2013 Paper and Plastic Bag Litter Study

A Baseline Survey of Paper and Plastic Bag Litter at
180 Sites in
Oakland, CA; San Francisco, CA; and Washington, D.C.

Conducted by

Environmental Resources Planning, LLC

Final Report

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ER PLANNING

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Executive Summary

As shown in the statistically based studies outlined in this report, plastic retail bags (*PR Bags)* comprise a very small portion of litter. National, statewide and citywide litter surveys that characterize litter using statistically based sampling methodologies have established and consistently show that *PR Bags* typically constitute less than 1.0 percent of litter.

Of that small portion, a significant number are unbranded and originate from sources such as small independent restaurants, retailers and convenience stores - the very stores often exempted from bag ordinances. A summary of *PR Bags* found in recent visible litter surveys is provided below:

- Texas: 1.95 percent in 2013 (ERP 2013)[1],
- Toronto (Canada): 0.80 percent in 2012 (ERP 2012),
- Northeast Litter Survey in 2010 (Maine, New Hampshire and Vermont) showed that plastic film, bags and wraps of all types constituted between 2.1 percent and 3.0 percent of all litter (ERP 2010),
- San Francisco: 0.64 percent in 2008 (HDR 2008),
- San Francisco: 0.59 percent in 2007 (HDR 2007),
- Florida: <1.0 percent in five litter surveys conducted 1994-2002 (FL 2002), and
- Nationally, all plastic bags (e.g., trash bags, retail bags, take-out food bags, bulk food bags, sandwich bags, etc.) comprise 0.60 percent of all litter based on Keep America Beautiful's 2009 National Litter Survey (KAB 2009).

With cities and counties focusing on litter issues, this study will help government officials understand the types of *PR Bags* found along city streets.

To accurately determine the types of plastic and paper bags found in litter, ER Planning conducted three separate citywide litter surveys between December 2011 and January 2012 in two California cities (Oakland and San Francisco) and in Washington, D.C. Each of these cities has taken a different approach to managing bag litter.

Field crews physically surveyed 180 sites (60 in each city), covering a total of 6.48 million square feet. In each city, field crews collected data for all types of plastic and paper bags including the source (e.g., convenience store) and brand label on each bag found in litter.

PR Bags from grocery stores, pharmacies, convenience stores and take-out food outlets were each categorized separately. *PR Bags* from all other retail stores such as Dollar Tree and Home Depot were categorized as *Other Retail Bags*.

Table ES-1 below shows the percentage of paper and plastic bags that were unbranded. San Francisco yielded the highest percentage of unbranded bags (82 percent).

[1] *Unbranded or generically labeled PR Bags comprised 1.3 percent of this total, while branded bags (with store names) comprised 0.7 percent (ERP 2013).*

Oakland (66 percent) and Washington, D.C. (67 percent) yielded a similar percentage of unbranded bags. Unbranded bags are used by independent stores and small vendors, but are not typically used by corporate stores, which tend to emboss their logos on the bags they use.

Table ES-1 – Unbranded Bags

City	All Paper Bags	All Plastic Bags	All Paper and All Plastic Bags
Oakland	49%	72%	66%
San Francisco	56%	96%	82%
Washington, D.C.	29%	73%	67%
All Cities	**48%**	**75%**	**68%**

PR Bags from all types of stores (i.e., convenience stores, take-out food establishments, grocery, pharmacy and other retail stores) comprised less than half of all bags and slightly more than half of plastic bags littered in Washington D.C. and Oakland, and much less in San Francisco.

Table ES-2 – *PR Bags* (Branded and Unbranded)

City	#	% of All Plastic Bags	% of All Paper & Plastic Bags
Oakland	149	57%	42%
San Francisco	9	18%	12%
Washington, D.C.	49	52%	44%
All Cities	**207**	**51%**	**38%**

Table ES-3 shows the percentage of *PR Bags* in each city that were unbranded. The highest percentage of unbranded *PR Bags* was observed in San Francisco (78 percent). Approximately half of the *PR Bags* littered in Oakland (50 percent) and Washington D.C. (49 percent) were unbranded.

The high percentage of unbranded *PR Bags* observed in all three cities suggests smaller, independent stores as the likely source. Cities that exempt independent stores from bag ordinances do so at their own peril, since more than half of all *PR Bags* surveyed in these three cities represented bags used by independent stores (unbranded).

Table ES-3 – Unbranded *PR Bags* in Litter

City	Unbranded *PR Bags*	All *PR Bags*	Percent Unbranded
Oakland	75	149	50%
San Francisco	7	9	78%
Washington, D.C.	24	49	49%
All Cities	**106**	**207**	**51%**

Similar to *PR Bags*, almost half of all paper bags observed in the three cities (48 percent) were unbranded as shown in Figure ES-4. This was particularly true in Oakland (49 percent) and San Francisco (56%), while slightly less than one-third of all littered paper bags in D.C. (29 percent) were unbranded.

Table ES-4 – Unbranded Paper Bags in Litter

City	Unbranded Paper Bags	All Paper Bags	Percent Unbranded
Oakland	44	90	49%
San Francisco	15	27	56%
Washington, D.C.	5	17	29%
All Cities	**64**	**134**	**48%**

Key Findings

- Most littered paper and plastic bags were unbranded in San Francisco (82 percent), D.C. (67 percent) and Oakland (66 percent) as shown in Table ES-1.
- A significant portion of *PR Bags* littered were unbranded in San Francisco (78 percent). About half of the *PR Bags* littered in Oakland (50 percent) and D.C. (49 percent) were unbranded (Table ES-3).
- *Other Retail Bags* (Home Depot, Dollar Tree, etc.) made up the largest portion of plastic bag litter (29 percent), followed by Bulk Food bags (21 percent) and Trash bags (19 percent).
- Field crews observed a number of unsecured trash setouts in all three cities. Such setouts have the potential to create litter of many types.
- Independent store sites had almost twice as many littered plastic bags as corporate store sites.
- San Francisco had the highest percentage of littered paper grocery bags (44 percent) compared to Oakland (2 percent) and D.C. (none).

2013 Paper and Plastic Bag Litter Study

Background

As found in the statistically based studies outlined in this report, plastic retail bags (*PR Bags)* comprise a very small portion of litter. National, statewide and citywide litter surveys that characterize litter using statistically based sampling methodologies have established and consistently show that *PR Bags* typically constitute less than 1.0 percent of litter as detailed in Table 1.

Of that small portion, a significant number are unbranded and originate from sources such as small independent restaurants, retailers and convenience stores - the very stores often exempted from bag ordinances.

Table 1 – PR Bags as a Component of Litter

#	Survey	Year	Percent	#	Survey	Year	Percent
1	Texas	2013	1.95%	13	Toronto	2006	0.10%
2	Toronto	2012	0.80%	14	Toronto	2004	0.20%
3	Edmonton	2012	0.30%	15	Durham	2003	0.30%
4	Edmonton	2011	1.10%	16	Peel	2003	0.10%
5	Edmonton	2010	0.50%	17	York	2003	0.40%
6	Edmonton	2009	0.30%	18	Toronto	2002	0.60%
7	Alberta	2009	0.00%	19	Florida	2002	0.50%
8	San Francisco	2008	0.60%	20	Florida	2001	0.70%
9	San Jose	2008	0.40%	21	Florida	1997	0.60%
10	KAB	2009	0.60%	22	Florida	1996	1.00%
11	San Francisco	2007	0.60%	23	Florida	1995	0.70%
12	Edmonton	2007	0.40%	24	Florida	1994	0.60%

The 2013 Texas Litter Survey found that *PR Bags* comprised 1.95 percent of *Visible Litter* (≥ 2 inches). Branded *PR Bags* comprised 0.66 percent, while unbranded *PR Bags* comprised 1.29 percent (ERP 2013).

