

# Overview of Results of CIWMB 2005 Targeted Waste Characterization Studies

Plastics Interested Parties Meeting  
June 2, 2006

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# What is Waste Characterization?

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Collect data on types and amounts of materials in the waste stream – how much paper, food, plastic, glass, metal, etc.

## How to do a Waste Characterization Study

- Take samples from garbage trucks or dumpsters
  - Sort materials
  - Record weights
  - Compile data
  - For diversion data – conduct audits/interviews
-



Waste Management  
of Alameda County  
510-613-8710

ONEPASS COLLECTION







AMERICA

NEW

Whisper  
Paper Towels



Worker 1: Blue hard hat, orange high-visibility vest, black t-shirt, dark pants, and black gloves.

Worker 2: Blue hard hat, orange high-visibility vest, white t-shirt, khaki pants, and knee pads.

Worker 3: Blue hard hat, orange high-visibility vest, white t-shirt, khaki pants, and knee pads.

CALIFORNIA TABLE WINES

Surveying instrument on a tripod.

Abandoned couch with a patterned seat cushion.

Abandoned table with a cardboard box on top.

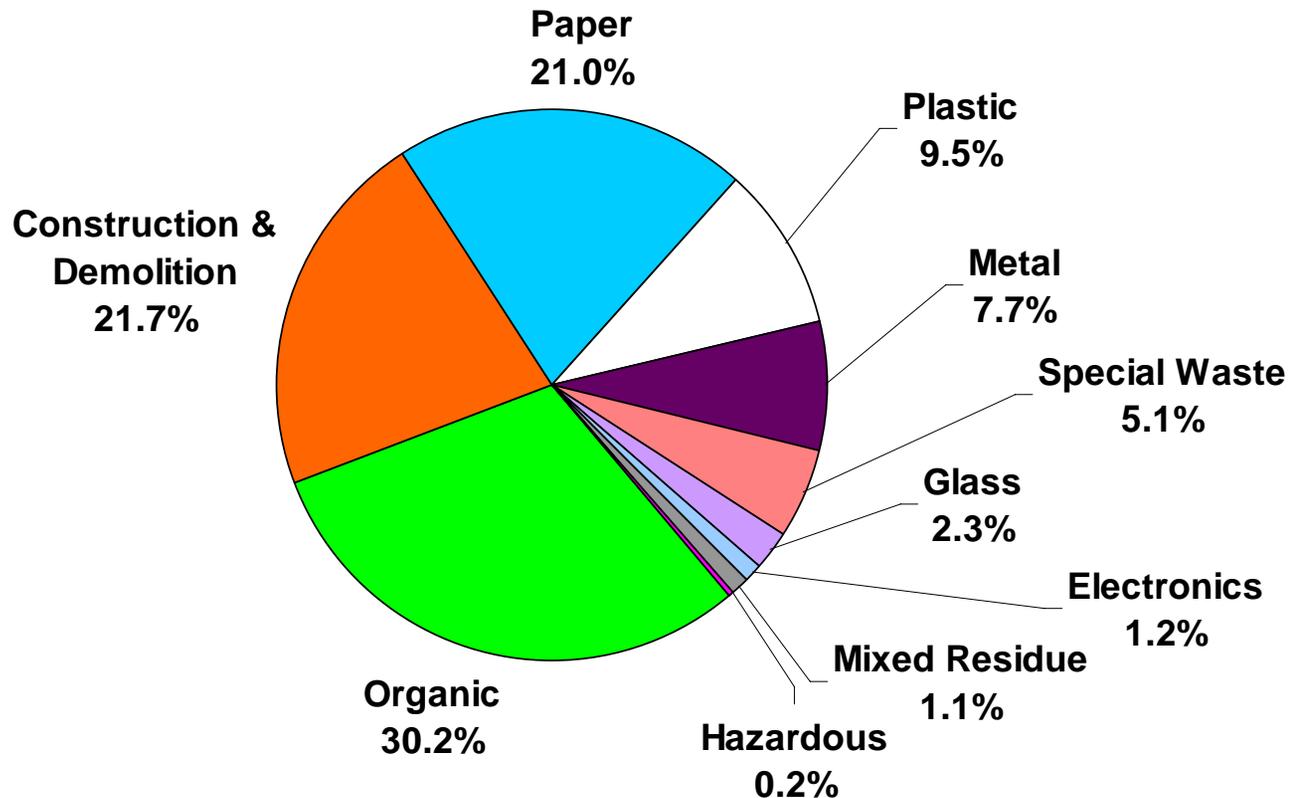
Stacked grey and black plastic storage bins.

