraft paper that are not clearly identified as grocery bags, and sheets of Kraft paper. The paper may be brown (unbleached) or white (bleached). The paper may also be single layer or multi-layer (multiwall).	• single-layer bags that are not grocery bags (e.g., department store bags, paper lunch bag) • multiwall bags that do not have a plastic layer incorporated into the bags (e.g., used for shipping bulk products like pet food, rice, flour, and sugar) • heavyweight sheets of Kraft packing paper

Running Total	Category Name and #	Material Type and Definition	Examples
4	P4 (Paper)	**Newspapers/Newspaper Inserts**: means paper used in newspapers and all items made from newsprint.	• newspapers • glossy inserts found in newspapers • free advertising guides • election guides • plain news packing paper • telephone books
5	P5 (Paper)	**White Office-type Paper and Mail** means white paper used in offices and mail. Does not include envelopes lined with plastic or bubble wrap.	• copy paper • computer printer paper • letter paper • bills/business forms • white envelopes with or without clear windows • white cardstock
6	P6 (Paper)	**Magazines and Catalogs** means multi-page bound items (glued or stapled) made of glossy coated paper. This paper is usually slick, smooth to the touch, and reflects light.	• glossy magazines • catalogs • brochures • pamphlets

Running Total	Category Name and #	Material Type and Definition	Examples
7	P7 (Paper)	**Folding Cartons and Other Paperboard Packaging** means paperboard boxes, other than corrugated, which fold and are primarily made of paper with few other materials (e.g., boxes with plastic windows are excluded) These cartons and packaging are typically used as the primary packaging for various products such as breakfast cereals, frozen foods, candy/cookies, jewelry, tobacco, pharmaceuticals and cosmetics. This also includes non-box paperboard such as paper tubes for toilet paper.	• paperboard boxes • tissue boxes • shoe boxes • paper-based tubes and cores (e.g., for toilet paper or paper towels)
8	P8 (Paper)	**Aseptic Containers** means bleached polycoated paperboard containers or paper containers with a foil liner of various sizes and shapes that contain shelf-stable food products. Containers may include a plastic pour spout as part of the container.	• containers for apple juice, soup, soy/rice milk.
9	P9 (Paper)	**Gable-top Cartons** means paper-based cartons with a triangular top used for refrigerated and non-refrigerated items. May include a plastic pour spout as part of the container.	• cartons used for milk, egg substitutes, and juice • gable-top containers used for snacks

Running Total	Category Name and #	Material Type and Definition	Examples
10	P10 (Paper)	**Paper/Fiber Food Service Ware** means items made mostly of paper that are used to consume, contain, or transport prepared food items intended for immediate consumption. Includes paper and molded fiber, including compostable and non-compostable items. May be contaminated with food and/or moisture. ***Excludes*** packaging and products from a food manufacturer.	• plates • bowls • cups • utensils • straws • stirrers • take-out containers • pizza boxes • bakery/bread bags • condiment cups
11	P11 (Paper)	**Other Recyclable Paper** means items made of paper that do not fit into any of the other paper types, but that are generally recyclable or not generally composted. Paper may be combined with minor amounts of other materials such as wax or glues.	• colored paper • manila folders • manila envelope • index cards • lined or colored notebook paper • carbonless forms • chipboard • self-adhesive notes • hardcover and paperback books • bagged shredded paper • greeting cards • paper clothing tags

Running Total	Category Name and #	Material Type and Definition	Examples
12	P12 (Paper)	**Remainder/Composite Paper** means items made mostly of paper but combined with large amounts of other materials. These are items that do not fit into any other categories and are not generally compostable or recyclable. ***Excludes*** packaging and food service ware.	• blueprints • sepia • carbon paper • photographs • sheets of paper stick-on labels • lined butcher paper • envelopes lined with plastic or bubble wrap
13	P13 (Paper)	**Other Paper/Fiber - Packaging** means items that are made mostly of paper or molded fiber that don't fit into any other material types and that are used for packaging. They may be combined with other materials or contaminated with food and/or moisture. ***Excludes*** food service ware, including clamshells, cups, bowls, plates, and trays.	• pulp paper egg carton • unused pulp plant pots • molded paper packaging (e.g., some berry trays) • food-soiled paper packaging • waxed corrugated cardboard bags and boxes with plastic component (e.g., window) • paper frozen juice cans with metal ends
14	P14 (Paper)	**Other Compostable Paper** means items that do not fit any other category, are made of paper, can be composted, and are generally not recycled. May be contaminated with food, moisture, or wax.	• waxed paper • napkins • facial tissues • paper towels
15	PL1 (Plastic)	**PETE Beverage Containers - CRV** means containers for beverages that are marked with PET (1) and have the CRV symbol.	• beverage containers for soda, juice, etc.

