New York City Department of Sanitation

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RECYCLING: WHAT DO NEW YORKERS THINK?
FIVE YEARS OF MARKET RESEARCH

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Abbreviations and Definitions

Backyard	Outdoor area behind or adjacent to a residential unit
Baseline Study	Citywide market research study on recycling attitudes and behaviors, conducted in 1995
Benchmark Study	The first in a series of periodic, citywide, market research studies on recycling attitudes and behaviors, conducted in 1997. This research was followed up in Waves 1, 2, and 3.
BWPRR	Bureau of Waste Prevention, Reuse and Recycling (formerly known as the Recycling Programs and Planning Division)
Capture Rate	Percentage of items recycled out of all the recyclables present in the waste stream. The amount of recyclables in the waste stream is based on waste composition sampling.
Chinese-Speakers Study	Market research study among Chinese-speaking residents in Manhattan and Queens on recycling attitudes and behaviors, conducted in 1997
Community District/ Sanitation District	One of the 59 administrative districts of NYC whose Boards advise Borough Presidents and City agencies on planning and services. Sanitation Districts, designated by the NYC Department of Sanitation for operational/administrative purposes, fall within the same boundaries as community districts.
DOS/Department/Sanitation	NYC Department of Sanitation
Diversion Rate	The portion of total discarded materials collected by the NYC Department of Sanitation that is diverted from the waste stream through recycling. Diversion rate is measured by dividing the weight of collected recyclables by the weight of collected waste plus recyclables.
Expanded Recycling/ Expansion	Addition of mixed paper, beverage cartons, bulk and household metal to the materials collected for recycling citywide. The Expansion was phased in by borough from 1995 to 1997.
Grass Recycling	The practice of leaving grass clippings on the lawn to decompose after mowing, rather than bagging and disposing of them (also known as leaving-it-on-the-lawn)
MSW	Municipal solid waste
NYCHA	New York City Housing Authority
Local Law 19	Local Law 19 of 1989 (the NYC Recycling Law)

Abbreviations and Definitions

Low-Diversion District	Sanitation Districts with diversion rates below 12%
Organics Recycling/ QBUF Study	Citywide market research study on attitudes toward organics recycling and QBUF alternatives, conducted in 1997
Park Slope Intensive Recycling Zone	The area within Park Slope, Brooklyn chosen by DOS in 1990 as a test zone for the collection of additional recyclables, starting with mixed paper and all kinds of plastics; followed by organics (1991) and then beverage cartons and textiles (1993). Survey research on textile recycling and focus group research on organics recycling/QBUF's was conducted among residents of this Zone.
The "Program"	NYC Recycling Program
QBUF's	Quantity-based user fees, where residents are charged for garbage collection according to the volume of waste they generate
Sanitation Worker Study	Focus group market research study among Sanitation workers and supervisors on recycling attitudes and behaviors, conducted in 1996 and 1999
Statistical significance at the 90% and 95% level	There is a 90% or 95% chance that repeated sampling would give the same results.
Task Force	The Task Force established in 1996 to explore waste management options in anticipation of the closure of the Fresh Kills Landfill. The Task Force included representatives from Federal, City, and State government, and from the Environmental Defense Fund and Staten Island Citizens for Clean Air.
Task Force Report	The report, *A Plan to Phase Out the Fresh Kills Landfill*, produced by the Task Force in November 1996
Textile Recycling Study	Market research study among residents of the Park Slope Intensive Recycling Zone on textile recycling attitudes and behaviors, conducted in 1996
Waste Prevention	The practice of reducing waste by preventing its creation. This includes: buying products that have the least amount of packaging or are packaged to last longer; not buying more of a product than needed; reusing, donating, or repairing items that might otherwise be discarded as trash or for recycling.
Waste Prevention Study	Citywide market research study on waste prevention attitudes and behaviors, conducted in 1996
Wave	The phase in a series of citywide market research studies on recycling attitudes and behaviors conducted by DOS. Initiated in 1997 (called Benchmark), this research was followed up in Wave 1 (1998), and Waves 2 and 3 (1999).

Summary of Survey Sampling Methodologies

for each study that included a telephone survey component

The following is a summary of selection criteria and subgroup composition for the survey samples used in the quantitative portions of the market research studies discussed in this Report. Note that each study consisted of a different group of randomly selected respondents, even if selection criteria and group composition were the same.

Baseline Study

Date	December 1995
Selection Criteria	Respondents between the ages of 25 to 64, personally involved in deciding which items to recycle, and residing in a home that was currently recycling
Subgroups	
General Population	500 Residents of the five boroughs (100/borough), randomly selected to represent a cross-section of NYC's population in terms of income, age, gender, and race
Spanish Speakers	200 Randomly selected residents (50/borough with the exception of Staten Island) with Spanish surnames who identified Spanish as their primary language. Interviews were conducted in Spanish by professionally trained interviewers using a translated questionnaire.
NYCHA Residents	100 NYCHA residents identified at random from NYCHA housing lists.

Benchmark and Wave 1, 2, and 3 Studies

Dates	First conducted in September 1997, repeated in January 1998, January 1999, and July 1999
Selection Criteria	Respondents between the ages of 25 to 64, personally involved in deciding which items to recycle, and residing in a home that was currently recycling
Subgroups	
General Population	750 Residents of the five boroughs (150/borough) randomly selected to represent a cross-section of NYC's population in terms of income, age, gender, and race
Spanish Speakers	200 Randomly selected residents (50/borough with the exception of Staten Island) with Spanish surnames who identified Spanish as their primary language. Interviews were conducted in Spanish by professionally trained interviewers using a translated questionnaire.
NYCHA Residents	100 NYCHA residents who were identified at random from NYCHA housing lists
Low-Diversion Residents	In addition, 1,150 randomly selected residents from the City's 23 Sanitation Districts (50/district) with the lowest diversion rates, as of 1998, were surveyed in Waves 2 and 3.

Summary of Survey Sampling Methodologies

Chinese-Speaking Residents

Date	July 1997
Selection Criteria/ Group	200 Randomly selected Chinese-speaking residents from Chinatown in Manhattan and Flushing, Queens (100 each). Interviews were conducted in Chinese by professionally trained interviewers using a translated questionnaire.

Textile Recycling Study

Date	January 1996
Selection Criteria/ Group	50 Respondents selected at random from a list of Park Slope Intensive Recycling Zone residents, balanced according to income, age, gender, and race

Waste Prevention Study

Date	June 1996
Selection Criteria	Respondents between the ages of 25 to 64, personally involved in purchasing and waste management decisions
Subgroups	
General Population	500 Residents of the five boroughs (100/borough) randomly selected to represent a cross-section of NYC's population in terms of income, age, gender, and race
Spanish Speakers	200 Randomly selected residents (50/borough with the exception of Staten Island) with Spanish surnames who identified Spanish as their primary language. Interviews were conducted in Spanish by professionally trained interviewers using a translated questionnaire.
NYCHA Residents	100 NYCHA residents who were identified at random from NYCHA housing lists

Organic Recycling/QBUF's

Date	June 1997
Selection Criteria	Respondents between the ages of 25 to 64, personally involved in purchasing and waste management decisions
Subgroups	
General Population	500 Residents of the five boroughs (100/borough) randomly selected to represent a cross-section of NYC's population in terms of income, age, gender, and race
Spanish Speakers	200 Randomly selected residents (50/borough with the exception of Staten Island) with Spanish surnames who identified Spanish as their primary language. Interviews were conducted in Spanish by professionally trained interviewers using a translated questionnaire.
NYCHA Residents	100 NYCHA residents who were identified at random from NYCHA housing lists

Director's Note

I am pleased to issue *Recycling: What Do New Yorkers Think?* — the Department of Sanitation's Report on five years of market research about recycling in New York City. The Report takes a broad and systematic look at what the people of New York *actually think* about the City's Recycling Program, as well as how they feel about possible new alternatives for reducing waste.

All too often, public discussion about the subject of recycling in New York City is informed by political testimony or anecdotal evidence—while real information about the opinions, attitudes, and behaviors of the majority of citizens goes unexamined. In contrast, this Report takes a comprehensive approach to gathering and analyzing data, and as such can greatly contribute to discourse on NYC waste management policy.

Summarizing opinions of thousands of "average" New Yorkers, and reflecting feedback from the Sanitation workers and supervisors who actually handle (and recycle much of) our waste each day, this Report is uniquely grounded in real-world experience. For this reason, I expect it to be an important source of information for those who currently contribute to the debate on recycling policy in this city—including citizen and environmental interest groups, community leaders, and political officials.

This Report summarizes information contained in millions of computer-coded data points that were gathered through telephone surveys, and painstakingly analyzed using statistical techniques. While the paper printouts of such data analyses would reach over ten feet high (if the Department didn't practice waste prevention by storing them electronically), this Report captures the essence of what they convey. It is my hope that the graphs and explanations provided here will guide readers through this mass of data toward a clearer understanding of public opinion.

As the City moves forward with the closure of the Fresh Kills Landfill and seeks to further increase diversion rates, periodic monitoring of public opinion, using the scientific techniques of market research, will continue. This Report represents a base of knowledge upon which to add further data-gathering, and I hope will serve as a source of discussion for all New Yorkers as we face new waste management challenges in the 21st century.

Robert Lange
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Introduction

BACKGROUND

In 1995, the New York City Department of Sanitation stood at an important juncture. The City's first Residential Recycling Program ("the Program"), created when Local Law 19 was passed in 1989, had been in place for five years and was starting to become a way of life for New Yorkers. Launching the Program had entailed introducing recycling among diverse communities throughout the five boroughs, conducting a massive campaign to educate the public about the rules of recycling, and organizing the Department's infrastructural and operational resources to adapt to this new method of waste management. It had also meant the implementation of a number of pilot programs to test alternative methods to reduce waste. Ahead lay a new challenge: Expansion. Under Expanded Recycling, more materials than ever before would be recycled, and a new color-coded method for separation would be introduced. The year 1995 represented an opportune time to take stock of the existing Recycling Program and to plan for its future—and for this the Department needed to hear directly from New York City residents.

During this time, the Department also conducted pilot research to assess the effectiveness of other waste reduction policies that could, potentially, be implemented in New York City. In 1991, the New York City Council approved funding for an Intensive Recycling Zone, to be located in one community district in Brooklyn (# 6). The Zone tested the following: 1) recycling new materials, 2) new collection methods, 3) new set-out options for residents, and finally, 4) different public education and outreach methods. The Intensive Program, which lasted for six years, enabled the Department to evaluate the diversion potential of alternative methods of waste reduction. Backyard composting went on to be evaluated in-depth in four different test neighborhoods of the City, between 1997 and 1998.

Finally, throughout this same period, events were taking place that would forever change the way New York City disposes of its garbage. In 1996, responding to years of opposition by the residents of Staten Island, Mayor Rudolph Giuliani, Staten Island Borough President Guy Molinari, and Governor George Pataki issued a joint agreement for the closure of the Fresh Kills Landfill. According to the agreement, after December 31, 2001, the City would export waste to localities outside the metropolitan area. Shortly following this announcement, the Mayor and Governor established a joint Task Force to explore waste management options in light of the closure. The Task Force included representatives from Federal, City and State government, and from the Environmental Defense Fund and Staten Island Citizens for Clean Air.

Six months of research, analysis, and discussion led to the issuing of the Task Force's report, *A Plan to Phase Out the Fresh Kills Landfill*. This document called for research into the motivating factors for residential recycling participation. Noting that the diversion rate (which the Task Force members linked to recycling participation) varied across districts of the City, the authors stated that:

> Considerable effort and time was expended by the Task Force Membership on grappling with the myriad of issues that affect recycling participation. There did not appear to be any one explanation for the variation in participation rates across the City. . . . The Task Force concluded that additional information and a better understanding of the factors affecting participation was needed. . . . The Task Force members recommended and the City has agreed that a consultant should be retained to examine the variables that affect participation rates, and to analyze what specific plans might be implemented to increase diversion.[1]

Consensus from inside and outside the Department was clear: recycling in New York needed to be studied from the point of view of those who do it every day—New Yorkers. But this realization brought with it questions: What issues should residents be queried on? What conclusions might be validly drawn from self-reported information?

[1] Task Force Report, *A Plan to Phase Out the Fresh Kills Landfill,* November 1996, p. 83.