# California Overall Disposed Waste Stream Composition, 2003

	<b>Est. Pct.</b>	<b>+/-</b>	<b>Est. Tons</b>		<b>Est. Pct.</b>	<b>+/-</b>	<b>Est. Tons</b>
<b>Paper</b>	<b>21.0%</b>		<b>8,445,989</b>	<b>Organic</b>	<b>30.2%</b>		<b>12,166,452</b>
Uncoated Corrugated Cardboard	5.7%	1.2%	2,312,147	Food	14.6%	2.6%	5,854,352
Paper Bags	1.0%	0.5%	386,097	Leaves and Grass	4.2%	1.0%	1,696,022
Newspaper	2.2%	0.4%	887,091	Prunings and Trimmings	2.3%	0.6%	920,356
White Ledger	1.1%	0.3%	447,516	Branches and Stumps	0.3%	0.2%	119,754
Colored Ledger	0.1%	0.0%	20,583	Agricultural Crop Residues	0.0%	0.0%	0
Computer Paper	0.1%	0.0%	20,845	Manures	0.1%	0.0%	36,506
Other Office Paper	0.7%	0.2%	296,203	Textiles	2.4%	1.3%	947,789
Magazines and Catalogs	0.8%	0.2%	311,143	Carpet	2.1%	0.7%	838,869
Phone Books and Directories	0.2%	0.1%	89,403	Remainder/Composite Organics	4.4%	0.8%	1,752,803
Other Miscellaneous Paper	3.5%	0.6%	1,400,526				
Remainder/Composite Paper	5.7%	0.7%	2,274,433	<b>Construction &amp; Demolition</b>	<b>21.7%</b>		<b>8,732,074</b>
				Concrete	2.4%	0.9%	966,607
<b>Glass</b>	<b>2.3%</b>		<b>934,926</b>	Asphalt Paving	0.0%	0.0%	10,414
Clear Glass Bottles and Containers	0.9%	0.1%	356,467	Asphalt Roofing	1.9%	1.0%	767,981
Green Glass Bottles and Containers	0.4%	0.1%	180,570	Lumber	9.6%	1.4%	3,881,214
Brown Glass Bottles and Containers	0.3%	0.0%	104,568	Gypsum Board	1.7%	0.8%	676,430
Other Colored Glass Bottles and Containers	0.0%	0.0%	3,106	Rock, Soil, and Fines	2.4%	1.0%	977,419
Flat Glass	0.4%	0.4%	151,344	Remainder/Composite Construction and Demolition	3.6%	0.8%	1,452,009
Remainder/Composite Glass	0.3%	0.1%	138,870				
				<b>Household Hazardous Waste</b>	<b>0.2%</b>		<b>73,599</b>
<b>Metal</b>	<b>7.7%</b>		<b>3,115,357</b>	Paint	0.0%	0.0%	19,203
Tin/Steel Cans	0.8%	0.2%	323,540	Vehicle and Equipment Fluids	0.0%	0.0%	1,000
Major Appliances	1.5%	2.1%	616,663	Used Oil	0.0%	0.0%	548
Used Oil Filters	0.0%	0.0%	1,376	Batteries	0.1%	0.0%	34,021
Other Ferrous	2.4%	0.5%	969,676	Remainder/Composite Household Hazardous	0.0%	0.0%	18,827
Aluminum Cans	0.2%	0.0%	74,851				
Other Non-Ferrous	0.3%	0.1%	111,008	<b>Special Waste</b>	<b>5.1%</b>		<b>2,038,431</b>
Remainder/Composite Metal	2.5%	0.6%	1,018,242	Ash	0.1%	0.1%	60,160
				Sewage Solids	0.0%	0.0%	0
<b>Electronics</b>	<b>1.2%</b>		<b>481,353</b>	Industrial Sludge	0.0%	0.0%	0
Brown Goods	0.1%	0.0%	41,394	Treated Medical Waste	0.0%	0.0%	15,367
Computer-related Electronics	0.3%	0.2%	119,917	Bulky Items	3.4%	1.2%	1,348,224
Other Small Consumer Electronics	0.2%	0.1%	93,273	Tires	0.3%	0.2%	126,633
Television and Other Items with CRTs	0.6%	0.5%	226,769	Remainder/Composite Special Waste	1.2%	1.6%	488,047
<b>Plastic</b>	<b>9.5%</b>		<b>3,809,699</b>	<b>Mixed Residue</b>	<b>1.1%</b>	0.3%	<b>437,448</b>
PETE Containers	0.5%	0.1%	216,134				
HDPE Containers	0.5%	0.1%	189,549	<b>Totals</b>	<b>100.0%</b>		<b>40,235,328</b>
Miscellaneous Plastic Containers	0.5%	0.1%	206,470	<b>Sample count:</b>	<b>550</b>		
Plastic Trash Bags	1.0%	0.2%	390,460				
Plastic Grocery and Other Merchandise Bags	0.4%	0.0%	147,038				
Non-Bag Commercial and Industrial Packaging Film	0.7%	0.3%	290,331				
Film Products	0.2%	0.2%	93,073				
Other Film	2.1%	0.6%	826,757				
Durable Plastic Items	1.4%	0.2%	561,543				
Remainder/Composite Plastic	2.2%	0.3%	888,343				