The 2012 Toronto Litter Audit found that branded *PR Bags* comprised 0.1 percent of *Visible Litter*, while unbranded *PR Bags* comprised 0.7 percent (ERP 2012).

The 2010 Northeast Litter Survey, which included three statewide litter surveys in Maine, New Hampshire and Vermont, found that plastic film, bags and wraps of all types comprised between 1.2 percent and 3.0 percent of litter. Although not specifically broken out in these particular surveys, *PR Bags* would only have represented a portion of that number (ERP 2010).

The 2009 KAB National Litter Survey characterized and quantified roadside litter on 288 sites nationwide using 65 separate categories. This survey concluded that all type of plastic bags (e.g., trash bags, retail bags, take-out food bags, bulk food bags, sandwich bags, etc.) comprise 0.6 percent of all litter nationwide (KAB 2009).

2013 Paper and Plastic Bag Litter Study

Comprehensive citywide street litter audits were conducted in San Francisco before and after *PR Bags* use had been banned by the city at certain retail establishments. These surveys showed that *PR Bags* constituted only 0.59 percent of litter by count in 2007 (HDR 2007) and 0.64 percent of litter by count in 2008 (HDR 2008). The percentage of *PR Bags* in litter actually grew slightly after the ban had been put into effect.

Six comprehensive statewide litter surveys were conducted in Florida between 1994 and 2002. The results consistently showed that *PR Bags* constituted less than 1.0 percent of litter (Florida 2002).

Litter surveys showing unusually high rates of items such as plastic bags were typically conducted by volunteers rather than professional staff and did not employ random sampling and standard statistical methods. At times, the material categories varied between surveys. While such studies have helped create the awareness of litter's impacts, their limitations have, in some cases, given rise to erroneous depictions of *PR Bags* as a component of the overall litter stream.

As cities and counties are now focusing on litter-related issues, this study will help government officials understand the types of paper and plastic bags that are littered along city streets and sidewalks.

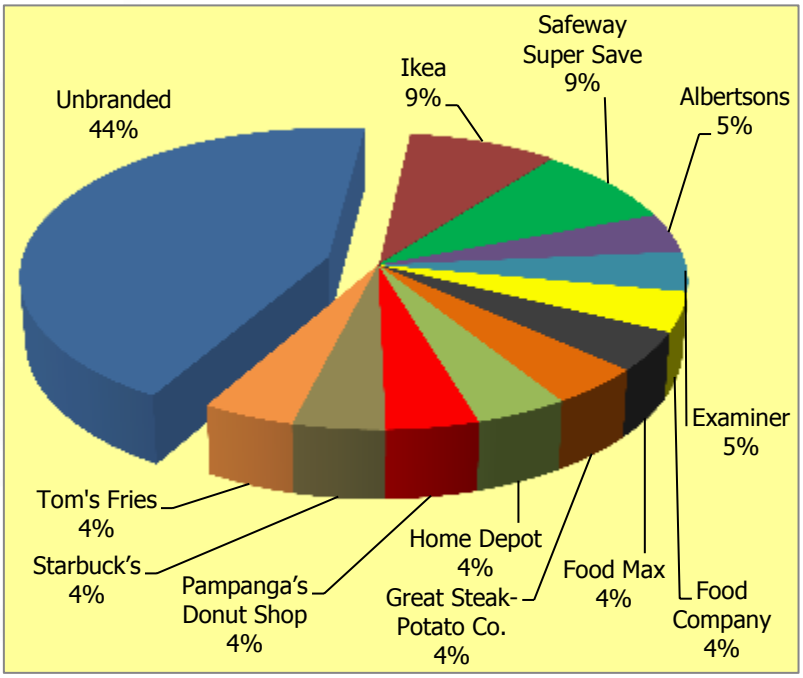
Project Hypothesis

A significant number of *PR Bags* found in litter originate from small, independent stores rather than major retailers and grocery stores even where the use of *PR Bags* has been banned with the exception of small, independent stores. San Francisco banned the use of *PR Bags* by large supermarkets and chain pharmacies in April 2007. The City conducted litter surveys in 2007 and 2008 to evaluate the impact of this ordinance on bags in litter.

The results showed that almost half (43 percent) of the 23 *PR Bags* observed in the 2007 San Francisco Litter Audit were unbranded.

Figure 1 - PR Bag Brands (2007)

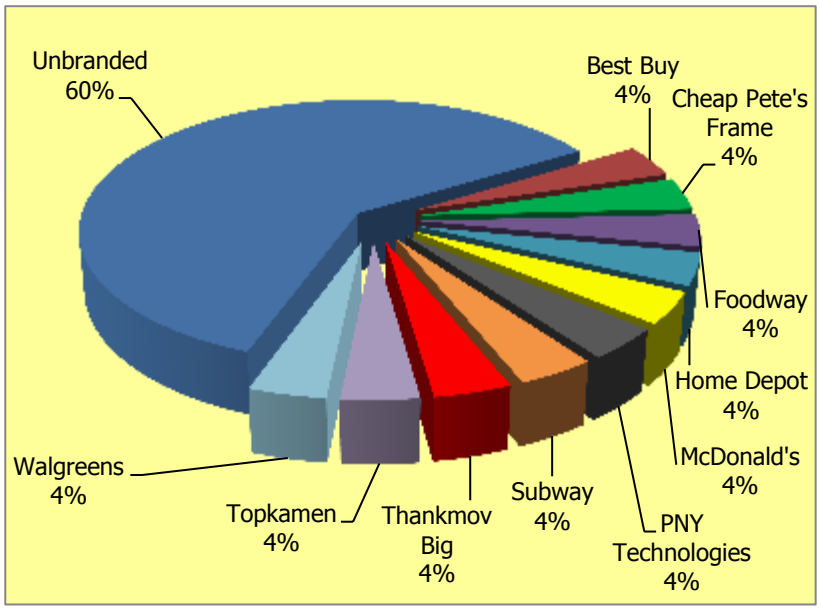
Items	#	%
Unbranded	10	43%
Ikea	2	9%
Safeway Super Save	2	9%
Albertsons	1	4%
Examiner	1	4%
Food Company	1	4%
Food Max	1	4%
Great Steak-Potato Co.	1	4%
Home Depot	1	4%
Pampanga's Donut Shop	1	4%
Starbuck's	1	4%
Tom's Fries	1	4%
Total	**23**	**100%**



That number grew to almost two-thirds (62 percent) in 2008:

Figure 2 - PR Bag Brands (2008)

Items	#	%
Unbranded	16	62%
Best Buy	1	4%
Cheap Pete's Frame	1	4%
Foodway	1	4%
Home Depot	1	4%
McDonald's	1	4%
PNY Technologies	1	4%
Subway	1	4%
Thankmov Big	1	4%
Topkamen	1	4%
Walgreens	1	4%
Total	**26**	**100%**



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San Francisco's amended ordinance regarding checkout bags[2] took effect six months after it was passed (in April 2007) and was in place for grocery stores (but not pharmacies) prior to the 2008 survey. This makes the following 2008 data points significant:

1. The number of *PR Bags* observed in 2008 **increased** compared to 2007.
2. The percentage of litter from large retail and grocery stores had not been reduced.
3. Unbranded *PR Bags* in 2008 comprised 62 percent of all *PR Bags*, suggesting sources other than large retailers and grocery stores.

The results show that despite the ban, the rate of *PR Bags* found in litter between 2007 and 2008 did not change substantially. This suggests that stores not included in the ban may be the primary source of these littered bags.