Running Total	Category Name and #	Material Type and Definition	Examples
16	PL2 (Plastic)	**PETE Bottles and Jars – Non-CRV** means screw top bottles without the CRV symbol and jars that are marked with PET (1).	• beverage containers for soda, juice, water • jars and containers for food • containers for household products (e.g., shampoo, cleaning products)
17	PL3 (Plastic)	**HDPE Beverage Containers - CRV** means containers for beverages that are marked with HDPE (2) and have the CRV symbol.	• beverage containers for soda, juice, etc.
18	PL4 (Plastic)	**HDPE Bottles and Jars - Non-CRV** means screw top bottles without the CRV symbol and jars that are marked HDPE (2).	• beverage containers for soda, juice, water • jars and containers for food • containers for household products (e.g., shampoo, cleaning products)
19	PL5 (Plastic)	**Expanded Polystyrene Packaging** means packaging items made of expanded polystyrene. Does not include non-packaging items such as insulation boards.	• egg cartons • foam ice chests • transport and other packaging
20	PL6 (Plastic)	**Plastic Trash Bags** means plastic bags sold for use as trash bags, for both residential and commercial use. This type does not include other plastic bags, like shopping bags, that might have been used to contain trash.	• garbage bags and can liners • compostable plastic bags • lawn and leaf bags
21	PL7 (Plastic)	**Plastic Grocery and Other Merchandise Bags** means plastic shopping bags used to contain merchandise to transport from the place of purchase, given out by the store with the purchase. Does not include produce bags.	• dry cleaning bags • grocery bags • merchandise bags

Running Total	Category Name and #	Material Type and Definition	Examples
22	PL8 (Plastic)	**Film Products- Non-Packaging** means plastic film used for purposes other than packaging, including agricultural use. ***Excludes*** personal protective equipment (PPE).	• agricultural film • wrap for hay bales • plastic sheeting (e.g., drop cloths) • building wrap • x-ray film • metallized film (e.g., balloons) • plastic food wrap • Tarps • Inflatable toys
23	PL9 (Plastic)	**Flexible Plastic Pouches** means plastic pouches made of thicker, multi-layer flexible material. Material is thicker than potato chip bags and frozen vegetable bags. May have a flat bottom so that package would stand up on its own, but not always. May have plastic screw tops.	• child resistant pouch bags • plastic coffee bags • juice pouches (e.g., Capri Sun) • baby food pouches • food pouches for soup, salad, wine, or backpacking meals • soap refill pouches
24	PL10 (Plastic)	**Non-Bag Commercial and Industrial Packaging Film** means film plastic used for large-scale packaging or transport packaging.	• shrink wrap • mattress bags • furniture wrap • film bubble wrap
25	PL11 (Plastic)	**Other Film Bags and Plastic Mailing Pouches** means all other plastic film, in bag form, that does not fit into any other type, excluding flexible plastic pouches. Includes single and multi-layered mailing pouches ***Excludes*** packaging and mailing pouches with a paper component.	• sandwich bags and zipper bags • newspaper bags • produce bags • single polymer mailing pouches • Plastic mailers with bubble wrap layer

Running Total	Category Name and #	Material Type and Definition	Examples
26	PL12 (Plastic)	**Rigid Plastic Food Service Ware** means items made partially or entirely of plastic that are used to consume, contain, or transport prepared food items. Includes all plastic types including compostable plastics and expanded polystyrene. Excludes packaging.	• plates • bowls • cups (and lids) • utensils • straws • stirrers • take-out containers (e.g., clamshells) • • condiment cups
27	PL13 (Plastic)	**Other Plastic Packaging** means jars, containers (including lids), and other packaging that are made of plastic, including film plastics. Only includes bottles and containers not included in any other category. Only includes film plastics not included in other categories. They may bear the triangular recycling symbol or may bear no recycling symbol. ***Excludes*** foodservice ware, including clamshells, takeout containers, cups, bowls, plates, and trays.	• frozen vegetable bags • bread bags • potato chip bags • candy wrappers • yogurt cups • ketchup bottles • small storage containers for fresh produce • household cleaning bottles • microwave food trays • vitamin bottles • cookie trays • single-use plant containers • thermoform packaging (e.g., berry containers)

Running Total	Category Name and #	Material Type and Definition	Examples
28	PL14 (Plastic)	**Durable Plastic Items** means plastic items that are made to last for more than one use. These items may bear the numbers 1 through 7 in the triangular recycling symbol.	• crates, totes, buckets, tubs • plastic garbage cans • flower pots larger than one gallon • lawn furniture • plastic toys and sporting goods • CDs and cases • Plastic housewares including durable plates, cups, utensils • Building materials such as house siding, housing for electronics, fan blades, plastic pipes, and fittings
29	PL15 (Plastic)	**Remainder/Composite Plastic** means plastic that cannot be put in any other type. This type includes items made mostly of plastic but combined with other materials.	• window blinds • insulating foam • imitation ceramics • handles and knobs • plastic lumber • EPS not used for packaging or food service ware • rigid bubble/foil packaging (e.g., blister pack) • some toys • some kitchenware • some auto parts
30	G1 (Glass)	**Clear Glass Bottles and Containers – CRV** means clear glass containers that display the CRV notification. Includes whole and broken bottles.	• soda bottles • fruit juice bottles • wine cooler bottles