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

# California Overall Disposed Waste Stream Composition, 2003

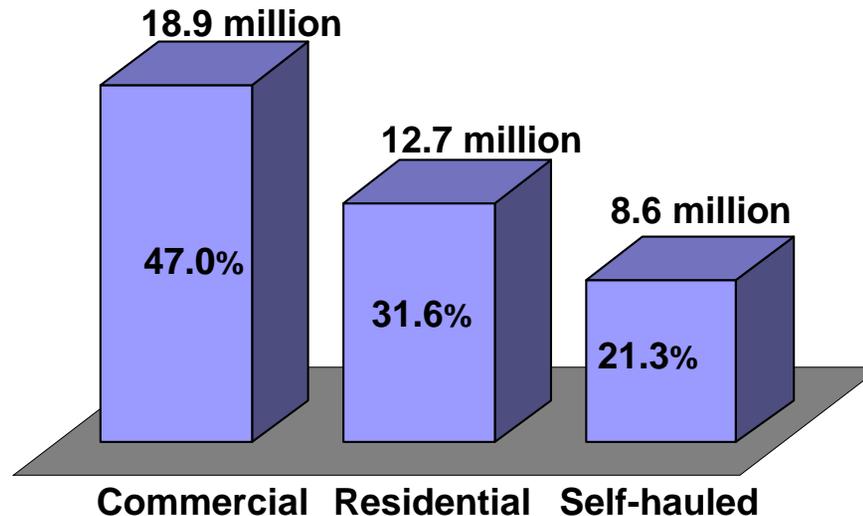


The largest fraction of disposed waste consists of *organic* materials (30.2%), followed by *construction & demolition* materials (21.7%) *paper* (21.0%), and *plastic* (9.5%).