In order to test the hypothesis that *PR Bags* from large stores do not make up the majority of bag litter, three focused citywide litter surveys were conducted: two in California (Oakland and San Francisco) and one in Washington, D.C.

[2] *San Francisco Ordinance #81-07*

Site Selection Methodology

The first step of the site selection process was to identify the categories of retail establishments upon which these litter surveys would focus.

Four categories were identified as the appropriate targets for these surveys:

1. Grocery Stores,
2. Pharmacies,
3. Take-Out and Convenience Stores, and
4. Other Retail Establishments.

This list of was further stratified so that:

1. Corporate stores, which generally use labeled plastic carrying bags, would comprise 50 percent of the retail sites, and
2. Independent stores, which normally use unbranded plastic carrying bags, would comprise the other 50 percent of retail sites.

Once the stratified list had been compiled, 60 retail stores were randomly selected as sites in each city as outlined above for a total of 180 retail sites. The site selection and survey methodologies employed ensured that a broad range of locales and commercial areas within each city were represented.

Table 2 shows how sites were selected to represent a cross-section of business establishments:

1. Potentially affected by current ordinances governing the use of paper and plastic bags, and
2. Suspected of generating bags subsequently found in litter.

Table 2 – Allocation of Sites by Retail Category

Retail Category	Corp.	Ind.	Total
Grocery	30	30	60
Other Retail	30	30	60
Pharmacy	15	15	30
Take-out/Conv.	15	15	30
Total	**90**	**90**	**180**

Sampling Methodology

The width of each site sampled in the 2013 study began 1.5 feet inside the curb and extended into the right-of-way towards the survey site to a maximum width of 18 feet. These are the same dimensions that were used in the 2007 and 2008 litter surveys conducted in San Francisco.

Since the 200 foot site length used in the 2007 and 2008 San Francisco litter surveys yielded only a small number of plastic bags, the length of each site in the 2013 study was increased to 2,000 feet. This provided a significantly higher probability of finding plastic bags within each designated site.

Therefore, while the area of each site in 2007 and 2008 was 3,600 square feet (200' x 18'), the area of each site was 36,000 square feet (2,000' x 18') in all three citywide litter surveys. Thus, each site surveyed for the 2013 study comprised an area 10 times larger than the site sizes used in the 2007 and 2008 litter surveys.

Additionally, since the number of sites surveyed was also larger in the 2013 study (180 sites) than in 2007 (105 sites) and 2008 (132 sites), the total area surveyed in the 2013 study was 17.1 times larger than in 2007 and 13.6 times larger than in 2008.

This was done so that the 2013 study would produce more statistically representative data than the 2007 and 2008 litter surveys, helping to ensure that the issues upon which this study was focused could be properly addressed.

Table 3 compares the site sizes used in the 2013 study with the site sizes used in the 2007 and 2008 San Francisco litter surveys.

Table 3 – Methodology Comparisons

Survey Parameters	SF 2007	SF 2008	SF/D.C./Oakland 2012
Number of Sites	105	132	180
Site Length (feet)	200	200	2,000
Site Width (feet)	18	18	18
Site Area (sq. ft.)	3,600	3,600	36,000
Total Area (sq. ft.)	378,000	475,200	6,480,000

Since the site selection process focused on areas around retail establishments and these sites were stratified by retail category, the resulting data, while much more in-depth and comprehensive than data from previous litter surveys, may not always be directly comparable to data from litter surveys focusing on areas other than, or in addition to, retail establishments.

Characterization of Littered Bags

In addition to recording the number of paper and plastic bags on each site, each bag was also characterized by type and any brand name observed. Details about unbranded bags were recorded along with any type of generic labeling such as "Thank You". The categories used in this survey were:

Plastic Bags

1. Loose and unsecured bags of trash[3]
2. Empty trash bags
3. Grocery bags
4. Convenience store bags
5. Pharmacy bags
6. Take-Out Food bags (including fast food)
7. Other Retail Stores bags (e.g., Home Depot, Dollar Tree, etc.)
8. Sandwich bags
9. Bulk food bags

In the 2013 study, *PR Bags* refer to #3-#7 from the list above.

Paper Bags

1. Grocery bags
2. Convenience Store bags
3. Pharmacy bags
4. Take-Out Food bags (including fast food)
5. Other paper bags

Once the site selection and sampling methodologies were completed, the three separate citywide litter surveys were conducted in Oakland, San Francisco and Washington D.C. between December 2011 and January 2012. The results and recommendations in this report are based on the data from these three citywide litter surveys.

[3] *For the purposes of this study, non-containerized bags of trash were not counted even if they were set out in violation of city codes. This applied as long as the trash bags were sealed.*

Survey Results

Approximately half of all paper bags littered were unbranded in San Francisco and Oakland. In Washington, D.C., only 29 percent of paper bags were unbranded, while approximately half of paper bags in San Francisco (56 percent) and Oakland (49 percent) were unbranded.

Unbranded plastic bags also comprised a significant portion of plastic bags littered in Oakland (72 percent) and D.C. (73 percent), while virtually all plastic bags littered in San Francisco (96 percent) were unbranded (Table 4).

Table 4 – Unbranded Bags in Litter

City	Paper Bags	Plastic Bags	Total Bags
Oakland	49%	72%	66%
San Francisco	56%	96%	82%
Washington, D.C.	29%	73%	67%
All Cities	**48%**	**75%**	**68%**

The percentage of unbranded *PR bags* was then calculated. PR bags include all carryout bags from grocery, take-out food, convenience, pharmacy and other retail stores. Unbranded *PR Bags* are typically used by smaller, independent stores and comprised a significant portion of all *PR Bags* as shown in Table 5.

The highest percentage of unbranded *PR Bags* was observed in San Francisco (78 percent). In Oakland, 50 percent of *PR Bags* were unbranded. Almost half of the *PR Bags* littered in Washington D.C. (49 percent) were unbranded.

The high percentage of unbranded *PR Bags* observed in all three cities suggests smaller, independent stores as the likely source. Cities that exempt independent stores from bag ordinances do so at their own peril, since more than half of all *PR Bags* surveyed in these three cities represented bags used by independent stores (unbranded).

Table 5 – Unbranded *PR Bags* in Litter

City	Unbranded *PR Bags*	All *PR Bags*	Percent Unbranded
Oakland	75	149	50%
San Francisco	7	9	78%
Washington, D.C.	24	49	49%
All Cities	**106**	**207**	**51%**

Paper Bags in Litter

Paper bags were rarely littered on the site of origin in any of the three cities. The one exception was at a Safeway store in San Francisco, where Safeway paper bags were found that had been run over by cars. Table 6 shows that the most littered paper bags in San Francisco were grocery bags, while the most littered paper bags in Oakland and D.C. were take-out food bags.