Running Total	Category Name and #	Material Type and Definition	Examples
31	G2 (Glass)	**Clear Glass Bottles and Containers - Non-CRV** means clear glass containers that do not display the CRV notification. Includes whole and broken containers.	• wine bottles • food jars
32	G3 (Glass)	**Green Glass Bottles and Containers – CRV** means green-colored glass containers that display the CRV notification. Includes whole and broken bottles.	• soda bottles • beer bottles
33	G4 (Glass)	**Brown Glass Bottles and Containers – CRV** means brown-colored glass containers that display the CRV notification. Includes whole and broken bottles.	• beer bottles
34	G5 (Glass)	**Green and Brown Glass Bottles and Containers - Non-CRV** means brown-colored or green-colored glass containers that do not display the CRV notification. Includes whole and broken containers.	• wine bottles
35	G6 (Glass)	**Other Colored Glass Bottles and Containers** means other-colored glass containers, with or without the CRV notification. Includes whole and broken containers.	• blue soda and water bottles • wine bottles • liquor bottles

Running Total	Category Name and #	Material Type and Definition	Examples
36	G7 (Glass)	**Remainder/Composite Glass** means glass that cannot be put in any other type. It includes flat and curved glass and items made mostly of glass but combined with other materials. Includes whole or broken items.	• window panes • doors and table tops • automotive glass • safety glass • Pyrex and kitchen glass • crystal and glass tableware • drinking glasses • mirrors • non-fluorescent light bulbs • laminated glass
37	M1 (Metal)	**Tin/Steel Cans** means rigid containers made mainly of steel, both CRV and non-CRV containers. These items will stick to a magnet and may be tin coated. This subtype is used to store food, beverages, paint, and a variety of other household and consumer products.	• canned food and beverage containers • empty metal paint cans • empty spray paint cans and aerosol containers • bimetal containers with steel sides and aluminum ends
38	M2 (Metal)	**Aluminum Cans - CRV** means any food or beverage container that is made mainly of aluminum and that displays the CRV notification. This subtype does not include bimetal containers with steel sides and aluminum ends.	• soda or beer cans
39	M3 (Metal)	**Aluminum Cans - Non-CRV** means any food or beverage container that is made mainly of aluminum and that does not display the CRV notification.	• pet food cans • meat cans • wine cans

Running Total	Category Name and #	Material Type and Definition	Examples
40	M4 (Metal)	**Major Appliances** means discarded major appliances encased in metal, of any color. These items are often enamel-coated. This type does not include electronics, such as televisions and stereos.	• washing machines • clothes dryer • hot water heater • stove • refrigerator
41	M5 (Metal)	**Other Ferrous** means any iron or steel that is magnetic or any stainless-steel item. This type does not include tin/steel cans.	• structural steel beams • metal clothes hangers • metal pipes • stainless steel cookware • security bars • scrap ferrous items • reusable stainless steel water bottle
42	M6 (Metal)	**Other Non-Ferrous** means any metal item, other than aluminum cans, that is not stainless steel and that is not magnetic. These items may be made of aluminum, copper, brass, bronze, lead, zinc, or other metals.	• aluminum window frames • aluminum siding • copper wire • shell casings • brass pipes • aluminum foil • some cookware
43	M7 (Metal)	**Remainder/Composite Metal** means metal that cannot be put in any other type. This type includes items made mostly of metal but combined with other materials and items made of both ferrous metal and non-ferrous metals combined. Includes products whose weight is derived significantly from the metal portion of its construction.	• small non-electronic appliances (e.g., toasters, hair dryers) • used oil filters • motors • insulated wire

Running Total	Category Name and #	Material Type and Definition	Examples
44	E1 (Electronics)	**Covered Video Display Devices** means video display devices with a screen greater than four inches, measured diagonally. A video display device may use, but is not limited to, a cathode ray tube (CRT), liquid crystal display (LCD), gas plasma, digital light processing, or other image projection technology	• computers with displays or computer monitors • televisions • portable DVD players or gaming console with screen • tablet computers (e.g., iPad or Kindle) • cathode ray tubes
45	E2 (Electronics)	**Consumer Electronics and Small Equipment** means small IT and telecommunication equipment, and other small items that usually need electric currents or electromagnetic fields to operate.	• mobile phones • GPS • calculators • printers • computer without screen • sewing machines • microwaves • irons • toasters • electric knives • shavers • toys • some sport equipment • some hair care appliances
46	E3 (Electronics)	**Large Equipment** means large items that usually need electric currents or electromagnetic fields to operate.	• musical equipment • slot machines • large printing machines • large exercise equipment