And how well would residents' reports of their attitudes and behavior fit with the measured variations in diversion rates across the City? Fortunately, a paradigm existed to address such issues: **market research.**

When a government agency gathers information about public attitudes, it is important to do so systematically. While testimony from individuals and anecdotal evidence are important, only ordered and consistent data-gathering ensures that the full range of points of view is represented. Market research is a proven, established method to gather such broad-based information. It is frequently used in the private sector to test consumers' reactions to products and services, but can be extremely useful for government as well, because it provides direct feedback from the public, allowing agencies to improve their services and policies based on "real-life" information about the people they serve. Market research methods may be **qualitative,** involving structured interviews of small groups of people, or **quantitative,** using surveys of large samples, with results analyzed statistically.

Conducting good market research takes skill, experience, and resources. To make sure that its research would adhere to professional standards, the Department contracted with Grey Entertainment, a subsidiary of Grey Advertising—one of the City's largest and most respected full-service advertising agencies. Grey was charged with the responsibilities of designing and carrying out the research that would answer questions the Department posed, and presenting results in a manner relevant to the Department's planning needs. Grey's extensive experience in surveying and interviewing—as well as its cutting-edge understanding of trends in public opinion, behavior, and preference—made it well-suited for this important work.

The resulting research, which has been ongoing since 1995, has contributed enormously to the Department's understanding of how New Yorkers think about recycling and how they have reacted to the Department's public education efforts. This report is about that research. It covers a series of studies, carried out over five years, that investigate general attitudes towards residential recycling, as well as specific points of view of certain subgroups of the population—including foreign-language speakers, residents from NYC Housing Authority (NYCHA) sites, residents of districts where the diversion rate is lowest, and Sanitation workers. In addition, this report discusses research on recycling alternatives, including textile recycling, waste prevention, organic-waste recycling (including municipal composting), and quantity-based user fees.

REPORT STRUCTURE

In the chapters to follow, this report will summarize the volume of data that has been gathered on these subjects in graphic, tabular, and text format. Readers who are interested in a detailed analysis of findings are referred to these sections.

The remainder of this chapter will present a summary of the major findings of the research, and a full discussion of their implications, for readers who prefer to review first the policy ramifications of the data that has been gathered.

MAJOR FINDINGS AND THEIR IMPLICATIONS

The Current Recycling Program

Survey and focus group research on the subject of recycling in New York City since 1995 shows a number of definite trends in recycling attitudes and behaviors among New Yorkers.

Widespread Approval of the Program

It is clear that the design and implementation of the residential Recycling Program lives up to New Yorkers' expectations. One of the most consistent and striking results of the market research is that **New Yorkers are very enthusiastic about recycling.** Year after year, results show that over 75% of residents rate the Program positively, and most believe that the Program has made New York City cleaner, has cut down on pollution from landfills, and has made productive use of materials that would otherwise have gone to waste. A more recent trend (seen since 1998) has been growing approval of the Program's organizational aspects—the "blue/green" system, the variety of materials that can be recycled, and the Program's overall efficiency.

Table 1

Report Structure

Chapter	Research Topic	Research Time Period	Population Studied
	Residential Recycling		
I	Pre-Expansion	12/95	General Population, Spanish-speakers, and NYCHA residents
II	Post-Expansion	begun in 9/97 and ongoing	General Population, Spanish-speakers, NYCHA residents, and Low-Diversion District residents
III	Chinese-Speaking Residents	7/97	Residents of Chinese-speaking communities in Manhattan and Queens
IV	Sanitation Workers	7/99	DOS employees in garages throughout the five boroughs
	Recycling Alternatives		
V	Textile Recycling	1/96	Residents of the Park Slope Intensive Recycling Zone
VI	Waste Prevention	6/96	General Population, Spanish-speakers, and NYCHA residents
VII	Organics Recycling and Quantity-Based User Fees	6/97	General Population, Spanish-speakers, NYCHA residents, Park Slope Intensive Recycling Zone residents, and Building Superintendents

A Strong Knowledge Base

What is Recyclable

A second major, repeated finding of the research is that **knowledge about what is recyclable, and the Program's rules, is strong.** Residents consider themselves well informed about recycling and correctly identify the major recyclables at very high rates (most over 90%). High knowledgeability is seen regardless of where residents live, whether English or Spanish is their primary language, or what type of housing they reside in. This is very good, but not surprising, news for the Department, which has consistently geared its public education towards explaining Program basics.

What is Not Recyclable

The research also clearly shows, however, that **confusion continues to exist about what is *not* recyclable.** Forty to sixty percent of residents persist in believing that they can recycle items not accepted under the Program—most often plastic receptacles such as yogurt containers and takeout containers, as well as styrofoam items. Furthermore, plastic grocery bags (which residents tend to use to dispose of recyclables, especially in apartment buildings) continue to be considered recyclable by about two-thirds of residents surveyed.

It would appear that residents are using erroneous criteria to decide what should go into the recycling bin. Since the Program is generally known to accept "metal, glass and plastic," it is possible that many residents believe that all items in these categories can be recycled, despite the fact that all of the Department's educational materials clearly indicate the particular metal, glass, and plastic items that are included in the Program. This confusion is compounded by the widespread and indiscriminate use of the term "recyclable" by producers of consumer goods in their marketing and promotion. Claims that a product is "environmentally friendly" because it is composed of material that is theoretically recyclable have nothing to do with local recycling programs, which must limit their designation of recyclables to items that have some economic value for resource recovery. Nationally marketed brands use environmental labeling and the recycling symbol (three chasing arrows) to stimulate consumption and increase sales.

Residents' over-inclusion of items in the recycling bin, while understandable and well-meaning, presents a problem with which the Department continues to struggle. Contamination—the mixing of nonrecyclable items with recyclable ones—complicates the recycling process because recovery facilities must remove the nonrecyclable items

from the acceptable metal, glass, plastic, and paper that is collected. Market research among Sanitation workers confirms that residential contamination is a problem. Since Sanitation workers routinely opt to place items about which they are unsure, such as bulk metal items that contain less then 50% metal, in a garbage truck rather than recycling truck, contamination at the street level does not appear to be a major issue. Instead, most contamination originates with residents' inclusion of nonrecyclables in recycling bins and bags.

Most New Yorkers Recycle, But Think Others Don't

What are the negative things New Yorkers have to say about the Program? After concerns about the infrequency of recycling pickups (which have been addressed with the institution of weekly collection citywide), the most common complaint among those surveyed was that **not all New Yorkers are doing their "fair share."** Much of this impression may stem from the difficulty of enforcing recycling laws among the 3.5 million households of the City, especially in apartment buildings where it is most difficult to establish accountability. The fact that this is the most common negative finding again suggests that the Program is on the right track. Rather than criticizing aspects of the Program itself, people are most likely to feel frustrated because they perceive that others are not participating.

Market research shows, however, that since 1995, the reported levels of nonparticipation have dropped dramatically, declining from 20% in that year to close to 5% as of 1999. (This finding is supported by the upward trend in the citywide diversion rate over this same period.) While self-reporting of compliance with the law is notoriously unreliable, the direction of the trend, measured over time, does suggest that the number of persons who don't participate in recycling is low. It is possible that residents' impressions of widespread noncompliance may be generated by other factors.[2]

Friendly Recycling Bins and Bags

The market research shows that the Department's cartoon campaign is gathering momentum as it is repeated, and that **residents are increasingly coming to identify the Program with its lovable characters, clever messages, and straightforward information.** This provides a powerful base upon which to introduce new concepts, reinforce ideas, and continue publicity in the future. The most successful public venues for these images are the transit system, billboards, newspapers, and television. Future market research will be able to confirm whether incorporation of cartoon themes into mass mailings (such as the updated recycling checklist, which was included with announcements of weekly recycling implementation throughout 1999) will improve residents' retention of mailed information. Sanitation workers, moreover, may represent an as-of-yet untapped resource for using cartoon images to educate residents. Working on recommendations from the last round of focus group interviews of workers conducted in late 1998, the Department developed a plan to distribute posters to garages (shown below) and supply workers with literature for distribution, both of which employ the cartoon theme.

[2] Sociological research has shown a tendency of individuals to construct and reinforce their identity as "law abiding citizens" by contrasting themselves with others whom they may perceive (sometimes erroneously) as flouting the law.

Consistent Attitudes Among Subsegments of the Population

New York City's population is not homogeneous. Within its borders, hundreds of nationalities are represented and over 25 major languages spoken. Incomes vary greatly, with 20% of residents living below the poverty level, a median household income of $23,000, the majority (around 60%) making between $15,000 and $75,000, and 2.5% earning in excess of $150,000.[3] Housing arrangements are diverse and atypical of most major U.S. cities as well: a mere 8.6% of New York City homes are single-family detached houses, and over 30% are apartment buildings with 50 or more units; out of all residences, 23% are owned and the remainder, 77%, are rented.

Popular belief and conventional wisdom often maintain that waste and recycling habits differ among members of different social groups. Such ideas are often based upon pre-existing opinions, anecdotal evidence, or in the case of the Task Force Report, an interpretation of local variations in diversion rates. In order to assess whether different demographic groups do, indeed, recycle differently, the Department has gathered hard data. Specifically, it has investigated the (self-reported) recycling behavior and attitudes among five distinct groups: Spanish and Chinese-speaking residents, NYC Housing Authority residents, Demographic Subgroups, and residents of Low-Diversion Districts.

Major Language Groups
New York is an international city, with foreign-born persons making up one-third of the population and over 25 major language groups represented. Public education about recycling must take into account language differences. Accordingly, most of the Department's materials are routinely translated into Spanish and Chinese (and some are translated into other languages as well). If there are problems with translation—in terms of word choice or concepts—some of the messages that the Department is seeking to impart may be lost. This is why research among these groups in particular is important.

While some findings suggested significant differences between the General Population sample and Spanish-speakers sample (notably that Spanish speakers were more positive about the Program in general and about its environmental benefits in particular), over time no clear trends of difference emerged. Research among Chinese speakers showed a somewhat lower rate of Program approval (but similar levels of knowledgeability). Feedback from leaders in the Chinese community indicates that DOS literature sent in Chinese would do well to focus on how recycling improves residents' lives and community, as opposed to the broader environment—an idea that is consistent with the Department's overall education strategy.

NYCHA Residents
Due to the unique institutional recycling arrangements at Housing Authority sites, surveys included a group comprised of NYCHA tenants, who number approximately 600,000 out of New York's seven million inhabitants. Residents in some of New York's 346 Housing Authority buildings face different recycling arrangements than most residents of apartment buildings in the City, because they are required to carry waste and recyclables to large, outdoor containers themselves. Open containers represent opportunities for contamination; and the inconvenience of transporting waste from apartments, often on high floors, complicates disposal arrangements.

Despite these obstacles, however, attitudes and behaviors reported by NYCHA residents did not, overall, differ in a statistically significant way from the General Population sample, nor did the few differences that were measured point to any marked and generalized trend over time. Recent research suggests that NYCHA residents' general approval of the Program, as well as their overall knowledge of the recyclability of items, may be falling in relation to residents of other types of housing, but as of yet no long-term trends in these directions have been established.

Other Demographic Variations
Over the course of the longitudinal research conducted since 1995, there were some instances

[3] City of New York, Department of City Planning. *Socioeconomic Profiles: A Portrait of New York City's Community Districts from the 1980 and 1990 Censuses,* March 1993.

of variation in recycling attitudes and behaviors by demographic characteristic (including income, gender, marital status, race, employment status, citizenship, length of time living in New York and in the USA, number of persons in the home, and age). However, only one category displayed any consistent trend, over time, of significant differences: housing occupancy status.

Differences between owners and renters are summarized in the tables accompanying Chapters I and II. In general, there is a tendency for renters to be slightly less knowledgeable about what not to recycle, yet more supportive of the environmental benefits of the Recycling Program. Homeowners, on the other hand, tend more to value aspects of the Recycling Program itself (such as its efficiency and organization), as well as to report recycling at slightly higher rates.

The lack of any clear trends that can be specifically attributed to income in the General Population sample supports the conclusions (described below) of the market research in Low-Diversion Districts (all of which have a lower median income than the City as a whole) that income is not a good predictor of recycling attitudes or opinions. This is important to keep in mind because a perceived connection between low income and low diversion does exist, as stated in the Task Force report:

> Evidence shows that districts on the lower end of the income scale have lower than average diversion rates. . . . [4]

Implicitly, it may often be assumed that low income results in low diversion because of less-committed attitudes on the part of this segment of the population. It is an important finding that none of the market research found evidence to support this idea, suggesting that there may be reasons other than resident attitudes in low-income neighborhoods that create conditions for a low-diversion rate.