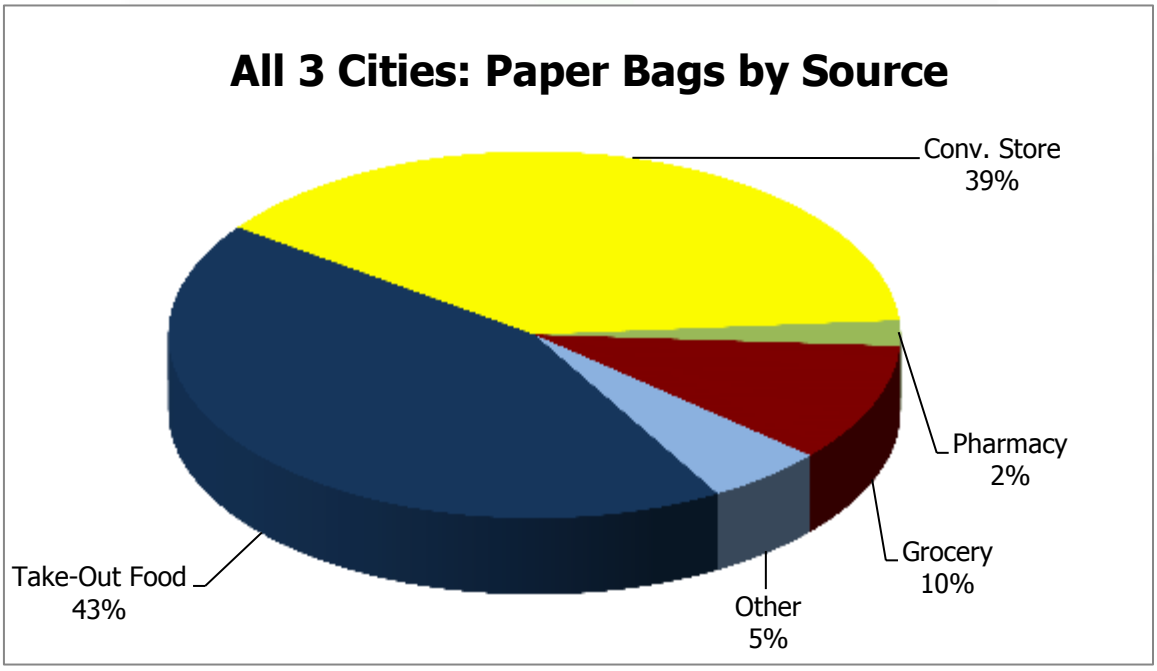
Table 6 – Paper Bags by Source and Type

Category	SF		DC		Oakland		Summary	
	#	%	#	%	#	%	#	%
Take-out Food	7	26%	10	59%	41	46%	58	43%
Conv. Store	8	30%	5	29%	39	43%	52	39%
Pharmacy	0	0%	1	6%	2	2%	3	2%
Grocery	12	44%	0	0%	2	2%	14	10%
Other	0	0%	1	6%	6	7%	7	5%
Subtotal	**27**	**100%**	**17**	**100%**	**90**	**100%**	**134**	**100%**

(Columns may not add to 100% due to rounding.)

Figure 3 shows that Take-Out Food (43 percent) and Convenience Store (39 percent) together comprised the predominant portion (82 percent) of paper bags found littered overall.

Figure 3 – Paper Bags Littered by Source



(Percentages may not add to 100% due to rounding.)

Paper bags were also characterized by brand name. Notations were also made for unbranded and generically labeled bags. Table 7 shows that unbranded bags constituted the largest portion of littered paper bags in San Francisco and Oakland, while McDonalds and unbranded bags were equally high in D.C. No other brand name was littered nearly as much as McDonalds, specifically in Oakland (27 percent) and D.C. (29 percent).

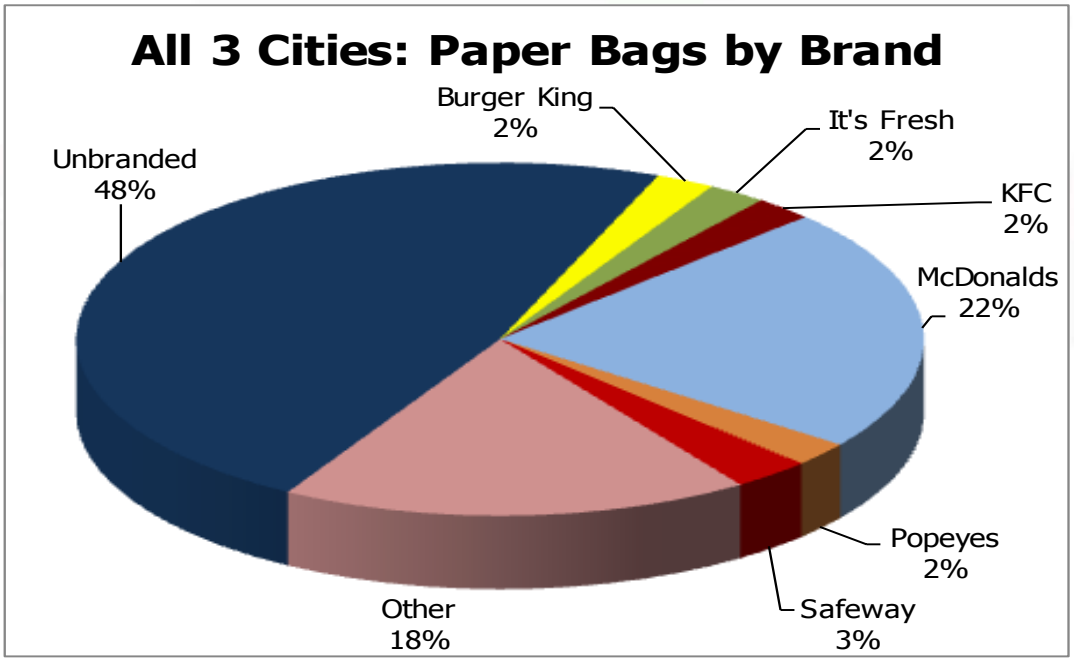
Table 7 – Paper Bags by Brand

Category	SF		DC		Oakland		Summary	
	#	%	#	%	#	%	#	%
Unbranded	15	56%	5	29%	44	49%	64	48%
Burger King	0	0%	1	6%	2	2%	3	2%
It's Fresh	2	7%	0	0%	1	1%	3	2%
KFC	0	0%	1	6%	2	2%	3	2%
McDonalds	1	4%	5	29%	24	27%	30	22%
Popeye's	1	4%	1	6%	1	1%	3	2%
Safeway	4	15%	0	0%	0	0%	4	3%
Other	4	15%	4	24%	16	18%	24	18%
Subtotal	**27**	**100%**	**17**	**100%**	**90**	**100%**	**134**	**100%**

(Columns may not add to 100% due to rounding.)

Almost half of all paper bags observed in all three cities (48 percent) were unbranded as shown in Figure 4. Likewise, McDonald's bags comprised the largest percent of branded paper bags – a trend also found in other recent litter surveys.

Figure 4 – Paper Bags Littered by Brand



(Percentages may not add to 100% due to rounding.)

Plastic Bags in Litter

Following discussions with the City of San Francisco Public Works and Environmental Health Departments, the following five guidelines were used:

1. Full and Properly Secured Trash Bags
Plastic bags were characterized by type, noting the source. Some full trash bags were properly tied. While they may not have met the requirement for a proper trash set-out, they were not deemed to have been littered and were excluded from this tally for that reason.

2. Empty Trash Bags
Empty or near-empty bags were deemed to have been littered since none of them were observed to be part of, or in close proximity to, a bona fide trash set-out. In addition, most of them were at least partially opened and/or seemed to have been blown about.

3. Partially Open Trash Bags
Several trash bags observed were open and had created litter. Field crews observed bags blowing about from similar set-outs. Thus, these bags were counted as litter.

4. Improperly Secured Trash Bags
In other cases, plastic bags filled with trash were left open and the contents were falling or blowing out, which created more litter. The bags themselves were not considered litter as they were substantially filled. However, if not collected and disposed of properly, they would continue to produce litter. In addition, they could very well become litter themselves, but had not done so yet. Inappropriate trash set-outs are a known cause of negligent litter.

5. Loose Trash Bags
Other bags, however, were carelessly set out in a manner that created opportunities for wind-blown litter, but were not littered yet. Other items from these set-outs had already become and were counted as litter.

Plastic Bags – Source and Type

Table 8 shows that sandwich bags were the most littered type of plastic bag in San Francisco (43 percent), while plastic bags from Other Retail stores were the highest in D.C. (24 percent) and Oakland (34 percent). Full and empty trash bags were a noticeable portion of littered plastic bags in all three cities (38 percent in San Francisco, 26 percent in D.C. and 12 percent in Oakland), averaging 19 percent overall.