Running Total	Category Name and #	Material Type and Definition	Examples
47	OR1 (Organics)	**Food - Potentially Donatable – Vegetative (Perishable/Fresh)** means uncooked or cooked fresh vegetables, fruits, and fungi that are in a whole state (i.e., not partially consumed) and are unmixed with non-vegetative food types. Items in their whole state are either in original, unopened packaging or unpackaged items from commercial sector that have clearly not been consumed (e.g., a whole apple or entire head of lettuce). Items that are ***excluded*** from this category include condiments, non-perishable packaged fruits, and vegetables such as: packaged dried fruits and vegetables, canned fruits and vegetables, and nuts. Any unpackaged vegetables, fruits, and fungi found in a whole state in residential loads are ***excluded*** from this category and should be sorted as "not donatable – non-meat". However, unpackaged vegetables fruits, and fungi found in a whole state in commercial loads are included in this category.	• unopened package of mushrooms • whole fruit or vegetable • unopened package of fruit salad or salad greens

Running Total	Category Name and #	Material Type and Definition	Examples
48	OR2 (Organics)	**Food - Potentially Donatable - Eggs, Dairy, and Dairy Alternatives** means egg or dairy products and dairy alternatives that are in a whole state, unmixed with other food types, and in the original unopened package. Items may be refrigerated or shelf stable.	• milk • cheese (dairy and non-dairy) • eggs (whole or sliced) • yogurts • soy/nut/rice/oat milks
49	OR3 (Organics)	**Food - Potentially Donatable – Meat** means any uncooked or cooked meat (beef, poultry, pork, lamb) or fish product that is in a whole state, is unmixed with other food types, and is in the original unopened package. This includes meat alternatives.	• whole or cooked meat or fish in unopened package • deli meat in unopened package • unopened jerky • unopened frozen meats (e.g., chicken nuggets) • canned meat and fish • meat alternatives
50	OR4 (Organics)	**Food - Potentially Donatable - Cooked/Baked/Prepared Perishable Items** means items that are in a whole state but could have multiple food types mixed together as a part of cooking or preparation and are still in their original unopened package.	• whole sandwich in original unopened package • whole tray of food (e.g., lasagna) that is untouched • whole frozen pizza in unopened package • whole loaves of bread • bag of tortillas • unopened perishable fresh fruit and vegetable juice

Running Total	Category Name and #	Material Type and Definition	Examples
51	OR5 (Organics)	**Food - Potentially Donatable - Packaged Non-perishable** means shelf-stable foods that are in a whole state and are in the original unopened package. Includes foods contained in aseptic or retort packages and other products that do not require refrigeration until after opening. Also includes non-perishable beverages such as sodas. **Excluded** from this category are shelf-stable meats, shelf-stable dairy products, and shelf-stable dairy alternatives.	• canned and bottled foods • rice • pasta • condiments • nuts and nut butters • flour, sugar, spices • oils • non-perishable beverages
52	OR6 (Organics)	**Food - Not Donatable – Meat** means any food that is predominantly meat or fish, but the product is not in a whole state (i.e., partially consumed), or the product's packaging has been opened, or the product was not contained in any packaging at all.	• partially consumed meat, meat alternatives, or fish • meat or fish in opened package • hamburger that is mostly meat by weight • meat and fish trimmings • deli meats

Running Total	Category Name and #	Material Type and Definition	Examples
53	OR7 (Organics)	**Food - Not Donatable – Non-meat** means any food that is not predominantly meat or fish, not in a whole state, or not in its original unopened package. Includes any non-meat partially consumed foods, any non-meat foods in a package that has been opened – *as best as can be determined*, any non-meat foods that are not in their original packaging. Item may contain small amounts of meat or fish. This category also includes fruit and vegetable peels, skins, trimmings, and or any parts of fruits and vegetables not included in the inedible category. In addition, this category also includes any indistinguishable food.	• partially consumed burrito or lasagna • fruit and vegetable peels (e.g., potato skins, carrot peels) • fruit and vegetable trimmings (e.g., cucumber ends, carrot tops, beet greens, broccoli and cauliflower stalks) • apple and pear cores • fruit or vegetables out of its original packaging and altered from its original form (e.g., individual lettuce loose lettuce leaves that have been removed from the head)

Running Total	Category Name and #	Material Type and Definition	Examples
54	OR8 (Organics)	**Food - Inedible** means items typically not consumed by people in the United States. Categories of inedible parts include bones, pits, shells, banana peels, coffee grounds and tea leaves, rinds, woody stems/tops and vines, and corn cobs/husks. *Note that small amounts of edible material associated with the inedible material are permitted to be included as "inedible."* ***Excludes*** other fruit and vegetable peels, skins, trimmings, cores, and ends not included in the previous categories (e.g., potato peels, carrot tops, apple cores, broccoli stalks, cucumber ends).	• pits (peach, avocado) • shells (eggs, nuts) • rinds (citrus, melon) • woody stems/tops and vines (pumpkin stem, pineapple top, tomato vine) • banana peels • corn cobs and husks • bones • coffee grounds • tea leaves
55	OR9 (Organics)	**Leaves and Grass** means plant material, except woody material, from any public or private landscape. This type does not include woody material or material from agricultural sources.	• leaves • grass clippings • plants • seaweed
56	OR10 (Organics)	**Prunings and Trimmings** means woody plant material up to 4 inches in diameter from any public or private landscape. This type does not include stumps, tree trunks, or material from agricultural sources.	• pruning from shrubs • branches with diameters of less than 4 inches