Low-Diversion Districts

Residents of the City's 23 Low-Diversion Districts (which showed diversion rates consistently under 12%) were included in the market research to see if their behaviors and attitudes differed from those of the General Population sample. A major finding was that, in the vast majority of cases, there was no difference in attitudes and self-reported behaviors of these residents as compared to the General Population sample. This strongly suggests that there are other factors influencing the diversion rate, the most prominent of which may be the composition of waste in these neighborhoods. Results of a waste analysis conducted in 1998 show that Low-Diversion Districts have smaller fractions of paper and glass in their waste streams; a lower diversion rate may simply be the result of less to recycle.[5]

Low-Diversion Districts have received close scrutiny in recent years by the City Council and the environmental community. The research clearly shows that when thinking about how to increase diversion rates in these neighborhoods, it is important to rationally assess whether residents' attitudes and behaviors are a factor, or whether there are larger structural causes that determine these rates.

Alternatives to the Current Program

Since market research is an effective method to gauge public receptivity to new programs, it was used to investigate alternatives to the current Recycling Program. As might be expected, findings revealed varying levels of enthusiasm in regard to waste prevention and reuse, textile recycling, organic-waste recycling, and quantity-based user fees.

Waste Prevention and Reuse

As the Bureau of Waste Prevention, Reuse and Recycling's name indicates, the Department recognizes waste prevention and reuse at the top of the waste reduction hierarchy. The theoretical environmental and economic benefits of both of these methods—which focus on preventing garbage from being generated in the first place—are clear. Less waste to collect means lower collection costs, as well as fewer environmental impacts associated with waste disposal. At the residential level, municipal policies of waste prevention and reuse often include encouraging consumers to: 1) buy items with less packaging (such as concentrated or

[4] Task Force Report, p. 82.

[5] New York City Department of Sanitation. *Mixed Waste Processing in New York City: A Pilot Test Evaluation*, October, 1999.

larger size products); 2) use durable dishware and utensils instead of disposables; 3) reuse grocery bags or use tote bags for shopping; 4) donate clothes or other products to charity; 5) repair items instead of throwing them away; and 6) remove their names from junk mail lists.

What Has Been Done

The Bureau's Waste Prevention Unit, which has carried out numerous research and technical assistance projects to encourage waste prevention in public institutions and businesses, has dedicated significant resources to waste prevention education at the **residential** level as well. In 1991, as part of its Partnership for Waste Prevention program, the Department educated patrons of dry cleaners, supermarkets, and Chinese restaurants about site-specific waste reduction activities. Using a mix of personal outreach, store posters, and other contact methods, the Department urged customers to: return hangers and polyethylene bags to cleaners for reuse; bring their own bag or refuse unneeded bags at the supermarket; and take only those utensils, sauce-packs, and napkins they need when buying Chinese take-out. Furthermore, in 1991, 1993, and 1994, DOS sponsored several Household Hazardous Waste Collection Days and promoted general, residential waste prevention in the accompanying publicity.

Also, beginning in 1991, the Department produced and distributed several waste prevention brochures. Some were part of larger recycling education efforts, while two in particular—the *NYC Waste Reduction Handbook* and *The DOS Guide to Reuse in NYC*—were promoted exclusively as part of waste prevention initiatives. The brochures were widely distributed by Department outreach staff at community meetings and events, through local organizations, in response to requests generated by a 1993 subway poster campaign, and through the Sanitation Action Center. In 1993, the Department sent every New York City household information about how to have their names removed from third-class mailing lists. In 1996, the Department reinforced these efforts with mail-in postcard displays in public offices, libraries, and organizations. Since 1993, there has also been waste prevention information in the Yellow Pages telephone directories. At present, an automated telephone system with information about where residents can donate, buy, sell, rent, or repair reusable goods is being pilot-tested in Staten Island. This hotline, called *The NYC Stuff Exchange,* will be publicized citywide when testing is completed.[6]

Research Findings

Despite these efforts, citizens and organizations interested in waste prevention have continued to press for expanded public education on this topic, believing it to be an untapped resource for decreasing the City's waste stream. And indeed, the first major finding of the Department's market research in this area (summarized in Chapters I, II, and VI) was that among New York City residents, there is a decided lack of understanding as to what the term "waste prevention" means. Moreover, survey respondents persistently associate waste prevention with *recycling*, even after being provided with a definition. However, once residents understand the concept, most (80%) say they consider it important, listing many advantages and few disadvantages to this form of waste reduction. Both of these results would support an argument for expansion of public education in the area of residential waste prevention.

However, the research just as clearly revealed that while New Yorkers frequently reuse plastic bags, and sometimes engage in reuse and repair of other items, they only occasionally make buying decisions based on size or packaging. Why do residents engage in some and not other waste prevention behaviors? The market research suggests that the answer lies in the economics of everyday life.

In both the focus groups and survey research, most residents associated waste prevention activities that involved purchasing decisions with higher shopping costs. For example, members of focus groups stated that brand loyalty, price, and perceived product value influenced their choice more strongly than how a good was packaged; and there was wide-spread belief that environmentally friendly products were more expensive. In other cases, residents reported that the inconvenience of a behavior, such as bringing a reusable shopping bag to the grocery store, overrode its environmental benefits, even when residents approved of such a practice in

[6] For further information about waste prevention and other outreach efforts, see the Department's report, *NYC Recycles: More Than a Decade of Outreach Activities by the NYC Department of Sanitation, FY 1986-1999*, Fall 1999.

the abstract. Residents also had a strong sense that producers, as much or more so than consumers, should bear the burden of waste prevention and that any government regulations should focus on the way goods are packaged and not on influencing buying behavior.

Microeconomic Realities

These results are consistent with a microeconomic theory of consumer behavior, in which individuals seek to maximize direct benefits and minimize direct costs through a rational weighing of one against the other. One might counter that such rational factors are not the only ones to determine individual behavior—and that abstract or shared environmental benefits and costs can also come into play. Indeed, recycling participation, which is voluntary in many communities outside of NYC, can be interpreted as a behavior with no direct benefits that is practiced solely out of a concern for the greater public good. The unique problem with purchasing-based waste prevention, however, is that benefits that are immediate and direct outweigh benefits that are long-term and indirect.

In order to put New Yorkers' responses into perspective, one can compare their attitudes to those of Californians, as studied by the California Integrated Waste Management Board. In 1991, the Board issued a report summarizing its own focus group research on this subject.[7] This research also found that waste prevention habits were driven far more by economic considerations than environmental or civic motivations, even among the most ecologically committed individuals. California residents reported that consumer-based waste reduction habits—such as buying in bulk, purchasing products made from recycled material, choosing brands with less packaging, or shopping for used items—rarely hinged on a desire to protect the environment. Instead, consumers made choices to buy in a way that produced less waste when the convenience, economy, and/or quality of product were perceived as higher than alternatives. Consumers showed the most willingness to prevent waste **when it did not impact consumption**; specifically in the cases of donating used items to charity, or repairing large appliances. The same economic motivations caused them to resist the idea of repairing small appliances, because it cost more than replacing them. And like New Yorkers, Californians felt that more responsibility lay with producers of packaging and goods than with themselves, noting the need for corporate cooperation and government intervention in creating a less wasteful marketplace.

It would seem, therefore, that consumers engage in activities that prevent waste only when these activities do not entail additional cost or inconvenience. **In sum, residents choose to prevent waste when there are rational reasons to do so that deal with their daily lives.**

Organic Waste Recycling

The Department of Sanitation's citywide waste composition study, conducted in 1990 and summarized in the *1992 Comprehensive Solid Waste Management Plan,*[8] estimated that the City's waste stream contains around 5% yard waste and 15% food waste. The Department currently collects leaves and other forms of yard waste[9] in the four outer boroughs of the City, and actively encourages voluntary backyard composting through extensive partnership with the City's botanical gardens. However, there are additional methods that other municipalities have used to divert food waste, including collection for centralized composting and in-sink garbage disposals. The Department's market research sought to test residents' reactions to these options for New York City waste management policy.

Among those who could afford them, **in-sink garbage disposals were the most attractive form of organic waste management.** Eighty percent agreed that promotion of garbage disposals should be studied as a solid waste management option in New York City, and half said they would be willing to pay some or all of the costs of installing a disposal. Focus group discussions also suggested that many New Yorkers, especially those who own their homes, were strongly interested in this alternative.

[7] California Integrated Waste Management Board and DDB Needham Advertising, *Report on Waste Management Strategic Development, Consumer and Business Focus Groups,* December 1991, Gail Golieb Marketing Research, Westlake Village, CA.

[8] New York City Department of Sanitation, *1992 Comprehensive Solid Waste Management Plan*.

[9] The Department does not include grass clippings in its leaf collection program because they present serious odor problems in outdoor composting.

On the other hand, the idea of separating the food component of garbage for collection and centralized composting was much less appealing to New Yorkers, although most did agree that the City should study this option as a waste management policy.[10] At the personal level, residents strongly objected to envisioned unsanitary conditions, odors, and mess that separating and storing food waste would entail. What's more, while they conceded that organics separation might be good for the environment, all considered it **unrealistic to expect people to segregate their discarded food.**

In addition, the results of market research on grass recycling show that there is already moderate participation (close to 30%) among New Yorkers who have lawns to mow, a testimony to the success of the Department's ongoing "Leave It On The Lawn" campaign. The findings also point to the need in future campaigns to reemphasize the positive (and real) nutritive properties of grass recycling and counter misconceptions about clippings' harmfulness or unsightliness.

Quantity-Based User Fees

Quantity-based user fees (QBUF's) charge residents for garbage collection according to the volume of waste they generate. **Research results on this topic were contradictory**. Focus group participants expressed strong resistance to QBUF's, believing that New York City taxes should be sufficient to cover collection costs, that fees would encourage illegal dumping, and that City streets would become dirtier as a result of such a program. Homeowners in particular felt that they would be unfairly singled out for enforcement and fines; superintendents suspected that such a program would be impossible to fairly implement in apartment buildings.

On the other hand, nearly all telephone survey respondents were open to the general idea that the City should consider quantity-based user fees as a policy option. This discrepancy between focus group reactions and survey responses may have been due to the wording of the survey question, which did not probe respondents' reactions to how quantity-based user fees would affect them personally. It is likely that a clearer definition of the specifics of a fee-for-service program would have to be communicated in future research to accurately evaluate public response to this issue. At present, more targeted research on the subject of QBUF's is in the planning stages at BWPRR.

Textile Recycling

The Department's 1990 Waste Composition Study estimated that textiles represent 4.75% of New York's waste stream. This finding led the Department, as part of its 1992 Intensive Recycling Zone Program in Park Slope, Brooklyn, to explore the idea of collecting textiles at curbside for processing along with other fibers such as cardboard and paper.[11]

The analysis found that textile recycling was only carried out by a small subset of residents. Instead, it appeared that donation to charity was the preferred method of disposal of unwanted cloth. This may be because charity donation has a much greater precedent than curbside collection of textiles and avoids the problems associated with scavenging that residents occasionally reported encountering in this pilot.

These results make intuitive sense. In pursuing any public goal, it is preferable to capitalize on infrastructure that is already well known and in place, rather than reinventing a costly, duplicate system. New York City has an extensive network of clothing donation charities, which include the Salvation Army and Goodwill, to name a few. In order to encourage diversion of the 4.75% textiles

[10] In considering this policy option in general, it must be remembered there are serious operational difficulties associated with organics collection that public participation cannot control. In 1992, the Department initiated a pilot to test the feasibility of residential source-separation of organics in Park Slope, Brooklyn. The pilot demonstrated that residents in medium density ("brownstone") housing, when educated through extensive and constant outreach programs, were willing to source-separate their organic waste. In fact, the Park Slope program achieved food-waste capture rates that approximated 50%. However, the cost of adding a fourth truck route, at maximum load rates of 5 tons per truck (compared to an average of 10 tons per truck for solid waste, 8 tons per truck for paper recycling, and 7 tons per truck for leaf collection) precluded consideration of this program for citywide expansion. Perhaps more significantly, a similar pilot conducted in Starrett City, Brooklyn, which has higher density housing more typical of the City, resulted in minimal food waste diversion that was so heavily contaminated that it could not be composted. The expense and difficulty of collecting source-separated food waste in densely populated areas make such programs impractical for cities like New York. In fact, even in countries such as Germany and Holland, where source-separated composting plays a significant role as a waste management strategy, such programs are not carried out with equal success in high-rise buildings in the larger, denser cities like Berlin and Amsterdam.