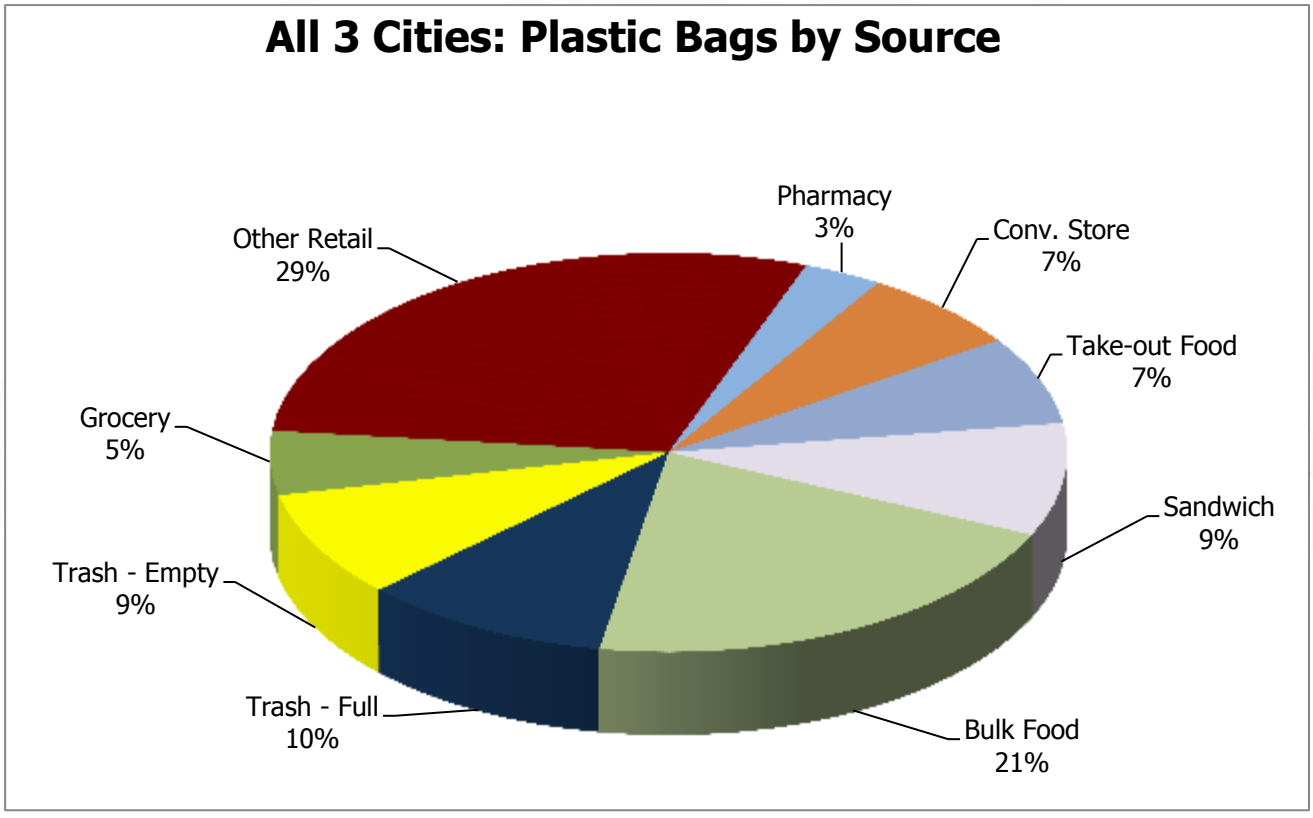
Table 8 – Plastic Bags by Source and Type

	SF		DC		Oakland		Summary	
Category	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**
Trash - Full	9	18%	13	14%	19	7%	41	10%
Trash - Empty	10	20%	11	12%	14	5%	35	9%
Grocery	1	2%	9	10%	11	4%	21	5%
Other Retail	4	8%	23	24%	90	34%	117	29%
Pharmacy	0	0%	2	2%	11	4%	13	3%
Conv. Store	0	0%	5	5%	22	8%	27	7%
Take-out Food	4	8%	10	11%	15	6%	29	7%
Sandwich	21	43%	0	0%	16	6%	37	9%
Bulk Food	0	0%	21	22%	64	24%	85	21%
Subtotal	**49**	**100%**	**94**	**100%**	**262**	**100%**	**405**	**100%**

(Columns may not add to 100% due to rounding.)

Figure 5 shows that, overall, the predominant sources of plastic bags were *Other Retail* (29 percent) and *Bulk Food* (21 percent).

Figure 5 – Plastic Bags Littered by Source



Branded and unbranded *PR Bags* from all types of stores (i.e., convenience stores, take-out food establishments, grocery, pharmacy and other retail stores) comprised less than half of all bags and slightly more than half of plastic bags littered in Washington D.C. and Oakland. That percentage was lower in San Francisco, although they were predominantly unbranded bags (Table 9).

Table 9 – PR Bags in Litter

City	#	% of All Plastic Bags	% of All Bags
Oakland	149	57%	42%
San Francisco	9	18%	12%
Washington, D.C.	49	52%	44%
All Cities	**207**	**51%**	**38%**

Table 10 shows that most of the littered plastic bags in all three cities were unbranded (which includes generic labeling such as "Thank You"), particularly in San Francisco (96 percent), but also in D.C. (73 percent) and Oakland (72 percent).

Table 10 – Plastic Bags by Brand

	SF		DC		Oakland		Summary	
Category	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**
7-11	0	0%	3	3%	3	1%	6	1%
Unbranded	47	96%	69	73%	188	72%	304	75%
CVS	0	0%	0	0%	3	1%	3	1%
Dollar Stores[4]	0	0%	1	1%	11	4%	12	3%
Giant	0	0%	3	3%	0	0%	3	1%
Home Depot	0	0%	0	0%	3	1%	3	1%
KFC	0	0%	2	2%	1	0%	3	1%
Other	1	2%	10	11%	30	11%	41	10%
Lucky	0	0%	0	0%	4	2%	4	1%
Popeye's	0	0%	0	0%	4	2%	4	1%
Subway	1	2%	5	5%	3	1%	9	2%
Taco Bell	0	0%	0	0%	4	2%	4	1%
Target	0	0%	1	1%	2	1%	3	1%
Walgreens	0	0%	0	0%	6	2%	6	1%
Subtotal	**49**	**100%**	**94**	**100%**	**262**	**100%**	**405**	**100%**

(Columns may not add to 100% due to rounding.)