# Waste Quantities, 2003

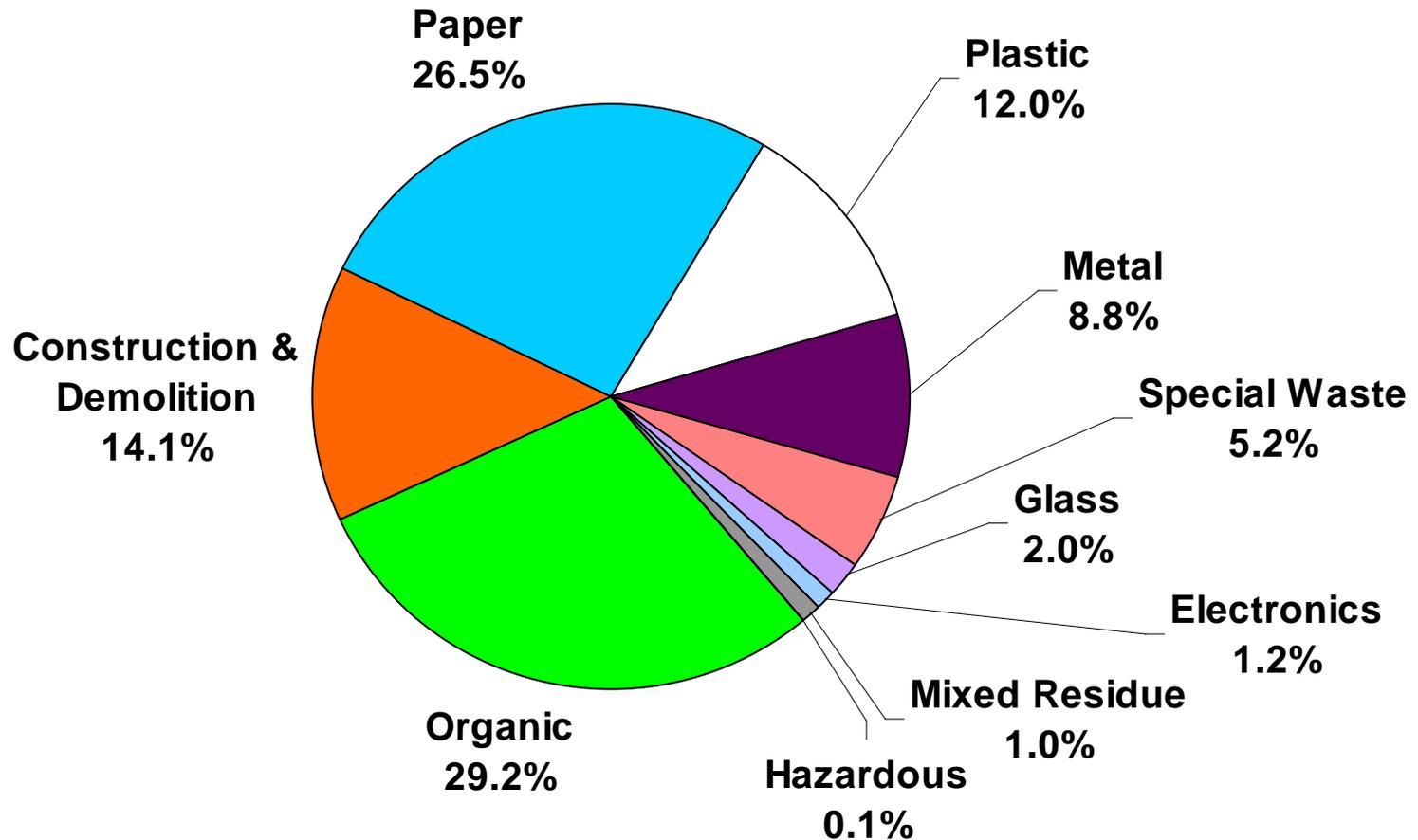
40.2 million tons were disposed

Tons Disposed in 2003



Disposal Reporting System provided total waste quantity data, and waste characterization study provided sector breakdown data.