Running Total	Category Name and #	Material Type and Definition	Examples
57	OR11 (Organics)	**Branches and Stumps** means woody plant material, branches, and stumps that exceed 4 inches in diameter, from any public or private landscape.	• branches with diameters greater than 4 inches • stumps
58	OR12 (Organics)	**Manures** means manure and soiled bedding materials from large domestic, farm, or ranch animals. Does not include feces from small household pets such as dogs and cats.	• manure • soiled bedding from animal operations
59	OR13 (Organics)	**Clean Dimensional Lumber** means unpainted new or demolition dimensional lumber. May contain nails or other trace contaminants.	• 2 x 4s, 2 x 6s, 2 x 12s • residual materials from framing and related construction activities
60	OR14 (Organics)	**Clean Engineered Wood** means unpainted new or demolition scrap from sheeted goods. May contain nails or other trace contaminants.	• plywood • particle board • wafer board • oriented strand board • residual materials used for sheathing and related construction uses
61	OR15 (Organics)	**Clean Pallets and Crates** means unpainted wood pallets, crates, and packaging made of lumber/engineered wood. May contain nails or other trace contaminants.	• unpainted wood pallets • unpainted crates • packaging made of lumber/engineered wood

Running Total	Category Name and #	Material Type and Definition	Examples
62	OR16 (Organics)	**Treated/Painted/Stained Wood** means wood that has been treated with a chemical preservative for purposes of protecting the wood against attacks from insects, microorganisms, fungi, and other environmental conditions that can lead to decay of the wood; and wood that has had an external coating such as paint, varnish, or other finish applied.	• handrails • finished furniture • other wood and wood products with paint, varnish, or other finish applied
63	OR17 (Organics)	**Other Recyclable Wood** means recyclable wood not included in any other category. This may include scrap from production of prefabricated wood products that have not been treated with paint, stain, or other chemical finish. Wood material should not be contaminated with another material (e.g.. tar). May contain nails or other trace contaminants.	• Untreated scrap from production of pre-fabricated wood products (e.g. from cabinets or furniture) • untreated/unpainted fencing • recyclable demolition wood • untreated/unpainted wood roofing and siding
64	OR18 (Organics)	**Remainder/Composite Organic** means organic material that cannot be put in any other type.	• natural cork • hemp rope • hair • small wood products (e.g. popsicle sticks, toothpicks) • sawdust • agriculture crop residues • animal carcasses • straw baskets • non-textile leather

Running Total	Category Name and #	Material Type and Definition	Examples
65	InOth1 (Inerts & Other)	**Concrete** means a hard material made from sand, aggregate, gravel, cement mix, and water. This category includes concrete with a steel internal structure composed of reinforcing bars (re-bar) or metal mesh.	• pieces of building foundations • concrete paving • concrete/cinder blocks
66	InOth2 (Inerts & Other)	**Asphalt Roofing** means composite shingles and other roofing material made with asphalt.	• asphalt roofing • asphalt shingles and attached roofing tar and tar paper
67	InOth3 (Inerts & Other)	**Gypsum Board** means interior wall covering made of a sheet of gypsum sandwiched between paper layers. Includes used and unused broken or whole sheets. Includes painted gypsum board.	• gypsum board • sheet rock • drywall • plasterboard • gypboard • Gyproc • wallboard
68	InOth4 (Inerts & Other)	**Carpet** means flooring applications consisting of various natural or synthetic fibers bonded to some type of backing material. This type does not include carpet padding or woven rugs with no backing.	• carpet
69	InOth5 (Inerts & Other)	**Rock, Soil and Fines** means rock pieces of any size and soil, dirt, and other matter. This type also includes nonhazardous contaminated soil.	• rock • stones • sand • clay • soil and other fines

Running Total	Category Name and #	Material Type and Definition	Examples
70	InOth6 (Inerts & Other)	**Remainder/Composite Inerts and Other** means inerts and other material that cannot be put in any other type. This type may include items from different types combined, which would be very hard to separate. This type may also include demolition debris that is a mixture of items such as plate glass, wood, tiles, gypsum board, synthetic counter tops, fiber or composite acoustic ceiling tiles, and aluminum scrap.	• brick • ceramics • tiles • toilets • sinks • dried paint not attached to any materials • fiberglass • insulation • carpet padding • asphalt paving
71	HHW1 (Household Hazardous Waste)	**Paint** means containers with paint in them. This type does not include dried paint, empty paint cans, or empty aerosol containers.	• latex paint • oil-based paint • tubes of pigment • fine art paint
72	HHW2 (Household Hazardous Waste)	**Used Oil** means the same as defined in Health and Safety Code section 25250.1(a).	• spent lubricating oil (e.g. crankcase and transmission oil, gear oil, hydraulic oil)
73	HHW3 (Household Hazardous Waste)	**Lead-acid (automotive) batteries** means batteries consisting of lead-acid cells.	• auto batteries
74	HHW4 (Household Hazardous Waste)	**Other batteries** means any type of battery other than lead-acid (automotive) batteries. Examples include household batteries such as AA, AAA, D, button cell, 9 volt, and rechargeable batteries used for flashlights, small appliances, watches, and hearing aids.	• AA, AAA, D batteries • 9 volt batteries • rechargeable batteries • watch and hearing aid batteries