[4] *In Table 9, Dollar Stores refers to all of the following stores: Dollar Tree, Family Dollar and 99 Cents, whose marketing focuses on this specific price point.*

Figure 6 – Plastic Bags Littered by Brand

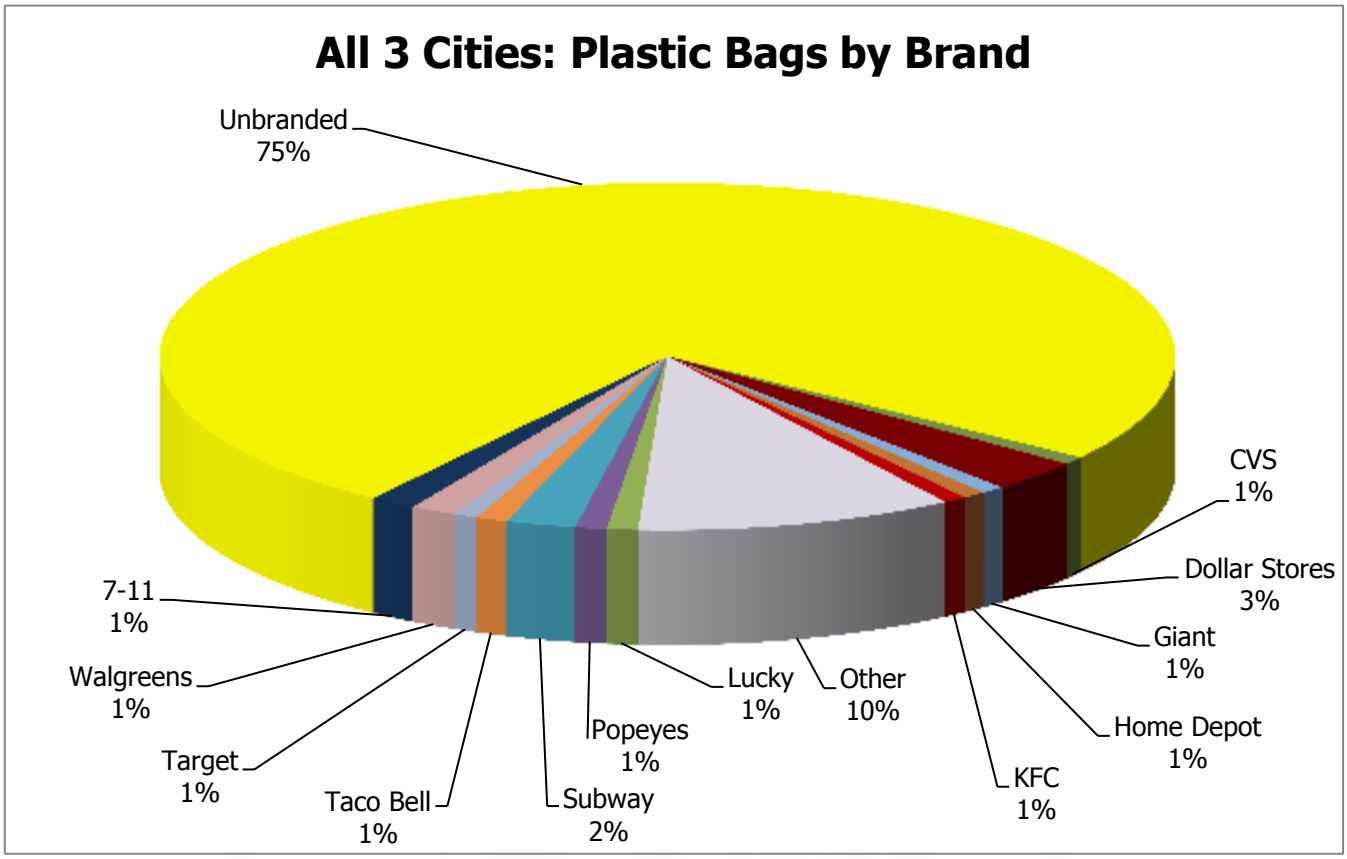


Figure 6 shows that 75 percent of all plastic bags overall were unbranded.

Littered Bags – Corporate and Independent Stores

Although this study focused on comparing the percentage of littered plastic bags from corporate and independent stores, the types of site upon which littered bags were found were also compared. While littered paper bags were split evenly between corporate and small independent stores, almost twice as many littered plastic bags were found at the sites of independent stores compared with corporate stores as shown in Table 11. This pattern was true in all three cities, but most evident in San Francisco. However, paper bags showed a more even distribution – with an almost even split between corporate and independent stores.

Table 11 – Littered Bags on Corporate and Independent Sites

Paper	Littered Bags		Distribution	
City	**Corp.**	**Ind.**	**Corp.**	**Ind.**
Oakland	53	37	59%	41%
San Francisco	7	20	26%	74%
Washington, D.C.	10	7	59%	41%
Average	**70**	**64**	**52%**	**48%**

Plastic	Littered Bags		Distribution	
City	**Corp.**	**Ind.**	**Corp.**	**Ind.**
Oakland	98	164	37%	63%
San Francisco	8	41	16%	84%
Washington, D.C.	33	61	35%	65%
Average	**139**	**266**	**34%**	**66%**

Findings

- Most littered bags were unbranded overall (68 percent). That was particularly clear in San Francisco (82 percent), but also apparent in D.C. (67 percent) and Oakland (66 percent) as shown in Table 4.

- *PR Bags* (Take-out food, convenience, grocery, pharmacy and other retail stores) comprised a significant portion of all bag litter in D.C. (44 percent) and Oakland (42 percent), but not in San Francisco (12 percent) as shown in Table 9.

- A significant portion of *PR Bags* were unbranded in all three cities (51 percent overall). The highest percent was in San Francisco (78 percent). About half of the *PR Bags* littered in Oakland (50 percent) and D.C. (49 percent) were unbranded (Table 5).

- San Francisco had the highest percentage of littered paper grocery bags (44 percent) compared to Oakland (2 percent) and D.C. (none).[5]

- Most of the littered paper grocery bags tallied were observed in San Francisco (86 percent).[6]

- *Other Retail Bags* (Home Depot, Dollar Tree, etc.) made up the largest portion of plastic bag litter (29 percent), followed by Bulk Food bags (21 percent) and Trash bags (19 percent) as shown in Table 8.

- Take-out food bags (43 percent) comprised the highest source of paper bag litter overall, followed closely by convenience store bags (39 percent). Together, these two categories accounted for 82 percent of paper bag litter overall (Table 6).

- Almost half of the paper bags littered were unbranded (48 percent). Outside of McDonald's (22 percent), no one brand made up more than 3 percent of paper bags littered (Table 7).

- Independent stores had almost twice as many littered plastic bags as corporate store sites (Table 11).

- Field crews observed improper trash setouts adding to street litter in all three cities. Such setouts have the potential to create a considerable amount of litter of all types.

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[5] [6] Data regarding the percentage of paper bag litter specifically attributable to paper grocery bags can be found as line items within Table 6.

Recommendations

- Ensure that programs addressing bag litter focus on helping smaller independent stores with this issue.
- Include bulk food bags and sandwich bags in any industry-based litter reduction efforts as these bags are a significant portion of bag litter.
- Encourage grocery and retail stores accepting plastic bags for recycling to publicize such programs more effectively so that the public is aware of this opportunity to reduce bag litter.
- As programs are put in place to address the types and sources of bag litter identified in this study, conduct follow-up litter surveys to monitor progress.
- Develop education programs to ensure that all recyclables and trash (other than bulk trash) are set out in adequately sized containers.
- Monitor trash and recycling collection, transportation and disposal to ensure progress with litter abatement.
- Ensure that litter receptacles are only placed in high-litter areas if they can be serviced appropriately.

The success of such efforts will be dependent upon the support and coordinated efforts of stakeholders in each community.

About the Author

This project was led by and the report authored by Mr. Steven R. Stein, Principal of Environmental Resources Planning, LLC (ER Planning), the only U.S. firm focusing entirely on litter-related surveys and research. Mr. Stein has an extensive background in litter surveying and analysis. Field crews under his direction have surveyed litter along more than 21 million square feet of roadways and recreational areas across North America.

Mr. Stein has worked in solid waste management and recycling for more than 25 years. His grandfather, a forester in the 1800s, started a paper recycling company in 1913. Mr. Stein trained under his father, who devoted his career to the field of recycling.

Mr. Stein earned his B. Sc., Cum Laude, in Environmental Studies with concentrations in Environmental Law and Waste Management from Syracuse University and SUNY College of Environmental Science and Forestry. He also received his M. Sc. in Resource Policy & Management there, studying under two forest economists and was awarded New York SWANA's Annual Scholarship Award for his research into the relationship between public policy initiatives and sustainable recycling. He began a Ph.D. program there as well, studying the underlying causes of littering.