# Overview of Commercial Disposed Waste, 2003



# 2005 Studies

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## **Four Targeted Studies**

1. Waste Disposal and Diversion Findings for Selected Industry Groups
  2. Characterization and Quantification of Residuals from Material Recovery Facilities (MRF)
  3. Detailed Characterization of Construction & Demolition Waste
  4. Detailed Characterization of Self-haul and Drop-box Waste
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# Overall Design

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All four studies:

- ❑ Focused on major metropolitan areas
  - ❑ Data collected for 2 seasons, winter and summer
  - ❑ Field work conducted in 2005, data analysis complete and study reports in review
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# Part 1: Waste Disposal and Diversion Findings for Selected Industry Groups

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- ❑ Targeted most important generators only – large disposal quantities, high potential for diversion
  - ❑ Collected disposal composition and diversion data
  - ❑ Designed some new generator groups – malls, office buildings
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# Example Composition Data

**Table 5: Food Stores: Waste Disposal, Diversion, and Total Generation Composition, 2005**

Material	Disposed Waste Est.		Diverted Waste Est. Percent	Total Generated Waste Est. Percent
	Percent	+ / -		
<b>Paper</b>	<b>18.5%</b>		<b>78.5%</b>	<b>61.3%</b>
Uncoated Corrugated Cardboard	3.9%	1.0%	78.5%	57.1%
Paper Bags/Kraft	0.5%	0.4%	0.0%	0.1%
Newspaper	1.1%	0.7%	0.0%	0.3%
White Ledger	0.2%	0.2%	0.0%	0.1%
Other Office Paper & Colored Ledger Paper	0.2%		0.0%	0.1%
<i>Colored Ledger</i>	0.0%	0.0%		
<i>Other Office Paper</i>	0.2%	0.1%		
Computer Paper	0.3%	0.5%	0.0%	0.1%
Magazines & Catalogs	0.2%	0.1%	0.0%	0.1%
Phone Books & Directories	0.1%	0.1%	0.0%	0.0%
Other Miscellaneous Paper	1.5%	0.4%	0.0%	0.4%
Remainder/Composite Paper	10.6%	3.5%	0.0%	3.0%
<b>Glass</b>	<b>0.5%</b>		<b>0.0%</b>	<b>0.2%</b>
Glass Bottles & Containers (colors not specified)	0.5%		0.0%	0.2%
<i>Clear Glass Bottles &amp; Containers</i>	0.4%	0.2%		
<i>Green Glass Bottles &amp; Containers</i>	0.1%	0.0%		
<i>Brown Glass Bottles &amp; Containers</i>	0.1%	0.1%		
<i>Other Colored Glass Bottles &amp; Containers</i>	0.0%	0.0%		
Flat Glass	0.0%	0.0%	0.0%	0.0%
Remainder/Composite Glass	0.0%	0.0%	0.0%	0.0%
<b>Metal</b>	<b>1.4%</b>		<b>0.0%</b>	<b>0.4%</b>
Tin/Steel Cans	0.3%	0.2%	0.0%	0.1%
Major Appliances	0.0%	0.0%	0.0%	0.0%
Used Oil Filters	0.0%	0.0%	0.0%	0.0%
Other Ferrous	0.8%	0.7%	0.0%	0.2%