[11] The Intensive Zone in Park Slope, Brooklyn included the following items for recycling collection: organics, textiles, mixed paper and plastics, and beverage cartons.

in the waste stream into these channels, the Department is currently pilot-testing a "Stuff Exchange" hotline that provides residents with referrals to local charities to which they can donate unwanted textiles and other items.

Implications for Diversion

The Department of Sanitation's primary measures of residential recycling success are the diversion rate and the capture rate, which are calculated as follows:

Diversion Rate = tons of recyclables collected* / tons collected (trash and recycling)

**tons are recorded when trucks deliver waste to transfer facilities*

Capture Rate = tons of recyclables collected* / tons of recyclables actually in the waste stream**

**tons are recorded when trucks deliver waste to transfer facilities*
***known from a citywide waste composition study conducted by DOS in 1991*

The diversion rate measures how much of all waste is being collected as recyclables, while the capture rate assesses the extent to which recyclable items are actually being recycled. Taken together, they give an indication of how much and how well residents are recycling. As of December 1999, these rates were 21% and 46%, respectively.[12]

In its report, the Task Force highlighted the need to increase diversion in the City, stating:

> The . . . rate for diversion of recyclables from residential waste needs to go up to assure maximal marketing of recyclables, and the greatest feasible reduction in waste disposal needs. . . . The data shows variations in participation rates at all levels on the socio-economic scale. . . . More uniform levels of diversion would stabilize the collection costs as well as reduce the overall reliance on exportation.[13]

The Department's market research has yielded telling results about recycling attitudes and behaviors in New York City, but it is important to be clear on what the research can predict about *diversion*. Market research provides excellent feedback about how residents experience the Recycling Program, and about their reactions to public information and new program ideas. It cannot and does not, however, explain changes in the actual diversion rate that the Department measures daily. This rate is heavily affected by other factors that determine the composition of the waste stream—primarily macroeconomic and microeconomic conditions that determine what is produced, and how much of it people buy and discard.

The large sample sizes, random selection, and the breadth of questions in the market research surveys make it likely that the results obtained are representative of New Yorkers as a whole. However, because residents do not weigh and measure the household waste they produce every week, there will always be inherent, unavoidable problems in connecting *reported* recycling behavior to *actual* recycling rates. Thus the fact that residents consistently report an average diversion rate of 50% and a capture rate of 75% is more indicative of internalized standards for their own behavior than actual diversion or capture. And finally, while the survey research measured a mere 5% of residents who say they do not recycle at all, there are always problems in trying to assess compliance with the law.

Given these limitations to the data, what are we to make of the fact that Program approval is so high, its benefits are so widely acknowledged, behaviors and attitudes are similar across different segments of the population, and awareness of what is recyclable is so strong, yet the diversion rate does not at present yield tonnages that correspond to those required by Local Law 19?[14]

[12] Department of Sanitation, *NYC Monthly Recycling Curbside and Containerized Total Diversion Report,* December 1999.

[13] Task Force Report, pp. 81-82.

[14] Local Law 19, the City's recycling law, is predicated on a 25% diversion rate for household material; New York's current rate is 21%. Two recent reports indicate that this is an excellent achievement given the City's density and the lack of yard waste. A U.S. Conference of Mayors study (*Multi-Family Recycling Costs, Diversion, and Program Characteristics*, May 1999) of 40 communities with apartment-house recycling found that, excluding yard waste, the average diversion rate for multifamily recycling was 14% (16% without yard waste for single-family sectors in those communities). New York City's rate is higher. And Franklin Associates (*Municipal Solid Waste Recycling Rates; New York City and the U.S.; Comparison and Analysis*, June 1999), who calculate the national rate for EPA, found that the national residential rate for the materials in the City's program was 13.1% in 1997. (National rates have changed little since then.)

Clearly, the public education campaign that the Department has mounted is achieving its goals of promoting enthusiasm and understanding of the Program. The market research has given every indication that its current theme of animated characters and explanation of Program rules work effectively to educate residents about how to recycle. Yet at the same time, there is a lack of correlation between varying attitudes and diversion rates throughout the City.

This may suggest that seeking improvements in diversion by focusing on individual recycling behavior may not be fruitful. Or, the lack of correlation may be due, to an unknown extent, to confounding variables—such as Program changes involving acceptable items and collection schedules—that make finding a measurable, direct link between public education and diversion unlikely. **While it makes intuitive sense that encouraging more participation through public education will increase diversion, there is no definitive statistic that supports this idea.** Therefore, consideration should be given to larger questions involving the composition of waste streams in massive, densely populated urban environments to gain an understanding of the diversion rate and where it may be headed.

Table 2 (on page 26) shows that the diversion rate has been steadily increasing since 1992. It is difficult however, to directly link these increases to waves of public education, or other efforts to encourage participation. It would appear that habituation to the Recycling Program, combined with Expansion from 1995-97 and possible changes in the waste stream, are responsible for improved diversion.

In addition to encouraging increased recycling, many in New York's environmental community have proposed alternative methods to increase the tonnage of residential waste that is diverted, beyond what can be achieved with traditional recycling. Market research is useful in separating hopes from reality here as well. It suggests that the public reacts well to garbage disposals for food waste, voluntary backyard composting and leaf collection programs for yard waste, and donation of textiles to charity. These preferences correspond to the waste reduction initiatives currently being pursued by BWPRR.

On the other hand, the research shows strong resistance to organics separation, quantity-based user fees, and some forms of consumer-level waste prevention. It is notable that each of these policies imposes far more on residents than do existing recycling programs, or more welcomed waste reduction alternatives. Whether to introduce and enforce such programs is a matter for consideration by the people of the City and their political representatives. For its part, the Department recommends pursuing methods of waste reduction that are user-friendly.

Furthermore, when considering any program alternative, it is important to remember that **residential receptivity to alternative waste reduction programs says nothing about their potential impact on overall diversion.** We know through direct measurement that as of 1999, the Department's yard waste collection programs divert close to 20,000 tons per year,[15] and extensive field research suggests that backyard composting could, at most, divert 5,700 tons per year.[16] The diversion impacts of programs to capture textiles or to promote installation of garbage disposals would need to be similarly established—that is, by direct measurement—before their efficacy for appreciably increasing diversion could be estimated and discussed. The question is then whether such intense study, as was carried out for backyard composting, is warranted when weighed against other public priorities.

NEXT STEPS

Due to the success of the animation campaigns, the Department plans to continue using the cartoon characters in future public education efforts. The familiar bins and bags, and other characters, will reinforce messages about what is and is not recyclable in NYC. New characters will be added for leaf collection, Christmas tree recycling, and backyard composting, as shown on the next page.

[15] The Department also diverts about 7,000 tons of food waste and wood chips on Rikers Island every year.

[16] For an extensive discussion of the diversion potential of Backyard Composting, see the Department's report *Backyard Composting: A Comprehensive Program Evaluation*, June 1999.

Market research has been crucial for testing residents' reactions to the original characters and for checking if public education messages are reaching target audiences. As such, it is a strong tool for program evaluation, and its continued application will be essential to ensure that public education is on the right track.

The market research, furthermore, has been very useful in guiding BWPRR to invest its resources in programs that impact substantial segments of the waste stream and that residents seem to appreciate. These include not only the mandatory Recycling Program, but also voluntary programs for yard waste collection, backyard composting, and reuse. The research does not, however, support programs for organics collection, consumer-based waste prevention, and QBUF's.

An important finding of the Department's market research is the **counter-intuitive conclusion that residents' attitudes and behaviors are not directly related to the City's overall diversion rate.** For this reason, the Department recommends a shift in emphasis away from the individual New Yorker and towards an examination of waste composition citywide, as the discourse about how to improve diversion continues.

The results of the Department's recent waste composition study in Low-Diversion Districts suggest that assumptions about how much of New York's waste stream is recyclable may need to be updated and refined.[17] Local Law 19 tonnage mandates, which were set before the last waste composition study was conducted ten years ago, need to be reevaluated in light of the current composition of the waste stream. The year 2000 may be an opportune time to reestablish citywide waste composition in conjunction with the U.S. Census, and in anticipation of the momentous change the City is poised to undergo as it moves toward waste export.

[17] This study found smaller fractions of paper and glass in low-diversion districts than the 1990 waste composition study had indicated. For a full discussion of this subject, please see *Mixed Waste Processing in New York City: A Pilot Test Evaluation*, DOS, October 1999.

Table 2

NYC Recycling Program Time Line

NYC Residential Recycling Program Development	Outreach and Education Highlights	Diversion Rates
1986 – 90: Collection of designated recyclables—newspaper, magazines, corrugated cardboard, metal, glass, and plastic—in many of the City's 59 Community Districts; curbside and containerized services provided.	***Localized outreach during pilot phases:*** Massive community outreach with development of site and mailing lists for targeted outreach to curbside and containerized sites, since program trials were not the same in each neighborhood.	
1990 – 93: ➪ Borough-wide collection and processing of designated recyclables phased in for all 3 million City households plus public institutions.	***Activities during this recycling implementation phase:*** Meetings with elected officials and district managers; gathering of organizational contacts for meetings and mailings. Print ads in local and citywide newspapers. Educational literature produced in English, Spanish, Chinese, Korean, Greek, French Creole, Polish, and Russian. Mailings to 3 million households, 138,000 apartment building owners and managers, and churches and other institutions. Special kick-off events (Kermit the Frog visits the Greenmarket!). Hundreds of school assemblies. Visits to churches, senior centers, and other community groups. Landlord and tenant seminars, decal distribution, sound trucks, and moving billboards. Ads on radio, TV, subways, buses, bus shelters, store fronts, and billboards. Ads in newspapers.	FY92: Households and institutions recycle 194,000 tons; diversion rate is **5.4%**.
1991 – 95: Two Intensive Zones test participation and costs of recycling expanded materials, including textiles and food waste.		
1992 – 96: Phase-in and expansion of collection of Christmas trees and Fall leaves for composting.		FY94: Diversion rate is **12.8%**.
1993 – Present: Voluntary backyard composting assistance.		
1995 – 97: ➪ Program expanded citywide to include mixed paper, and bulk and household metal.	***Activities during and following expansion phase:*** New rounds of meetings with elected officials, community groups, schools, and building superintendents. Mailings to all 3 million households, some with reply cards and decals. Mailings to all building owners and managers, public institutions, and residential management companies. Bus, subway, bus shelter, and other outdoor posters. Local newspaper and cable ads.	FY98: 595,000 tons recycled — 1,900 a day; **16%** diversion rate. June 1999: 2,200 tons a day recycled; **18%** diversion rate.
1997 – Present: ➪ Ongoing program support; weekly collection expanded.	Outreach in districts with low-diversion rates, including targeted advertising and distribution of recycling videos to schools and libraries. Seminars for building superintendents. Ongoing school visits and presentations to community groups. Spring and Fall comprehensive advertising campaigns, including TV, radio, newspapers, and outdoor media outlets.	(1999 finishes at **20%** diversion.) ⇧ NYC is like a microcosm of the nation. The U.S. residential recycling rate (excluding grass & yard waste) was 13% in 1996.* The rate for cities with multi-family recycling is 14% to 18%.** In NYC, 59 districts' rates range from 6% to 31%.

* *Municipal Solid Waste Recycling Rates; New York City and the U.S.; Comparison and Analysis* (Franklin Associates, June 1999).

***Multi-Family Recycling: Costs, Diversion, and Program Characteristics* (Barbara Stevens; prepared for U.S. Conference of Mayors/US EPA, May 1999).

Chapter I Pre-Expansion Market Research

BACKGROUND

In 1995, the Department of Sanitation's Bureau of Waste Prevention, Reuse and Recycling conducted its first market research study of recycling attitudes and behaviors among New York City residents. The purpose of this research was to gauge New Yorkers' attitudes towards the Residential Recycling Program, which had been in effect citywide since 1993 and was about to expand to include additional materials.[1]

The research focused on respondents':

1. Overall approval of the Recycling Program, and its perceived benefits and/or disadvantages.
2. Beliefs about why recycling was required in New York City.
3. Experience complying with Program requirements.
4. Opinions about enforcement under the Recycling Law.
5. Knowledge of materials or items accepted in the Program as of 1995.

SURVEY DESIGN

A total of 800 respondents were selected at random for the telephone survey. Of these, 500 were chosen from what is referred to in the study as the "General Population"—residents of the five boroughs who were randomly selected to represent a cross-section of New York City's population in terms of income, age, gender, and ethnicity. Other respondents were selected because they primarily spoke Spanish (200 respondents) or lived in New York City Housing Authority (NYCHA) buildings (100 respondents). To be included in the survey, respondents had to be between the ages of 25 and 64, personally involved in deciding which items to recycle, and residing in a home that was currently recycling.