Mr. Stein has led statewide litter surveys conducted in New Jersey (2004), Georgia (2006), Tennessee (2006), Maine (2010), New Hampshire (2010), Vermont (2010) and Texas (2013). He also led the Toronto Streets Litter Audit (2012) and a survey of 75 beach sites in Malibu and Santa Monica, CA (2005).

Mr. Stein was lead author of Litter: Literature Review (2007), written for Keep America Beautiful (KAB). He led the design and implementation of KAB's National Litter Study (2008), comprising the only nationwide litter survey ever conducted and a comprehensive analysis of the direct and indirect costs of litter. He was project manager for KAB's Community Appearance Index (2008), which provided KAB affiliates nationwide with tools to quantify the impact of litter-related indicators on the well-being of their communities.

He organized the 2011 National Litter Forum, which focused on the role of litter-related indicators in restoring our nation's communities. Mr. Stein has taught *Environmental Science* and *Ethics in Management* at the university level.

Mr. Stein's work on the impact of litter to our communities has been featured in the *New York Times* and *National Geographic Magazine* (December 2008) as well as on *NPR* and ABC's *Good Morning America*. Mr. Stein was invited, as a subject matter expert on environmental issues and community dynamics, to participate in a study commissioned by the President (2010).

Mr. Stein has contributed pro bono time for groups such as Potomac Watershed Initiative and Ocean Conservancy and served as Site Director at Chincoteague Island (VA) for Ocean Conservancy's National Marine Debris Monitoring Program.

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Appendix A – Sites Surveyed

Appendix A-1: Oakland, CA Sites

Appendix A-2: San Francisco, CA Sites

Appendix A-3: Washington, D.C. Sites

Appendix A-1: Oakland Survey Sites

#	Business Name	Address	Corp/Ind	Type
1	Food Maxx	10950 International Blvd	C	Grocery
2	Whole Foods	230 Bay Place	C	Grocery
3	Trader Joe's	3250 Lakeshore Ave.	C	Grocery
4	Safeway	6310 College Ave.	C	Grocery
5	Safeway	3550 Fruitvale Ave.	C	Grocery
6	Safeway	4100 Redwood Rd.	C	Grocery
7	Safeway	2096 Mountain Blvd.	C	Grocery
8	Safeway	3747 Grand Ave.	C	Grocery
9	Lucky's Supermarket	1963 Mountain Blvd.	C	Grocery
10	Safeway	5130 Broadway	C	Grocery
11	Monte Vista Food Center	4000 Piedmont Ave.	I	Grocery
12	Grocery Outlet	2900 Broadway	I	Grocery
13	Smart and Final	901 Broadway	I	Grocery
14	Sun Sang Supermarket	1211 8th Ave.	I	Grocery
15	Mi Pueblo Food Center	1630 High St.	I	Grocery
16	Sun Hop Fat 1 Supermarket	501 E 12th St.	I	Grocery
17	Orient Market	410 7th St.	I	Grocery
18	Thien Loi Hoa Supermarket	1199 E 12th St.	I	Grocery
19	Los Mexicanos Market	1244 High St.	I	Grocery
20	Farmer Joe's Marketplace	3426 Fruitvale Ave.	I	Grocery
21	Walgreen's	3232 Foothill Blvd.	C	Pharmacy
22	Rite-Aid	1400 Broadway	C	Pharmacy
23	CVS	344 Thomas L Berkley Way	C	Pharmacy
24	Rite-Aid	1991 Mountain Blvd.	C	Pharmacy
25	CVS	3238 Lakeshore Ave.	C	Pharmacy
26	Oakland Pharmacy	822 Webster St.	I	Pharmacy
27	New Oakland Pharmacy	388 9th St., #108	I	Pharmacy
28	Peralta Outpatient Pharmacy	3100 Telegraph Ave.	I	Pharmacy
29	Bradford Pharmacy	445 8th St.	I	Pharmacy
30	Lake Pharmacy	287 13th St.	I	Pharmacy
31	Walmart	8400 Edgewater Dr.	C	Retail
32	Home Depot	4000 Alameda Ave.	C	Retail
33	Best Buy	3700 Mandela Parkway	C	Retail

Appendix A-1: Oakland Survey Sites				
#	Business Name	Address	Corp/Ind	Type
34	Gap	3227 Lakeshore Ave.	C	Retail
35	Sear's	1955 Broadway	C	Retail
36	Radio Shack	2200 Macarthur Blvd.	C	Retail
37	GameStop	8460 Edgewater Dr.	C	Retail
38	Bed, Bath and Beyond	590 2nd St.	C	Retail
39	Glenview True Value Hardware	4218 Park Blvd.	C	Retail
40	Autozone	3525 MacArthur Blvd.	C	Retail
41	Iniam	5902 College Ave.	I	Retail
42	Citi Trends	900 Market St.	I	Retail
43	Lan Vie	489 Water St .	I	Retail
44	Issues	20 Glen Ave.	I	Retail
45	Puff n' Stuff	4051 Foothill Blvd.	I	Retail
46	Spectacular Bookstore	4163 Piedmont Ave.	I	Retail
47	Paws & Claws	3436 Dimond Ave.	I	Retail
48	Alpha TV & Electronics	2819 MacArthur Blvd.	I	Retail
49	Kerry's Office Supplies	1820 Franklin St.	I	Retail
50	Toyhouse Mount Clair Store	6115 La Salle Ave.	I	Retail
51	Taco Bell	6900 Bancroft Ave.	C	Fast food/Conven.
52	Panda Express	500 12th St.	C	Fast food/Conven.
53	Popeye's Chicken and Biscuits	3080 E 9th St.	C	Fast food/Conven.
54	7Eleven	5741 Thornhill Dr.	C	Fast food/Conven.
55	Chevron Gas Station	5500 Telegraph Ave.	C	Fast food/Conven.
56	Alexandre's Market and Spirit	1913 San Pablo Ave.	I	Fast food/Conven.
57	Market One	3301 E 12th St.	I	Fast food/Conven.
58	Geta Japanese Restaurant	165 41st St.	I	Fast food/Conven.
59	Vientian Café	3801 Allendale Ave.	I	Fast food/Conven.
60	Shan Dong Restaurant	328 10th St.	I	Fast food/Conven.

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Appendix A-2: San Francisco Survey Sites