# Plastics Disposed by Business Groups

## CIWMB 2005 Study

Percent by Weight of Group's Total Waste Stream

Business Group	Total Plastic	PETE, HDPE Containers	#3-7 Containers	Plastic Film	Durable Plastic Items	Remainder/ Composite Plastic
Anchor Stores at Shopping Malls	28.8%	0.7%	0.3%	10.4%	2.1%	15.3%
Other Parts of Shopping Malls	19.6%	1.1%	0.5%	11.3%	1.2%	5.4%
Non-Durable Goods Wholesale Distributors	16.0%	1.1%	0.3%	7.3%	1.2%	6.2%
Retail, Big Box Stores	16.0%	0.6%	0.7%	6.9%	2.6%	5.3%
Public Venues & Events	14.8%	2.4%	1.6%	6.1%	1.1%	3.5%
Retail, Other Stores	14.4%	1.2%	0.1%	6.0%	3.6%	3.5%
Large Office Buildings	12.5%	1.4%	1.3%	5.0%	0.4%	4.5%
Fast-Food Restaurants	11.6%	1.4%	0.5%	5.9%	0.9%	3.0%
Durable Goods Wholesale Distributors	9.9%	0.7%	0.1%	5.5%	1.1%	2.5%
Large Hotels	9.7%	1.6%	0.5%	3.7%	1.0%	2.8%
Food Stores	9.5%	0.7%	0.3%	5.7%	0.8%	2.1%
Full-Service Restaurants	7.3%	0.9%	0.3%	4.6%	0.6%	0.9%
Building Material & Garden, Big Box Stores	7.1%	0.3%	0.0%	2.8%	1.1%	2.9%
Building Material & Garden, Other Stores	7.1%	0.2%	0.3%	2.1%	0.7%	3.8%

# Disposal, Diversion, and Generation Rates

Industry Group	Disposal (pounds per employee)	Diversion (pounds per employee)	Waste Generation (pounds per employee)
Food Stores	4,754	11,825	16,578
Retail, Big Box Stores	2,866	4,932	7,798
Non-Durable Wholesale Distributors	2,861	4,070	6,931
Retail, Other Stores	1,719	1,995	3,714
Durable Wholesale Distributors	2,460	2,259	4,719
Anchor Stores at Shopping Malls ( <i>pounds per 1,000 sq ft</i> )	2,103	1,418	3,520
Fast-Food Restaurants	4,262	2,267	6,528
Full-Service Restaurants	4,403	2,034	6,437
Building Material & Gardening, Big Box Stores	6,343	2,689	9,031
Public Venues & Events ( <i>pounds per 100 visitors</i> )	172	72	244
Building Material & Gardening, Other Stores	3,481	1,118	4,599
Large Hotels	3,903	1,145	5,049
Shopping Malls ( <i>pounds per 1,000 sq ft</i> )	2,028	471	2,499
Large Office Buildings ( <i>pounds per 1,000 sq ft</i> )	1,866	132	1,998

# Plastics Disposed by Business Groups

(various bases)

<b>Business Group</b>	<b>Units</b>	<b>Total Plastic</b>	<b>PETE, HDPE Containers</b>	<b>#3-7 Containers</b>	<b>Plastic Film</b>	<b>Durable Plastic Items</b>	<b>Remainder/ Composite Plastic</b>
Anchor Stores at Shopping Malls	lb per 1000 sq ft	606	15	6	219	44	322
Other Parts of Shopping Malls	lb per 1000 sq ft	397	22	10	229	24	110
Non-Durable Goods Wholesale Distributors	lb per employee	458	31	9	209	34	177
Retail, Big Box Stores	lb per employee	459	17	20	198	75	152
Public Venues & Events	lb per 100 visitors	25	4	3	10	2	6
Retail, Other Stores	lb per employee	248	21	2	103	62	60
Large Office Buildings	lb per 1000 sq ft	233	26	24	93	7	84
Fast-Food Restaurants	lb per employee	494	60	21	251	38	128
Durable Goods Wholesale Distributors	lb per employee	244	17	2	135	27	62
Large Hotels	lb per employee	379	62	20	144	39	109
Food Stores	lb per employee	452	33	14	271	38	100
Full-Service Restaurants	lb per employee	321	40	13	203	26	40
Building Material & Garden, Big Box Stores	lb per employee	450	19	0	178	70	184
Building Material & Garden, Other Stores	lb per employee	247	7	10	73	24	132