Results of the survey were tabulated separately for the General Population, Spanish Speakers, and NYCHA residents. In addition, the General Population sample was further analyzed in subgroups that corresponded to borough of residence and several demographic characteristics (i.e., housing type, age, income, gender, etc.). Statistically significant differences among groups and subgroups were tested at the 90% level—which means that there is a 90% chance that repeated sampling would give the same results.

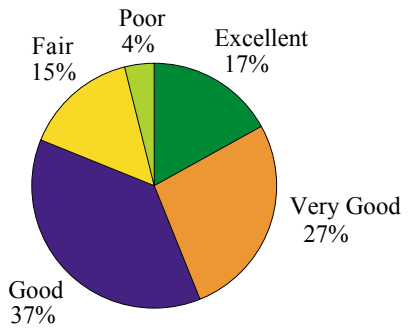
FINDINGS AMONG THE GENERAL POPULATION

Rating of the Program

The results of the survey revealed that, overall, New York City residents rated the Program positively. As Figure I-1 illustrates, a total 81% of all respondents rated the program as "excellent," "very good," or "good." Moreover, among those who rated the Program negatively, only 4% considered it "poor."

Figure I-1

Overall Rating of Recycling Program



[1] As of 1993, the Recycling Program collected the following materials citywide: newspapers, magazines, catalogs, phone books, corrugated cardboard, plastic bottles and jugs, glass bottles and jars, metal cans, and aluminum foil products. In 1997, the Program expanded to include mixed paper, beverage cartons, and household and bulk metal.

Figure I-2

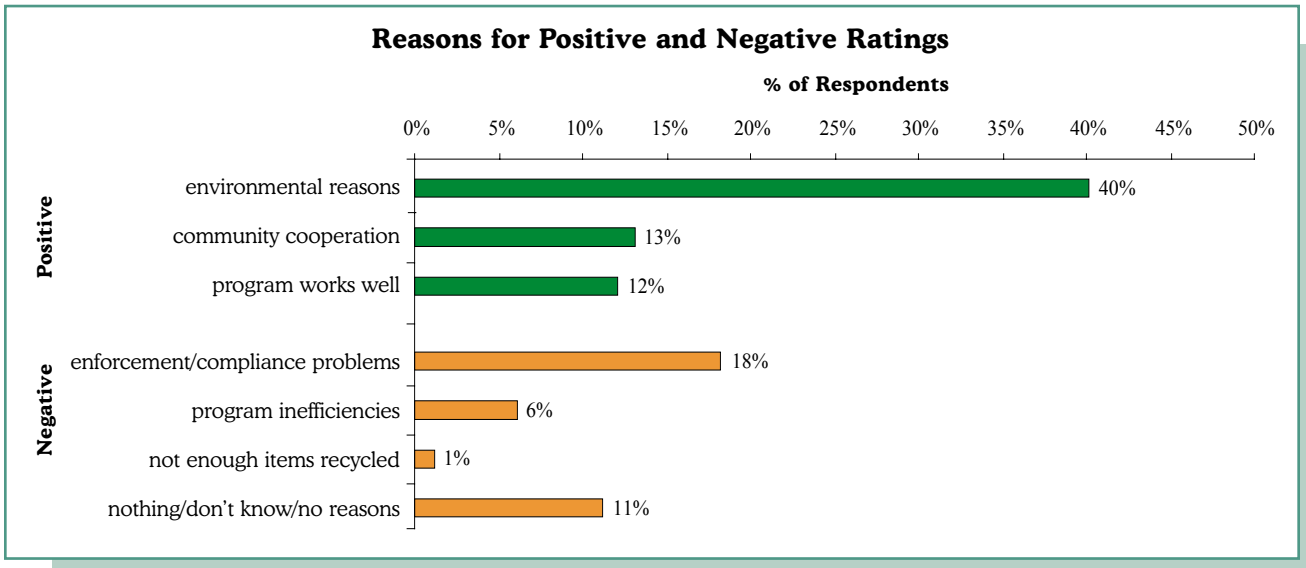
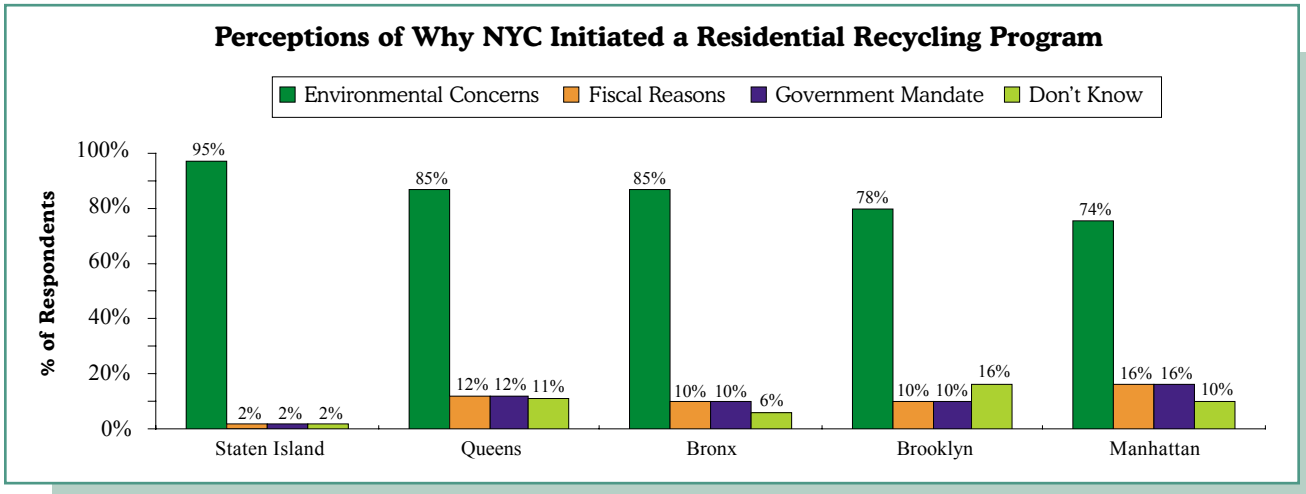


Figure I-2 above shows that respondents were most likely to rate the Program positively for environmental reasons, which included neighborhood cleanliness, decreasing landfills, reducing pollution, and overall environmental protection. Smaller percentages cited community cooperation, or in general felt that the Program worked well and was easy to follow. Justifications for negative ratings included lack of compliance, and Program inefficiencies such as infrequency of collection or complexity of the Program. Just over 10% of respondents rated the Program negatively for no reason at all.

Respondents were asked to speculate about why they thought the City had initiated its Residential Recycling Program. Responses varied widely, but most commonly dealt with the environment in one way or another. A total of 82% of respondents cited saving the environment, addressing problems of full landfills, keeping the neighborhood clean, and preventing pollution as motivations for the City's introduction of the Program. Among the five boroughs, Staten Islanders were most likely to cite environmental reasons (95% as opposed to 82% overall), mentioning landfill-related issues

Figure I-3



more often than the General Population. Overall, a much smaller number of respondents cited cost savings, revenue generation, or government mandates as bases for Program introduction. Only 11% stated that they did not know why this Program was in existence. Figure I-3 on page 28 shows the breakdown of responses according to borough.

Knowledge About the Program

Self-Assessed Knowledgeability

The level of knowledge about the 1995 Recycling Program varied among those surveyed. As shown in Figure I-4 below, when asked how knowledgeable they considered themselves, half of the residents stated "extremely" or "very," while the other half said "somewhat" or "not at all."

Recyclable Items

In order to directly test recycling knowledge, respondents were read a list of items (some of which were accepted under the Program at that time and others which were not) and asked whether they considered each "recyclable." Over 80% of all residents correctly identified the recyclable items, showing the highest awareness for glass (96%) and the lowest for shampoo/lotion bottles (84%).

Figure I-4

Degree of Knowledgeability About Items Accepted Under NYC's Recycling Program

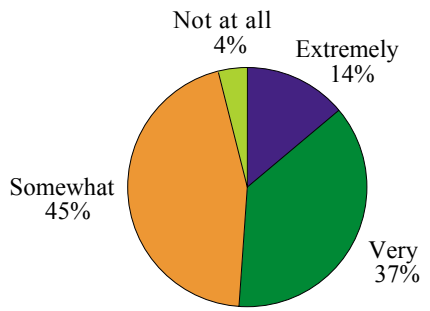


Table I-1

Respondents' Identification of Items Accepted in the Recycling Program in 1995

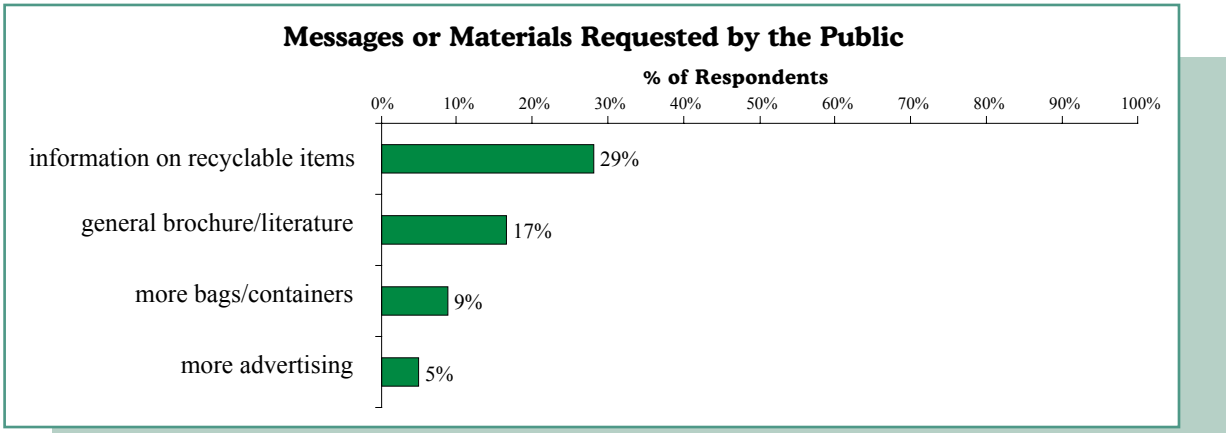
	% Who Consider This Item Recyclable
Recyclable in 1995	
glass jars	96%
soda bottles/cans	95%
newspapers	94%
plastic milk/water jugs	91%
aluminum foil/trays	85%
cans	85%
shampoo/lotion bottles	84%
Not recyclable in 1995*	
aerosol cans	63%
cereal boxes	57%
milk/juice cartons	57%
discarded mail	40%
Never recyclable	
bottle caps/jar lids	66%
yogurt containers**	59%
Chinese take out containers**	56%
plastic deli containers**	56%
styrofoam cups/plates	50%
ceramic/mirrors	45%
light bulbs	41%

*These materials were added to the recycling program under the Expansion.

**From Sept. '90 – June '82, when plastic recycling was being pilot-tested in 16 Sanitation Districts, these plastic items were collected. After June 1992, the Department began collecting only plastic bottles and jugs for recycling in response to market conditions.

Conversely, over 40% of respondents thought that one or more *nonrecyclable* items were recyclable. Leading this list were jar caps and lids (approximately 66% of respondents believed these recyclable), as well as yogurt containers, certain take-out containers, and styrofoam cups/plates (thought to be recyclable by over 50% of respondents). Items not part of NYC's Recycling Program in 1995, which have subsequently been added under the Expansion (cereal boxes, milk cartons, and discarded mail), were thought recyclable by over 40% of respondents. Table I-1 above summarizes residents' tested knowledge of the Program.