#	Business Name	Address	Corp/Ind	Type
1	Safeway	2020 Market St.	C	Grocery
2	Safeway	145 Jackson St.	C	Grocery
3	Whole Foods	399 4th St.	C	Grocery
4	Trader Joe's	555 9th St., #1	C	Grocery
5	Rainbow Grocery	1745 Folsom St.	C	Grocery
6	Bristol Farms	845 Market St.	C	Grocery
7	Lucky's	1515 Sloat Blvd.	C	Grocery
8	Fresh & Easy	5800 3rd St.	C	Grocery
9	Mollie Stone's	2435 California St.	C	Grocery
10	Safeway	15 Marina Blvd.	C	Grocery
11	Good Life Grocery	1524 20th St.	I	Grocery
12	Arguello Supermarket	782 Arguello Blvd.	I	Grocery
13	The Real Food Company	2140 Polk St.	I	Grocery
14	Nabila's Natural Inc.	599 Hayes St.	I	Grocery
15	Nick's Super Market	144 Page St.	I	Grocery
16	Bryan's Grocery	3445 California St.	I	Grocery
17	Jai Ho Indian Grocery	1462 Filmore St.	I	Grocery
18	Long Hua's Grocery Store	906 Stockton St.	I	Grocery
19	Nan Hai Corporation	919 Grant Ave.	I	Grocery
20	Nijiya Market	1737 Post St.	I	Grocery
21	Walgreen's	498 Castro St.	C	Pharmacy
22	CVS	2025 Van Ness Ave.	C	Pharmacy
23	Rite Aid	1300 Bush St.	C	Pharmacy
24	CVS	1301 Market St.	C	Pharmacy
25	Walgreen's	300 Gough St.	C	Pharmacy
26	Koshland Pharmacy	301 Folsom St.	I	Pharmacy
27	Parnassus Heights Pharmacy	350 Parnassus Ave.	I	Pharmacy
28	Clement Pharmacy	1922 Clement St.	I	Pharmacy
29	Greenhouse Pharmacy	1516 Noriega St.	I	Pharmacy
30	MOM's Pharmacy	4071 18th St.	I	Pharmacy
31	Best Buy	1717 Harrison St.	C	Retail
32	Radio Shack	4049 24th St.	C	Retail
33	Ace Hardware	140 Pine St.	C	Retail
34	Macy's	170 O'Farrell St.	C	Retail
35	Neiman Marcus	150 Stockton St.	C	Retail
36	Nordstrom Rack	555 9th St.	C	Retail
37	Lowe's Home Improvement	491 Bayshore Blvd.	C	Retail
38	Payless Shoe Source	934 Market St.	C	Retail
39	Gap	2 Folsom St .	C	Retail

Appendix A-2: San Francisco Survey Sites

#	Business Name	Address	Corp/Ind	Type
40	TJ Maxx	855 Harrison St.	C	Retail
41	Ferry Bldg	1 Ferry Bldg.	I	Retail
42	Bird & Beckett Books & Records	653 Chenney St.	I	Retail
43	Green Apple Books	506 Clement St.	I	Retail
44	Painted Bird	1360 Valencia St.	I	Retail
45	Pipe Dreams	1376 Haigh St.	I	Retail
46	Tedda Hughes	1623 Polk St.	I	Retail
47	Sun Entertainment	722 Sacramento St.	I	Retail
48	Far East Flea Market	729 Grant Ave.	I	Retail
49	Ichiban Kan	1625 Post St.	I	Retail
50	Asakichi Incense	1730 Geary Blvd.	I	Retail
51	Taco Bell	7 Drumm St.	C	Fast food/Conven.
52	Panda Express	500 Parnassus Ave.	C	Fast food/Conven.
53	7-Eleven	217 Sutter St.	C	Fast food/Conven.
54	Chevron Gas Station	3675 Gear Blvd.	C	Fast food/Conven.
55	Shell Gas Station	601 Lincoln Way	C	Fast food/Conven.
56	Wok Shop Café	1307 Sutter St.	I	Fast food/Conven.
57	Sam Wo Restaurant	813 Washington St.	I	Fast food/Conven.
58	Melisa's Chinese Cuisine	450 Balboa St.	I	Fast food/Conven.
59	Key Food Grocery	501 Filmore St.	I	Fast food/Conven.
60	Oasis Convenience Center	4 Embarcadero Center	I	Fast food/Conven.

Appendix A-3: Washington, D.C. Survey Sites

#	Business Name	Address	Corp/Ind	Type
1	Whole Foods	1440 P St., NW	C	Grocery
2	Safeway	1701 Corcoran St., NW	C	Grocery
3	Giant	1414 8th St., NW	C	Grocery
4	Safeway	4203 Davenport St., NW	C	Grocery
5	Safeway	1100 4th St., SW	C	Grocery
6	Safeway	1601 Maryland Ave., NE	C	Grocery
7	Trader Joe's	1101 25th St., NW	C	Grocery
8	Whole Foods	2201 Eye St., NW	C	Grocery
9	Harris Teeter	1201 1st St., NE	C	Grocery
10	Harris Teeter	1350 Potomac Ave., SE	C	Grocery
11	Yes! Organic Market	4100 Georgia Ave., NW	I	Grocery
12	Hana Japanese Market	2004 17th St., NW	I	Grocery
13	Capitol Supermarket	1231 11th St., NW	I	Grocery
14	Broad Branch Market	5608 Broad Branch Rd., NW	I	Grocery
15	FoBoGro	2140 F St., NW	I	Grocery
16	Chinatown Market	521 H St., NW	I	Grocery
17	K & H Grocery	3333 Martin Luther King Jr, SE	I	Grocery
18	A Litteri	517 Morse St., NE	I	Grocery
19	Roland's of Capitol Hill	333 Pennsylvania Ave., SE	I	Grocery
20	Rodman's	5100 Wisconsin Ave., NW	I	Grocery
21	Rite Aid	1815 Connecticut Ave., NW	C	Pharmacy
22	CVS	717 14th St., NW	C	Pharmacy
23	Walgreens	1217 22nd St., NW	C	Pharmacy
24	Rite Aid	3301 New Mexico Ave., NW	C	Pharmacy
25	CVS	128 Kennedy St., NW	C	Pharmacy
26	Tschiffely Pharmacy	1330 Connecticut Ave., NW	I	Pharmacy
27	Center Pharmacy	4900 Massachusetts Ave., NW	I	Pharmacy
28	Foer's Pharmacy	818 18th St., NW	I	Pharmacy
29	Morton's Care Pharmacy	724 East Capitol St., SE	I	Pharmacy
30	Bioscrip Pharmacy	1325 14th St., NW	I	Pharmacy

Appendix A-3: Washington, D.C. Survey Sites

#	Business Name	Address	Corp/Ind	Type
31	Hugo Boss	1517 Wisconsin Ave., NW	C	Retail
32	Banana Republic	601 13th St., NW	C	Retail
33	J Crew	3222 M St., NW	C	Retail
34	Best Buy	3100 14th St., NW	C	Retail
35	Radio Shack	717 D St., SE	C	Retail
36	The Home Depot	901 Rhode Island Ave.	C	Retail
37	5th St Ace Hardware	1055 5th St., NW	C	Retail
38	Macy's	1201 G St., NW	C	Retail
39	Payless Shoe Source	3900 Minnesota Ave.	C	Retail
40	Gamestop	1391 Pennsylvania Ave., SE	C	Retail
41	Biagio Fine Chocolate	1904 18th St., NW	I	Retail
42	Ginger Root	1530 U St., NW	I	Retail
43	Vineyard Vine	1225 Wisconsin Ave., NW	I	Retail
44	Redeem	1734 14th St., NW	I	Retail
45	India Art and Craft	2602 Connecticut Ave., NW	I	Retail
46	Rainbow Store	1060 Brentwood Rd., NE	I	Retail
47	Threadz	1345 Good Hope Rd., SE	I	Retail
48	Used Tires	1230 New York Ave., NE	I	Retail
49	The 3610 Boutique	3610 12th St., NE	I	Retail
50	DURKL	443 Eye St., NW	I	Retail
51	Bojangles'	50 Massachusetts Ave., NE	C	Fast food/Conven.
52	Arthur Treacher's Fish & Chips	400 Florida Ave., NW	C	Fast food/Conven.
53	Burger King	501 G St., NW	C	Fast food/Conven.
54	Popeye's	634 Rhode Island Ave., NE	C	Fast food/Conven.
55	McDonalds	2328 Georgia Ave., NW	C	Fast food/Conven.
56	DC-3	423 8th St., SE	I	Fast food/Conven.
57	Merzi	415 7th St NW	I	Fast food/Conven.
58	Adam's Market	700 F St., NE	I	Fast food/Conven.
59	Quick Service	2401 Martin Luther King Blvd.	I	Fast food/Conven.
60	Eleven M Corner	1133 11th St., NW	I	Fast food/Conven.

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