Running Total	Category Name and #	Material Type and Definition	Examples
75	HHW5 (Household Hazardous Waste)	**One-Pound or Less Propane Gas Cylinders** means small, compact, and portable propane gas cylinders used to power devices such as camping stoves, tailgating grills, heaters, and more. Generally, these cylinders are not refillable.	• one pound or less propane gas cylinder
76	HHW6 (Household Hazardous Waste)	**Pharmaceuticals** means both prescription and over-the-counter medications and supplements in all forms, including pills, liquid medications, creams, and ointments. Does not include containers for these items, except for tubes for creams and ointments and other containers that cannot be easily separated from the product they contain.	• pills • liquid medications • creams and ointments
77	HHW7 (Household Hazardous Waste)	**Remainder/Composite Household Hazardous** means household hazardous material that cannot be put in any other type. Examples include household hazardous waste that, if improperly put in the solid waste stream, may present handling problems or other hazards. Also includes vehicle and equipment fluids other than used oil.	• pesticides • caustic cleaners • sharps • fluorescent lamps • LED lamps • mercury-containing items such as thermostats or thermometers • vehicle and equipment fluids such as used oil
78	SW1 (Special Waste)	**Tires** means vehicle tires. Tires may be pneumatic or solid.	• automobile tires • lawn mower tires • bicycle tires • motorcycle tires

Running Total	Category Name and #	Material Type and Definition	Examples
79	SW2 (Special Waste)	**Mattresses and Foundations** means a resilient material or combination of materials that is enclosed by a ticking and is intended for or promoted for sleeping upon. Includes foundations, which means a ticking-covered structure used to support a mattress or sleep surface. The structure may include one or more of the following components: constructed frames, foam, box springs, or other materials. ***Excludes*** any unattached mattress pad or unattached mattress topper intended to be used with or on top of a mattress; sleeping bags and pillows; a car bed, crib, or bassinet mattress; juvenile products, including a carriage a product containing liquid- or gaseous-filled ticking, including a water bed or air mattress that does not contain upholstery material between the ticking and the mattress core; upholstered furniture that does not otherwise contain a detachable mattress or that is a fold out sofa bed or futon.	• mattresses • foundations used to support mattress
80	SW3 (Special Waste)	**Bulky Items** means large, hard-to-handle items that are not defined elsewhere in the material types list, including furniture and other large items.	• couches • furniture

Running Total	Category Name and #	Material Type and Definition	Examples
81	SW4 (Special Waste)	**Remainder/Composite Special Waste** means special waste that cannot be put in any other type. Includes treated medical waste (medical waste that has been processed in order to change its physical, chemical, or biological character or composition, or to remove or reduce its harmful properties or characteristics, as defined in Section 25123.5 of the Health and Safety Code). ***Excludes*** Personal Protective Equipment (PPE).	• ash • auto fluff • auto bodies • treated medical waste • untreated medical waste (e.g. tubes, oxygen masks) • asbestos-containing materials (e.g. certain pipes, insulation, and floor tiles) • artificial fireplace logs
82	MISC1 (Miscellaneous)	**Textiles – Cloth and Clothing** means cloth, clothing, sheets and towels, rope, and other textile items made of organic, synthetic, unknown, and mixed fibers. Textiles with zippers and buttons are included. ***Excludes*** Personal Protective Equipment (PPE).	• cloth and rags • clothing • towels • sheets • rope
83	MISC2 (Miscellaneous)	**Textiles - Shoes, Purses, Belts** means all shoes and boots, purses, and belts whether made of leather, rubber, other materials, or a combination thereof.	• shoes and sandals • purses • belts

Running Total	Category Name and #	Material Type and Definition	Examples
84	MISC3 (Miscellaneous)	**Personal Protective Equipment (PPE)** means material or equipment that is commonly used for the protection of eyes and face, hands, respiratory system, and other body parts from any sector/industry that is generally, but not always disposable or single-use. This excludes untreated and treated medical waste (tubing, pipettes, sharps, saline drip bags, oxygen masks).	• Face masks including dust masks, N-95 masks, cloth masks, half-mask respirators, full mask respirators • Face shields or safety glasses/goggles • Any PPE gloves (latex, nitrile, vinyl, or chemical resistant gloves) • Scrubs and disposable aprons • Ear plugs
85	MISC4(Miscellaneous)	**Solar Panels** means panels used to convert sunlight into electricity. Solar panels consist of a semiconductor material such as silicon, encased in glass, with an aluminum frame. This category is specific to the panels, themselves, and does not include associated equipment such as junction boxes, wires, inverters, cables, energy storage batteries, or a photovoltaic cell that is part of a consumer electronic device for which it provides electricity needed to make the device function.	• solar panels
86	MISC5 (Miscellaneous)	**Diapers & Sanitary Products** means single-use items that are made from a combination of natural and/or synthetic fibers.	• diapers • feminine hygiene products • absorbent pads