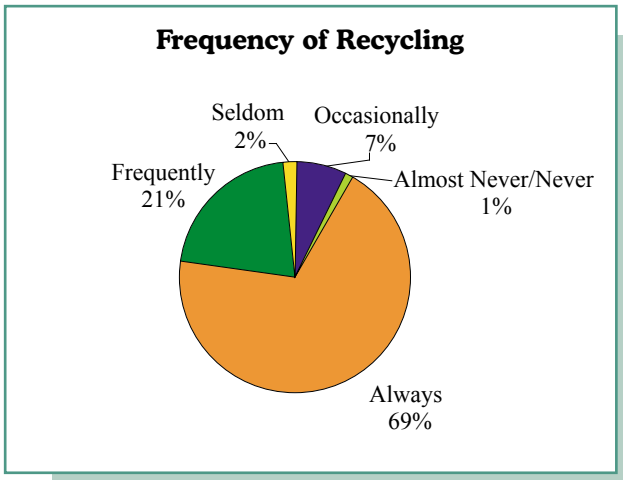
Figure I-5



Public Information Awareness

As recycling was implemented throughout the City, DOS periodically mailed informational flyers and brochures to educate residents.[2] When questioned, roughly half of respondents reported receiving literature at one time or another from the Department. Staten Islanders were most likely to report this, while Manhattanites were the least. Of residents who said they received literature, most remembered a recycling brochure, a list of recyclable items, and/or a collection schedule. When asked what additional messages or materials might be needed (in addition to what was available at that time), respondents most commonly requested a list or update of recyclable items, followed by a general brochure, recycling bags or containers, and advertising (see Figure I-5 above).

Figure I-6



Compliance and Enforcement

Recycling Frequency and Awareness of the Law

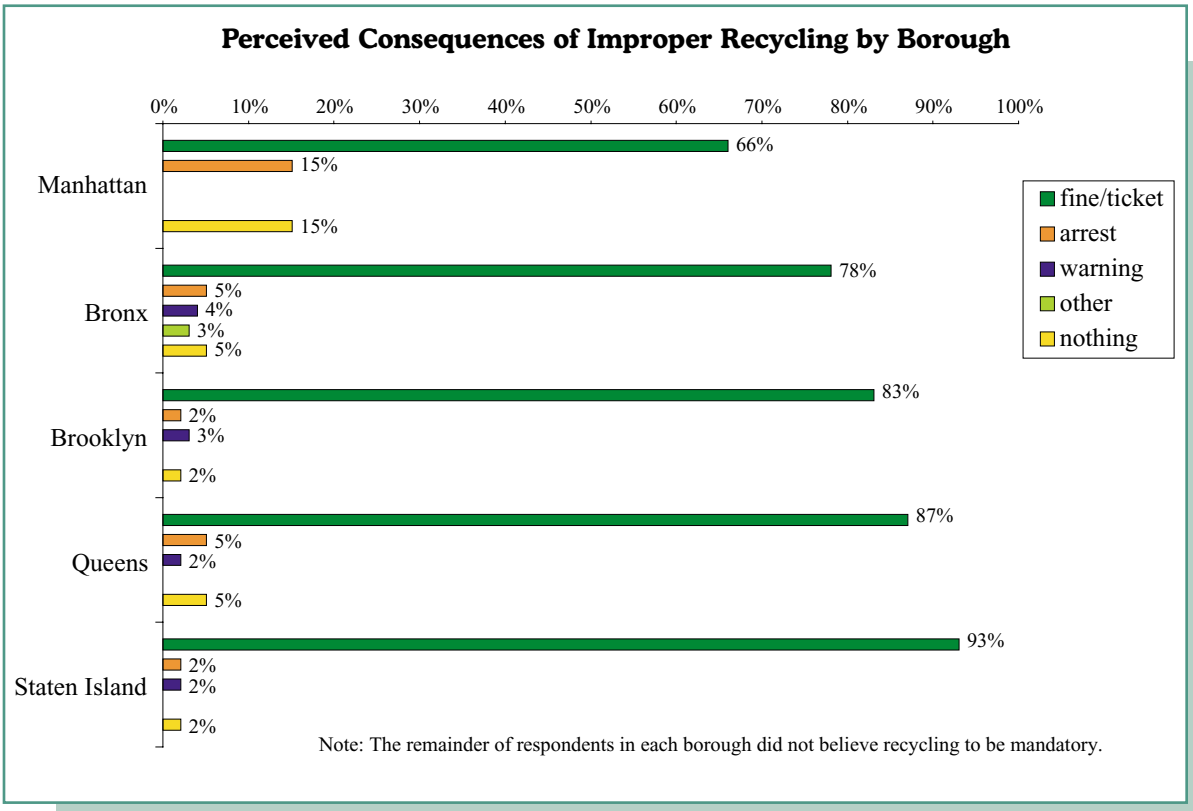
Figure I-6 at left shows that in 1995, the vast majority of residents (90%) reported "always" or "frequently" recycling.

The survey furthermore found that residents were well-aware that recycling was required under the law, with 95% of all respondents stating that they knew this. No borough fell under 90% for this measure. When asked in a separate question whether residential recycling was mandatory, 91% of respondents also said "yes." Among those who were aware that recycling was required by law, 78% listed a fine or ticket as the most likely consequence for improper recycling; less than 5% cited arrest, receiving a warning, "nothing," and "other." Manhattanites were significantly less likely to cite ticketing as a consequence for improper recycling, yet more likely to list "arrest" or "nothing" (see Figure I-7).

While ticketing was the most commonly perceived consequence for failing to recycle, only 8% of Queens residents reported receiving tickets; the percentage from the other boroughs averaged 1- 4% (see Figure I-8).

[2] For more information on the Department's outreach and public education programs, see *New York City Recycles: More Than a Decade of Outreach Activities by the NYC Department of Sanitation, FY 1986-1999*, Fall 1999.

Figure I-7

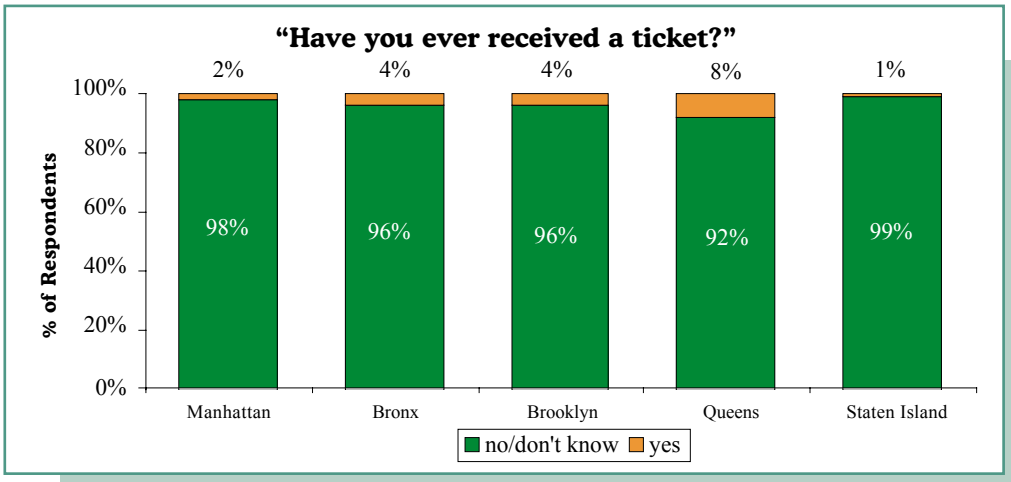


Compliance Behavior

The NYC Recycling Program requires residents to empty and rinse recyclables before setting them out for collection. When questioned about their compliance with this part of the Program, 61% of respondents reported frequently rinsing out metal, glass, and plastic before recycling and 18% reported occasionally doing so, leaving 21% who seldom or never did.

Respondents were also asked whether they placed their recycling bins in front of their house or apartment, or if they used a central collection area

Figure I-8

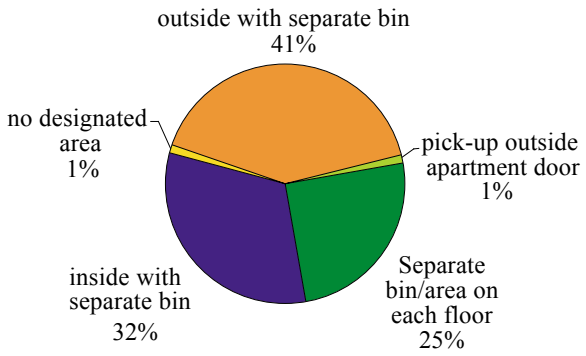


for their recyclables. The results were roughly 50-50 for each option. Manhattanites were most likely to store bins centrally (75%) and Staten Islanders were most likely to place them in front of their homes (88%).

Among residents with centralized collection areas, 25% reported access to a recycling bin on each floor of their building, 32% to one bin in the building, and 41% in an area outside the building (see Figure I-9). Staten Islanders were much more likely to have outdoor bins (75%) than residents from other boroughs.

Figure I-9

For Households with Central Collection Area: Location of Bins (all boroughs)



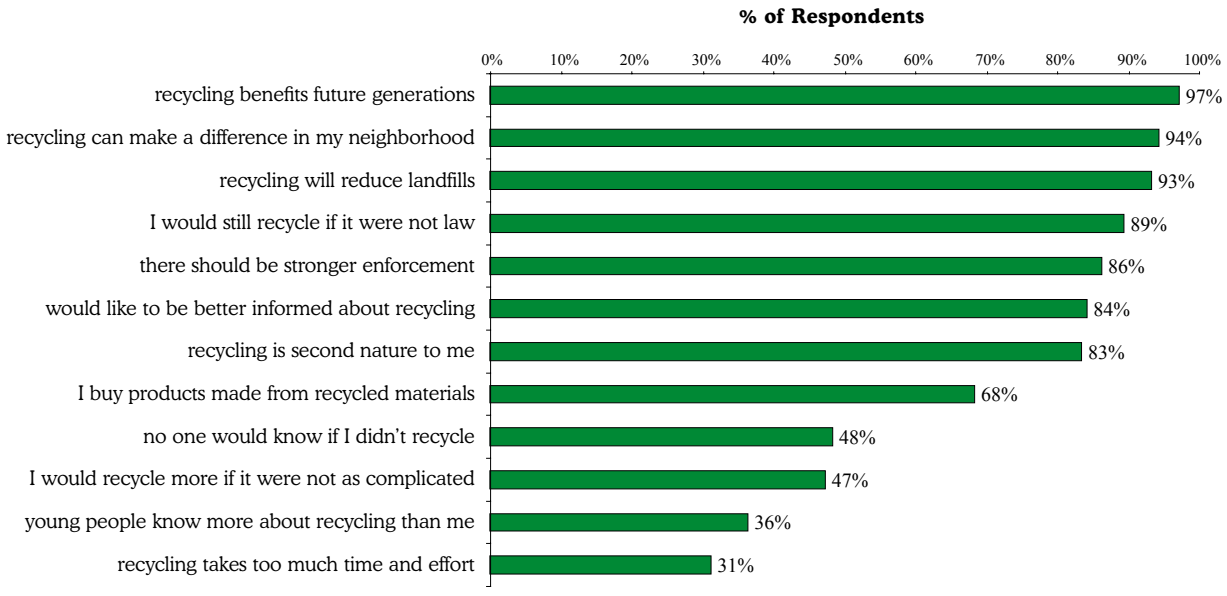
Recycling Attitudes

Twelve statements about recycling were read to respondents, who were asked to agree or disagree "completely" or "somewhat." Statements reflected environmental awareness, compliance concepts, needs for information, citizens' reported recycling habits, and other ideas.

As reflected in Figure I-10, residents were most likely to agree with statements about the positive environmental aspects of recycling (i.e., its benefit to future generations, respondents' own neighborhoods, and/or landfill reduction), and least likely to agree with negative statements about recycling (which focused on time, effort, and complexity of recycling as well as respondents' lack of awareness as compared to younger people).

Figure I-10

Agreement with Recycling Statements



Attitudes about compliance were more complex. While the majority of respondents agreed that they would still recycle if it were not required by law (89%), and that recycling was "second nature" (83%), a major portion of respondents said that there should be stronger enforcement (86%). A sizable number of respondents (48%) agreed with the statement, "even if I do not recycle, no one would really know."

The statements also revealed respondents' interest in recycling. Eighty-four percent agreed that they wished they could be better informed about recycling, and 68% stated that they tended to buy products made from recycled materials.

SUBGROUP FINDINGS

The findings reported thus far have pertained to the General Population—that sample of 500 residents selected at random from New York City's overall population. In addition to studying how recycling was viewed and experienced by the "average" New Yorker, the Department also investigated the attitudes of specific group members who—for varying reasons—might understand and/or comply with the Recycling Program differently. These included Spanish speakers, NYCHA residents, and selected demographic subgroups of the General Population.

These groups were selected for study for the following reasons:

Spanish Speakers
The Department of Sanitation's informational materials are available in several foreign languages, which correspond to those most commonly spoken in New York.[3] Almost all literature and advertising is translated into Spanish due to the size of the Latino community. In order to test how advertisements and other recycling messages were reaching this audience, the Department randomly selected residents with Spanish surnames in order to recruit a sample of 200 who identified Spanish as their primary language.