# Plastics Definitions (some)

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- **Durable Plastic Items** means all other plastic objects other than containers, or film plastic. Examples include mop buckets, plastic outdoor furniture, plastic toys, large paint/food buckets, CD's, plastic stay straps, sporting goods, and plastic house wares such as dishes, cups, and cutlery. This type also includes building materials such as house siding, window sashes and frames, housings for electronics (such as computers, televisions and stereos), fan blades, impact-resistance cases (e.g. tool boxes, first aid boxes, tackle boxes, sewing kits, etc.), and plastic pipes and fittings.
- **Remainder/Composite Plastic** means plastic that cannot be put in any other type. They are usually recognized by their optical opacity. This type includes items made mostly of plastic but combined with other materials. Examples include auto parts made of plastic attached to metal, plastic drinking straws, foam drinking cups, produce trays, foam meat and pastry trays, foam packing blocks, packing peanuts, foam plates and bowls, plastic strapping, plastic lids, some kitchen ware, toys, new plastic laminate (e.g., Formica), vinyl, linoleum, plastic lumber, insulating foams, imitation ceramics, handles and knobs, plastic string (such as is used for hay bales), and plastic rigid bubble/foil packaging (as for medications).

# Plastics Definitions for Detailed Film Types

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- ❑ **Plastic Trash Bags** means plastic bags sold for use as trash bags, for both residential and commercial use. Does not include other plastic bags like shopping bags that might have been used to contain trash.
- ❑ **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. Includes dry-cleaning plastic bags intended for 1-time use.
- ❑ **Non-Bag Commercial And Industrial Packaging Film** means film plastic used for large-scale packaging or transport packaging. Examples include shrink-wrap, mattress bags, furniture wrap, and film bubble wrap.
- ❑ **Film Products** means plastic film used for purposes other than packaging. Examples include agricultural film (films used in various farming and growing applications, such as silage greenhouse films, mulch films, and wrap for hay bales), plastic sheeting used as drop cloths, and building wrap.
- ❑ **Other Film** means all other plastic film that does not fit into any other type. Examples include other types of plastic bags (sandwich bags, zipper-recloseable bags, newspaper bags, produce bags, frozen vegetable bags, bread bags), food wrappers such as candy-bar wrappers, mailing pouches, bank bags, X-ray film, metallized film (wine containers and balloons), and plastic food wrap.



# Film Plastic Details for Non-Durable Goods Wholesale Distributors

Business Group	Total Plastic	PETE, HDPE Containers	#3-7 Containers	Plastic Film	Durable Plastic Items	Remainder/ Composite Plastic
Non-Durable Goods Wholesale Distributors	16.0%	1.1%	0.3%	7.3%	1.2%	6.2%

Details for Plastid Film	% of Total Waste Stream	lb/emp/yr
TOTAL Plastic Film	7.3%	210
Plastic Trash Bags	0.9%	27
Plastic Grocery & Other Merchandise Bags	0.1%	2
Non-Bag Comm. & Indust. Packg Film	3.1%	90
Film Products	0.2%	5
Other Film	3.0%	87

# Part 2: Characterization and Quantification of Residuals from Material Recovery Facilities (MRF)

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- Data for 4 MRF types:
    - MRFs processing single-stream material
    - MRFs processing multi-stream material
    - MRFs processing mixed solid waste
    - MRFs processing C&D material
  - Detailed composition profile for each MRF type as well as overall residuals stream
  - Estimated tonnage produced by each MRF type statewide
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# Details for Plastics Disposed in MRF Residuals, 2005