Running Total	Category Name and #	Material Type and Definition	Examples
87	MISC6 (Miscellaneous)	**Miscellaneous Inorganics** means inorganic items that cannot be put in any other type.	• kitchen ceramics • synthetic rubber products sports balls • dryer sheets • cosmetics • vacuum cleaner bag
88	MISC7 (Miscellaneous)	**Mixed Residue** means material (including 2-inch-minus materials) that cannot be put in any other type or category. This category includes mixed residue and materials smaller than two inches that cannot be further sorted.	• clumping kitty litter • feces from household pets • partially filled containers of non-food consumer products • dryer lint

Appendix C: Forms Used in the Study

Examples forms include:

- Vehicle Survey Form
- Vehicle Selection Form

Gate Survey Form (Front)

California Statewide Waste Characterization Study
Vehicle Survey Form

Date ___/___/___

Page ____ of ____

Survey Site ____________________

Surveyor ____________________

Minimum weight at this site __________

This sheet started at __________ am pm

Checked by ____________________

All Vehicles											*Sample Number*	*% Recycled*	*Surveyor's Notes*
ID	Hauler Type	Vehicle Type	Jurisdiction	Material Hauled	Generator				From Construction Site?	Net Weight of Load			
	C - Commercial Hauler M - Municipal Sanitation CN - Contractor R - Res./Home Owner J - Junk Removal Hauler O - Other private/ Government Entity	1. Packer 2. DB, Loose 3. DB, Cmpctd 4. Pick-up, Van, SUV, Bx Truck 5. Car 6. Semi Truck	Please list the city of origin that the waste came from	R - Refuse C&D - Construction and Demolition L - Landscaping	SF - Single-family Residential MF - Multifamily COM - Commercial MRF - MRF Residue				If no — No = Not from Const. If yes — N=new construction, R=remodel, D=demolition, RF=roofing, OC=other c&d	Circle units if they aren't all the same. Default units (circle one) tons lbs yds			If needed for net weights, record license/ticket #s here. Enter hauler name if space permits.
	Choose One	*Choose One*		*Circle only one*	*Must Equal 100%*				*Select One Only*				
					% SF	% MF	%COM	%MRF					
				R C&D L					No N R D RF OC	tons lbs yds			
				R C&D L					No N R D RF OC	tons lbs yds			
				R C&D L					No N R D RF OC	tons lbs yds			
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				R C&D L					No N R D RF OC	tons lbs yds			
				R C&D L					No N R D RF OC	tons lbs yds			

Gate Survey Form (Back)

GENERAL INSTRUCTIONS

Enter the information at the top of each page. Enter total # of pages on each page at the end of the day.
Enter the net weight of the load. If the operator measures self-haul loads by volume, record the volume and indicate that the unit is "yds".
If the load is from a construction site, circle only one of the activities in the From Construction Site? column.
If load is not from a construction site ask if it's Landscaping.
If it's a commercial hauler ask if load is MRF residuals.
If you make an error on an entry, draw a line through the entire entry and start over on a new line.

CHECK IN WITH GATEHOUSE STAFF

Confirm the method for getting net weights.

AS THE VEHICLE ARRIVES RECORD THE TYPE OF VEHICLE ON THE SURVEY SHEET

HAULER TYPE

C - Commercial Hauler	Haulers contracted by a City/County/Municipal gov't to haul from residents, businesses, and institutions. May be hauling MSW, C&D, or bulky waste.
M - Municipal Sanitation	City/County/Municipal gov't that hauls residential, business, and institutional waste. May be hauling MSW, C&D, or bulky waste. For example, the city of San Diego.
CN - Contractor	Private business, agencies, or institutions hauling waste they generate in the course of their operations. This includes garbage, C&D, bulky, or landscaping. Examples are Joe's Roofing and Goodwill hauling their own garbage.
R - Residential/Home Owners	Individuals and home owners hauling their own household trash and clean up. Can be bagged or loose trash, C&D, bulky, or yard waste. May be from multifamily but usually single family
J - Junk Removal	On call haulers of trash and bulky waste from residential or business locations. An example is "1-800 Got Junk."
O - Other Private/Govt. Entity	Other private/governmental hauler. Examples include the parks department, CalTrans, sewage treament departments, universities, prisons, etc.