NYCHA Residents
Recycling arrangements at many NYCHA buildings are unlike any other in the City in that many residents are required to carry recyclables to outside containers. Because of this unique situation, a group of 100 NYCHA residents were selected for study.

Demographic Groups
Demographic data collected from all surveyed residents allowed for the investigation of statistically significant differences among responses that coincided with age, gender, income, education, housing status, or other demographic factors. Among these, only two categories accounted for a sizeable number of significant differences: income and housing status.

Major findings of differences among each of these groups are summarized in Tables I-2 through I-5 on the pages that follow. In interpreting these findings, please note that only significant and sizeable differences are presented. The vast majority of measures did not differ significantly among subgroups, or, if they did, differed by less than five percentage points.

Spanish Speakers

The comparison of Spanish speakers' responses to those of all respondents suggests that Spanish speakers held a more positive view of the Recycling Program (mainly for environmental reasons) and expressed a stronger desire for heightened enforcement—although a greater number stated that they did not know why the law had been enacted (see Table I-2).

Data concerning Spanish speakers' understanding of the Program, however, were mixed. On one hand, Spanish speakers were more likely than residents as a whole to rate themselves as "extremely knowledgeable" about the Recycling Program and to correctly identify shampoo or lotion bottles as recyclable. On the other hand, they were less likely to correctly identify newspapers as recyclable, more prone to state in error that a number of nondesignated items were recyclable,

[3] The Department currently produces materials in the following languages: Spanish, Chinese, Korean, Russian, Polish, Greek, and French Creole.

and more often agreed with the statement that "younger people know more about recycling than I do." In addition, despite their positive ratings of the Program, over half agreed that "recycling takes too much time and effort," as opposed to only one-third of respondents as a whole.

NYCHA Residents

As Table I-3 shows, there were several substantial significant differences between Housing Authority residents and the surveyed group as a whole. The disparities that were found suggested that NYCHA residents had a less positive view of the Program, and lower levels of understanding and compliance with its requirements. A somewhat higher percentage of NYCHA tenants, however, agreed that "recycling was second nature to them" (27% vs. 16% overall).

A marked difference between this group and the respondents as a whole involved bin location. As might be expected, nearly 80% of NYCHA residents used an outdoor bin to store recyclables, as opposed to 41% overall. This fact is important because it greatly influences enforcement, as centralized collection removes accountability from those who generate waste and assigns it to superintendents and building managers who consolidate it for pickup.

Care must be exercised in interpreting too much from the significant differences found between

Table I-2

Significant Differences:
Spanish Speakers vs. All Respondents

	Spanish Speakers	All Respondents		Spanish Speakers	All Respondents
More Spanish speakers than total respondents...			***Fewer Spanish speakers than total respondents...***		
rate the Program excellent or very good	↑**56%**	43%	thought of reasons to rate the Program negatively	↓15%	**28%**
thought of reasons to rate the Program positively	↑**73%**	62%			
rate the Program positively for environmental reasons	↑**55%**	40%			
rate themselves "extremely knowledgeable" about the Program	↑**22%**	14%	recall having received literature about the Recycling Program	↓31%	**52%**
correctly identify shampoo/lotion bottles as recyclable	↑**90%**	84%	correctly identify newspapers as recyclable	↓83%	**94%**
incorrectly consider four items* recyclable	↑**65%**	57%			
agree that younger people know more about recycling than they do	↑**50%**	36%			
do not know why law was enacted	↑**17%**	11%	say law was enacted to protect the environment	↓76%	**82%**
			say law was enacted to reduce the landfills	↓5%	**12%**
agree that there should be stronger Program enforcement	↑**93%**	86%			
agree that no one would know if they did not recycle	↑**60%**	48%			
agree that recycling takes too much time and effort	↑**57%**	31%			

*** jar lids, yogurt containers, take-out containers, and light bulbs**

↓ and ↑ indicate a significant difference at the 95% level

Table I-3

Significant Differences:
Housing Authority Residents vs. All Respondents

	Housing Authority	All Respondents
More Housing Authority residents...		
rate Program "fair" or "poor"	↑**33%**	19%
rate themselves somewhat/not at all knowledgeable	↑**67%**	49%
place dirty cans in trash	↑**19%**	9%
state that recycling is second nature	↑**27%**	16%
place recyclables in an area outside the building	↑**79%**	41%
Fewer Housing Authority residents...		
"always" or "frequently" recycle	↓ 77%	**90%**
rate themselves extremely/very knowledgeable about the Program	↓ 33%	**51%**

↓ and ↑ indicate a significant difference at the 95% level

respondents as a whole and Spanish speakers or NYCHA residents. As mentioned previously, in most cases Spanish speakers and NYCHA residents had responses that were similar to those of the General Population, and in many instances significant tendencies suggested in one question were canceled out by those measured in a second, similar question.

The Role of Income

It is important to keep in mind that the Spanish speakers and NYCHA residents surveyed were more likely than the General Population to have incomes under $20,000. Half of the Spanish speakers and 40% of the NYCHA residents reported incomes in this range, as opposed to only 25% of

Table I-4

Significant Differences, by Income

	Low Income	High Income
More high-income respondents (over $29,000/year)...		
"always" or "frequently" recycle	87%	↑**94%**
rinse recyclables	51%	↑**69%**
are aware that recycling is mandatory	89%	↑**95%**
say ticket would result from noncompliance	75%	↑**82%**
More low-income respondents (under $29,000/year)...		
rate Program "excellent"	↑**21%**	13%
rate themselves somewhat/not at all knowledgeable about the Program	↑**53%**	49%

↓ and ↑ indicate a significant difference at the 95% level

respondents as a whole and only 11% of the General Population group.

An analysis by income of all households surveyed (see Table I-4 on the previous page) suggests that there were small but significant differences among respondents with incomes over $29,000 per year and those earning less than this amount. Differences show that respondents with higher incomes report recycling more frequently and are more aware of the compliance requirements of the Program. On the other hand, 21% of low-income respondents rate the Program "excellent," as opposed to 13% of high-income households. These differences do not point to one consistent trend. The lack of clear results suggests that the causes of differences between Spanish speakers or NYCHA residents and the General Population are complex.

Owners vs. Renters

As Table I-5 indicates, there were significant differences between renters and owners regarding recycling knowledge, behavior, and attitudes. Homeowners were more knowledgeable about the Program, and showed a greater understanding of why the law was enacted. **Renters, in general, expressed more appreciation of recycling for its**

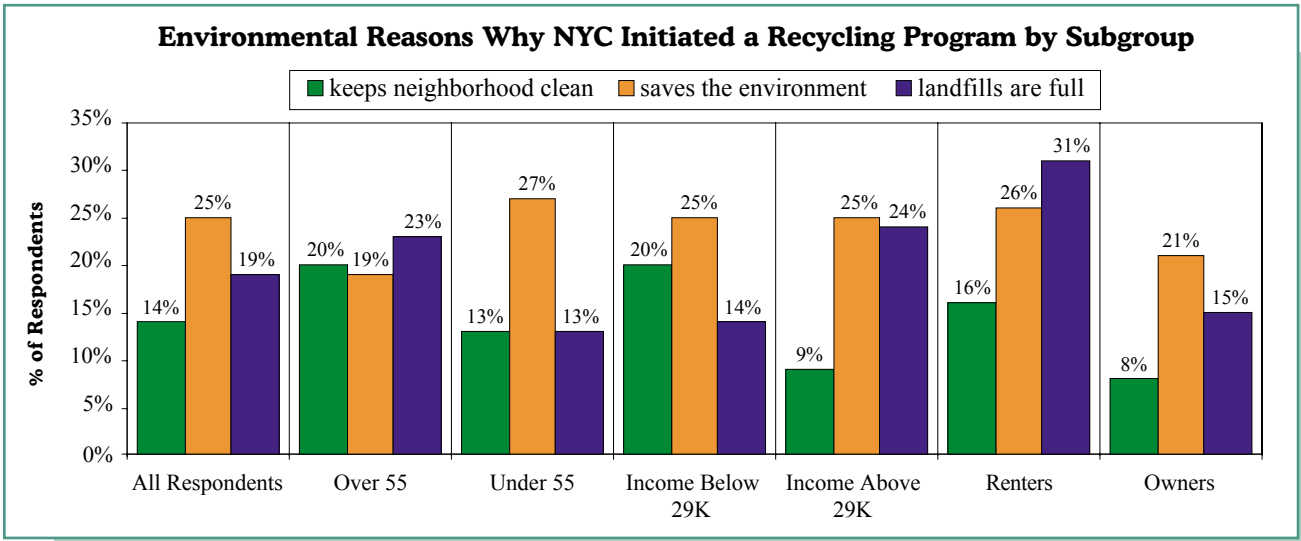
Table I-5

Significant Differences, by Home Ownership

	Owners	Renters
More renters...		
feel recycling takes too much time and effort	21%	↑**34%**
admit discarding newspapers instead of recycling them	7%	↑**11%**
agree that there should be stronger enforcement of the Program	81%	↑**88%**
agree that no one would know if they did not recycle	38%	↑**51%**
say law was enacted to keep the city clean	8%	↑**16%**
do not know why law was enacted	7%	↑**12%**
rate the Program positively because it will keep the neighborhood clean	8%	↑**20%**
rate themselves somewhat or not at all knowledgeable about the Program	37%	↑**53%**
incorrectly considered 10 nondesignated items recyclable	42%	↑**57%**
wish they could be better informed about recycling	78%	↑**87%**
agree that young people know more about recycling than they do	29%	↑**38%**
agree that they would recycle more if it weren't so complicated	39%	↑**50%**
More owners...		
feel that recycling is second nature to them	↑**89%**	81%
believe the City initiated recycling for environmental reasons	↑**87%**	80%
believe the City implemented recycling specifically...		
because the landfills are full	↑**31%**	15%
for monetary reasons	↑**11%**	7%
rate themselves extremely or very knowledgeable about the Program	↑**62%**	47%
have received literature about the Recycling Program	↑**70%**	45%
still have this literature	↑**53%**	36%
know that the following are recyclable...		
glass bottles	↑**98%**	95%
newspapers	↑**99%**	92%
aluminum foil	↑**92%**	82%

↑ **indicates a significant difference at the 95% level**

Figure I-11



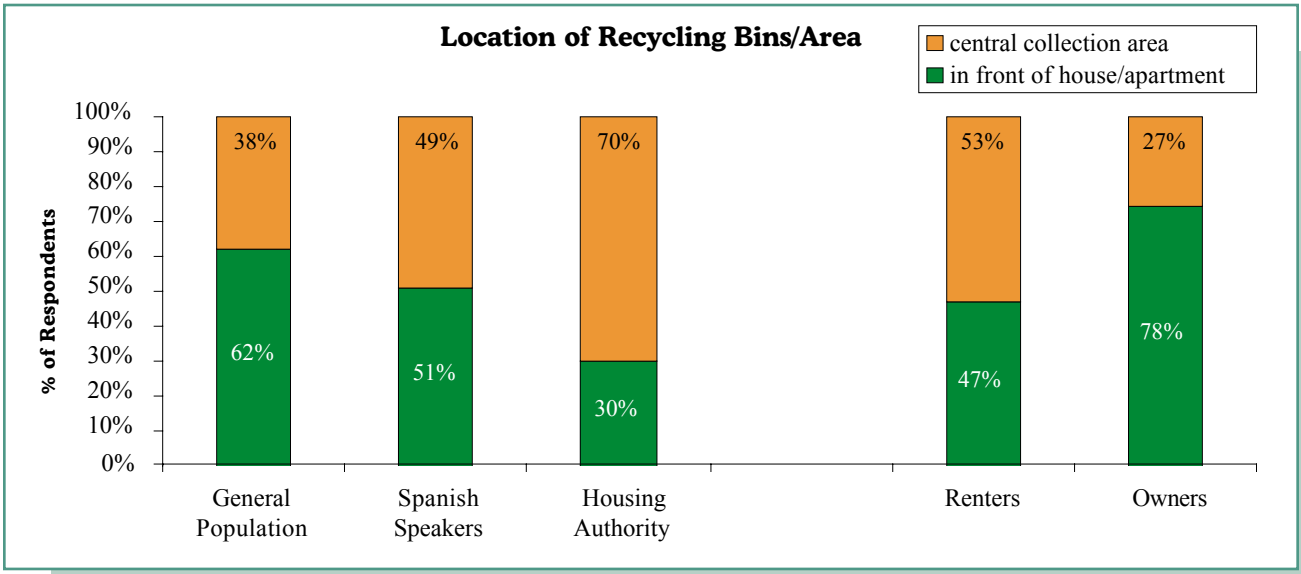
neighborhood benefits, yet were overall less compliant and knowledgeable.