	Est. Pct.	+/-	Est. Tons
<b>Total Plastic</b>	<b>17.2%</b>	<b>0.6%</b>	<b>1,266,737</b>
PETE Bottles	0.7%	0.0%	48,654
Other PETE Containers	0.2%	0.0%	13,019
HDPE Natural Bottles	0.3%	0.0%	21,449
HDPE Colored Bottles	0.3%	0.0%	18,907
HDPE 5-gallon buckets (Food)	0.1%	0.0%	5,067
HDPE 5-gallon buckets (Non-Food)	0.3%	0.1%	23,020
Other HDPE Containers	0.1%	0.0%	8,466
#3-#7 Bottles	0.1%	0.0%	7,417
Other #3-#7 Containers	0.8%	0.1%	61,357
Plastic Trash Bags	1.2%	0.1%	91,290
Grocery/Merch. Bags	1.2%	0.2%	85,791
Non-bag Comm./Ind. Packaging Film	1.6%	0.3%	121,026
Film Products	0.2%	0.1%	12,961
Other Film	3.6%	0.2%	264,564
Durable Plastic Items	1.4%	0.2%	102,113
Remainder/Composite Plastic	5.2%	0.3%	381,635

# Part 3: Detailed Characterization of Construction & Demolition Waste

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- Characterize sources of C&D waste
    - residential and non-residential sources
    - new construction, remodeling, roofing, other
  - Estimate amounts disposed from each source in 4 urban areas
  - Develop visual characterization method for CIWMB and local government use
  - **Plastics – less than 1% of waste stream**
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## Part 4: Detailed Characterization of Self-haul and Drop-box Waste

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- Other commercial (non-C&D) self-haul
  - Drop box containers provided by haulers (non-C&D)
  - Characterization of materials
  - Estimate amounts disposed from each source in 4 urban areas
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# Details for Plastics, Overall Self-Haul Waste Stream, 2005

Material	Est. Percent	+ / -	Est. Tons
<b>TOTAL PLASTIC</b>	4.1%		<b>56,594</b>
PETE Bottles	0.0%	0.0%	56
Other PETE	0.0%	0.0%	3
HDPE Natural Bottles	0.0%	0.0%	21
HDPE Colored Bottles	0.0%	0.0%	61
HDPE 5-gallon buckets (food)	0.1%	0.1%	931
HDPE 5-gallon (Non-food)	0.0%	0.0%	409
Other HDPE	0.2%	0.2%	2,822
#3-#7 Bottles	0.1%	0.2%	1,790
Other #3-#7	0.3%	0.4%	3,549
Plastic Trash Bags	0.1%	0.1%	886
Grocery/Merch. Bags	0.1%	0.2%	1,691
Non-Bag Comm./Ind. Packaging Film	0.4%	0.3%	5,300
Film Products	0.0%	0.0%	113
Other Film	0.0%	0.0%	307
Durable Plastic Items	1.7%	0.9%	23,686
Remainder/Composite Plastic	1.1%	0.7%	14,968

# Details for Plastics, Overall Drop Box Waste Stream, 2005

<b>Material</b>	<b>Est. Percent</b>	<b>+ / -</b>	<b>Est. Tons</b>
<b>Plastic</b>	9.7%		<b>160,365</b>
PETE Bottles	0.0%	0.0%	463
Other PETE	0.0%	0.0%	4
HDPE Natural Bottles	0.0%	0.0%	326
HDPE Colored Bottles	0.0%	0.0%	292
HDPE 5-gallon buckets (food)	0.1%	0.1%	1,209
HDPE 5-gallon (Non-food)	0.1%	0.1%	1,396
Other HDPE	0.1%	0.1%	1,080
#3-#7 Bottles	0.0%	0.1%	674
Other #3-#7	0.1%	0.1%	1,779
Plastic Trash Bags	0.1%	0.1%	1,772
Grocery/Merch. Bags	0.0%	0.0%	140
Non-Bag Comm./Ind. Packaging Film	0.5%	0.4%	8,029
Film Products	2.8%	2.3%	46,126
Other Film	0.5%	0.7%	8,690
Durable Plastic Items	3.7%	2.2%	60,614
Remainder/Composite Plastic	1.7%	0.9%	27,772

# Status of 2005 Studies

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- Final reports are now under review
  - Available June 2006
  - Agenda Item 13 at June 13<sup>th</sup> Board Meeting
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# Questions?

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