VEHICLE TYPE

1. Packer	Packer trucks can be front load, side load, or rear load vehicles
2. DB, Loose	Roll-off loose debris boxes can be closed top or open top. The hauler picks this container up on a rail truck. The container is not a separate trailer.
3 DB, Compacted	Roll-off compacting debris box can be sealed or with small opening in back covered with soft cover. The hauler picks this container up on a rail truck. The container is not a separate traile
4. Pick-up, Van, SUV, Bx Truck, Dump beds	Can be a pick-up, pick-up with trailer, SUV (sport utility vehicle), box truck (i.e. U-Haul), or flat bed truck (truck with no sides or stake sides), passenger or cargo van, or vehicles with hydraulic dump beds.
5. Car	Passenger car
6. Semi-Truck	A 2 or 3 axle tractor pulling a 1 to 3 axle trailer. The trailer can be open or closed top. The trailer can be separated from the tractor.

MATERIAL TYPE

R - Refuse	Garbage from single-family, multi-family, or businesses.
C&D - Construction and Demolition	Waste generated by the activities of construction or demolition
L - Landscaping	Material such as green waste, rock, soil, or other activities generated by landscapers.

GENERATOR TYPE

SF - Single-family Residential	Household garbage, yard waste, or C&D generated at single-family parcels
MF - Multifamily Residential	Household garbage, yard waste, or C&D generated at multifamily parcels
COM - Commercial	Waste generated at industrial, commercial, or institutional parcels
MRF - MRF Residue	Residue generated by sorting recyclables at a Material Recovery Facility

FROM A CONSTRUCTION SITE

No = Not from Const. Site	Circle "No" if the load is not from a Construction and Demolition site.
N=new construction	Circle "N' if the load is from a new construction site.
R=remodel	Circle "R" is load has been generated by renovation activities
D=demolition	Circle "D" if the load has been generated by demolitions activities
RF=roofing	Circle "RF" if load has been generated by roofing activities.
OC=other c&d	Circle "OC" if load has been generated by any other const. or demolition activity

Vehicle Selection Form

California Statewide Waste Characterization Study
Vehicle Selection Form

Date ____/____/____ **This sheet started at** _____ **am pm**

Survey Site _____ **Page** _____ **of** _____

Minimum weight at this site _____ **Surveyor** _____

RESIDENTIAL:	**NEED**	**3 TOTAL**
(1) 2 (3) 4 (5) 6 7 (expect 7)		
COMMERCIAL:	**NEED**	**3 TOTAL**
1 2 (3) 4 (5) 6 (7) (expect 7)		
SELF-HAUL:	**NEED**	**3 TOTAL**
1 2 (3) 4 5 6 7 8 (9) 10 11 12 13 14 (15) 16 (expect 16)		

Appendix D: Special Considerations

- *Solar Panels* were not observed in any samples in this study. This does not mean that *solar panels* are not in the waste stream.
- Two recruited multi-family sites (2 of 50) did not yield enough material to meet the 200-pound sample requirement. Multiple samples were collected from other sites to obtain 50 multi-family samples.
- Mixed waste composition are not included in the statewide results because it is difficult to determine an accurate source sector composition for each sample after the waste has been commingled.
- The ambient humidity at the centralized location for the moisture analysis fluctuated throughout the study and may have impacted the results.
- Multi-day vehicle surveys were not conducted during this study and the Department relied on self-reported source sector data from RDRS. This has a direct impact of the estimated tonnage attributed to each source sector.
- While the field team's goal was to sample every 'nth vehicle', sometimes the vehicle estimates provided by facility operator did not match actual field conditions the day of sampling. Occasionally, the team had to sample every vehicle incoming into the facility until the quota was met.
- In Table 21, 505 samples were allotted, this does not include the 50 franchised multi-family residential samples that were characterized throughout the study. 556 samples were ultimately characterized because the Contractor collected one additional franchised commercial and multi-family residential sample.

Appendix E: Glossary of Terms

- eDRS: electronic Disposal Reporting System (retired in 2019)
- HHW: Household Hazardous Waste
- Mixed Waste: waste that has been commingled with either various or unknown source sectors at an intermediate facility (e.g., transfer station) and sent to a disposal facility destined for disposal
- Multi-family unit: a residential dwelling with four or more units
- Operator: entity that operates a primarily unprocessed waste facility
- Primarily Unprocessed Waste Facility: a disposal facility that does not primarily process material for recovery or diversion (e.g., landfill)
- RDRS: Recycling and Disposal Reporting System
- Self-Hauler: individuals, businesses, or government agencies that haul their own garbage, including all waste delivered by anyone other than a contracted, franchised, or municipal hauler. This also includes all construction and demolition related waste
- Sorter: a contractor who sorts waste into specific material types
- Source Sector: source of waste generation

Bibliography

1. Short-lived climate pollutants: methane emissions: dairy and livestock: organic waste: landfills, Cal. S. B. 1383 (2015-2016), Chapter 395 (Cal. Stat 2016).
2. Solid waste: food service packaging: state agencies, facilities, and property. Cal. S. B. 1335 (2017-2018), Chapter 610 (Cal Stat. 2018).