Comparative Variations

Figure I-11 shows how perceived environmental reasons for recycling were segmented according to local and global benefits. While there was variation by income, age, and home ownership, in general more New Yorkers felt that recycling would "save the environment" than mentioned local effects within neighborhoods or at the landfill.

Figure I-12 shows another area in which there was significant and marked variation among subgroups: bin location. Not surprisingly, renters and NYCHA dwellers were more likely to place recyclables in a central area, rather than at curbside.

Figure I-12



GENERAL CONCLUSIONS

This first citywide recycling survey yielded important results for the Department.

1 The first was that the majority of respondents viewed NYC's Recycling Program positively. Residents generally believed that recycling had been initiated for environmental reasons—to protect natural resources, reduce landfills, and keep neighborhoods clean. Among the majority who rated the Program positively, the most common reasons cited were also environmental—pollution reduction, neighborhood cleanliness, and/or landfill reduction.

2 Secondly, there seemed to be strong awareness that recycling was mandatory under the law. Perceived consequences of noncompliance corresponded to what they actually were: ticketing and fines. It should be noted, however, that a fair portion of respondents thought that no action would result if they failed to recycle or recycled improperly. The roughly one-third of respondents who rated the Program negatively most often cited lack of citizen compliance and the need for greater enforcement as their reasons.

3 Thirdly, the most important finding of this study was that there was a gap between residents' assessment of their own knowledge about the Program and their knowledge when directly tested. The majority of respondents rated themselves as extremely or very knowledgeable about recycling, and over 80% of all respondents—regardless of how they assessed their own knowledgeability—*did* correctly identify the major categories of recyclable materials as such. However, there was a tendency for those surveyed to be over inclusive about acceptable items; roughly half incorrectly identified one or more items as recyclable that were not accepted at the time of the survey.

These findings shaped subsequent public education campaigns and research efforts. Later research, conducted to assess the efficacy of new public education initiatives, supported many of the findings of the 1995 study, yet also revealed residents' increasing comfort and familiarity with the Program. Analysis of subgroup findings, provided in the next chapter, became more refined as the surveys were repeated, and revealed far fewer trends of difference over time than the 1995 research had suggested.

Chapter II Post-Expansion Market Research

BACKGROUND

In 1995, the Department of Sanitation introduced Expanded Recycling to New York City, adding to the list of recyclable materials and introducing a two-color source separation system. Expanded Recycling was phased in over time and by geographic area. Staten Island started first in the Fall of 1995, followed by one district in Brooklyn (# 6, which contained the Intensive Recycling Zone) in January 1996, and all districts of the Bronx the following April. One year later, in April 1997, Manhattan came on board, followed in late September by the rest of Brooklyn and all of Queens. Table II-1 below summarizes the Expansion timetable.

The Expanded Recycling Program added mixed paper, beverage cartons, and household and bulk metal to the list of items that residents were required to recycle. It also introduced a two-color container system to simplify the separation of recyclables from the rest of the waste stream. Since recycling had begun, "blue" had been associated with metal, glass, plastic, and foil recyclables; under Expansion, "green" was designated as the color associated with mixed paper.[1] The basics of the Expanded Recycling Program are summarized in Table II-2.

Table II-1

Implementation Dates for Expanded Recycling

Borough	Districts	Implementation Date
Staten Island	all	November 15, 1995
Brooklyn	# 6	January 22, 1996
Bronx	all	April 1, 1996
Manhattan	all	April 1, 1997
Brooklyn	all remaining	September 29, 1997
Queens	all	September 29, 1997

Table II-2

Color Scheme for Separating Recyclables in New York City

"BLUE"	"GREEN"
Beverage Cartons, Bottles, Cans, Metal, and Foil	***Paper and Cardboard***
beverage cartons	paper and envelopes
small metal items	smooth cardboard
plastic bottles and jugs	paper bags
glass bottles and jars	newspapers, magazines, and catalogs
metal cans	phone books
aluminum foil wrap and trays	corrugated cardboard
Go In	***Go In***
a labeled bin (preferably blue)	a labeled bin (preferably green)
OR	*OR*
a blue translucent bag	a clear bag
OR	*OR*
any bin with a blue DOS Recycling decal	any bin with a green DOS Recycling decal

[1] Throughout this report, the term "blue" refers to the blue bin/blue-labeled can/blue bag system for recycling beverage cartons, bottles, cans, metal, and foil; and "green" refers to the green bin/green-labeled can/clear bag system for mixed paper.

When the expansion was fully implemented citywide, the Department launched a new, comprehensive advertising campaign that included television, radio, outdoor, and print media outlets. The campaign featured several user-friendly cartoon characters—particularly green and blue recycling bins—who explained the Expanded Recycling Program. The animation campaign started in October 1997 and has run biannually in the Spring and Fall ever since, incorporating concepts suggested by ongoing market research.

MARKET RESEARCH "WAVES"

In September 1997, March 1998, January 1999, and again in July 1999, the Department conducted a series of telephone surveys to study recycling attitudes citywide. These surveys (called **Benchmark, Wave 1, Wave 2, and Wave 3)** asked questions similar to the 1995 survey discussed in Chapter I, and also probed residents' opinions about Program *changes* that accompanied Expansion. The first survey, the Benchmark, was conducted just before Wave 1 of advertising campaign began in order to gauge the response to the new animation campaign. The market research timetable is outlined in Table II-3.

As indicated in Table II-3, each survey is named in relation to the Department's "waves" of advertising. The remainder of this Report discusses the results of the Benchmark, Wave 1, Wave 2, and Wave 3 surveys. It examines how the studies reflect the recycling attitudes of New Yorkers, and how such attitudes have changed over the course of the advertising campaigns.

Since the surveys used in this research initiative are not identical to the survey conducted in 1995, their results are not strictly comparable to the earlier results reported in Chapter I—although these data do serve as a context for our understanding of present attitudes.

Table II-3

Timetable of Advertising and Market Research Surveys

Event	Dates	Description
Benchmark survey	**September 1997**	**Asked residents about: their rating of the Program; knowledge of its rules; awareness of changes under Expansion; attitudes about compliance, enforcement, and level of service; awareness of Expansion-related literature or other DOS information; and environmental attitudes.**
Wave 1 of advertising	October – November 1997	Animated campaign is introduced; residents are reminded to recycle additional items and to use the blue/green system.
Wave 1 survey	**January 1998**	**Identical questions to Benchmark.**
Wave 2 of advertising	February – June 1998, October – December 1998	Spring: The same animated campaign as Fall 1997, with additional "comic strip" ads on subways and more outdoor media outlets. Fall: Ads focus on individual, confusing items and stress better source separation; special Spanish radio promotion.
Wave 2 survey	**January 1999**	**Similar questions to Benchmark and Wave 1, focusing on advertising recall and comparing the Program to when it first began; added questions about waste prevention.**
Wave 3 of advertising	April – June 1999	The animated campaign focuses on "green" mixed paper recycling; the new "recycling checklist" is introduced, showing streams of recyclables falling into the correct bins and bags.
Wave 3 survey	**July 1999**	**Same survey as Wave 2.**

SURVEY DESIGN

Survey respondents for the Benchmark, Wave 1, Wave 2, and Wave 3 surveys were selected at random. Samples included 750 persons chosen to reflect the **"General Population."** This sample was comprised of 150 residents from each of the five boroughs who represented a cross-section of the New York City population in terms of income, age, gender, and ethnicity. In addition, 200 more respondents (50 from each borough, except Staten Island) were identified from a random list of persons with Spanish surnames, and were selected for the survey specifically because they spoke Spanish as their primary language. The interviews with Spanish-speaking residents were conducted by professionally trained interviewers using a translated questionnaire. The study also targeted 100 residents of New York City Housing Authority (NYCHA) buildings, identified at random from housing lists, to understand the opinions of this portion of the City population.

To be included in the survey, respondents had to be between the ages of 25 and 64, personally involved in decisions about what to recycle, and residing in a home that was currently recycling.[2] Results of the survey were tabulated separately for the General Population, Spanish Speakers, and NYCHA residents. The General Population sample was further analyzed into subgroups that corresponded to borough of residence and several demographic characteristics (housing type, age, income, gender, etc.). Statistically significant differences among groups and subgroups were tested at the 95% level. Statistically significant differences among groups were examined in two ways—among each other within a given wave of research, and over time across waves.

It is important to keep in mind that *different* groups of randomly selected residents were used in each survey. Thus the results do not track attitude changes among a specific group of people, but rather on average. This is consistent with standard, statistical-sampling methodology.

[2] Residents who claimed not to recycle at all were not surveyed further. Out of all residents contacted, this represented 24% at Benchmark, 16% at Wave 1, 7% at Wave 2, and only 4% at Wave 3.

SURVEY QUESTIONS

The surveys addressed several areas of inquiry about recycling, including:

1. **Rating of the Program**—whether residents viewed the Program and its recent changes as positive or negative, and why. Reasons were volunteered in a free format by respondents, and later categorized into sets that summarized various concepts.

2. **Knowledge about the Program**—when directly tested, as well as self-assessed. This category of questions also probed understanding of how the Program has changed, and how the advertising campaign has increased knowledge.

3. **Attitudes about Compliance, Enforcement, and Level of Service**—including recycling behaviors, perceptions about enforcement of the law, and satisfaction with collection frequency and timeliness.

4. **Awareness of DOS advertising and public education efforts.**

5. **Attitudes about the relationship of recycling to the community and the environment**—including views on recycling's relationship to neighborhoods and landfills, waste prevention, and citizen cooperation.

FINDINGS AMONG THE GENERAL POPULATION

Rating of the Program

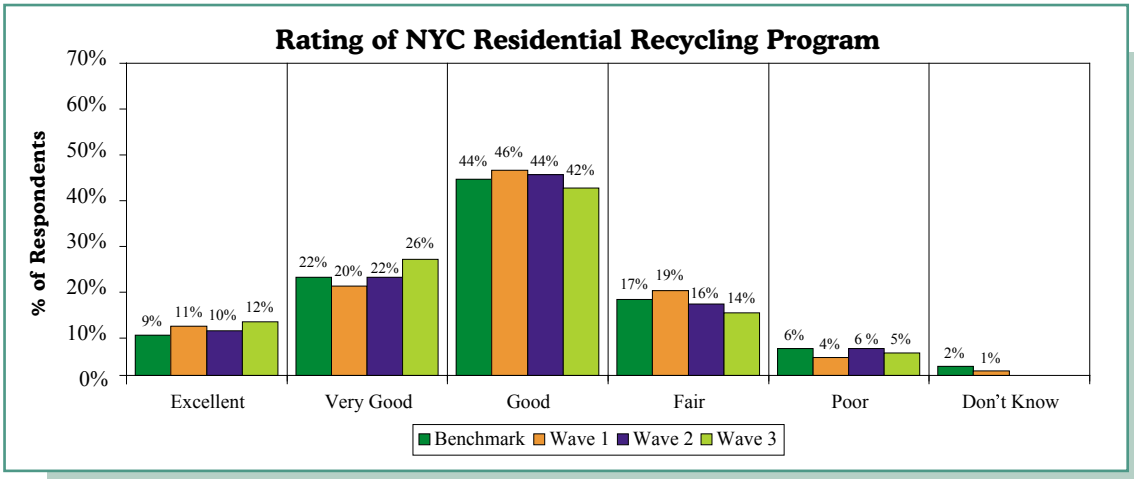
As they had in 1995, New Yorkers rated the Recycling Program very favorably. In the Benchmark, Wave 1, Wave 2, and Wave 3 surveys, **over 75% of residents said they considered the Recycling Program "excellent," "very good," or "good,"** while close to 20% rated it "fair," and only 5% thought it "poor" or had no opinion. Figure II-1 shows the range of opinions over the three survey periods.

Reasons for Program Ratings

Volunteered reasons for rating the Program as "excellent," "very good," or "good" fell into several consistent categories. From the outset at Benchmark, respondents praised the **environmental benefits** of recycling, which included general impressions of environmental improvement, as well as more local effects on neighborhood cleanliness. As time progressed, residents increasingly came to express positive views about **the Recycling Program itself;** they approved of more items being accepted and going towards beneficial use, more people participating, or clearer rules of compliance. The Program's efficiency, timely and frequent collections, and benefits to the City and community were also consistently praised in all four surveys.

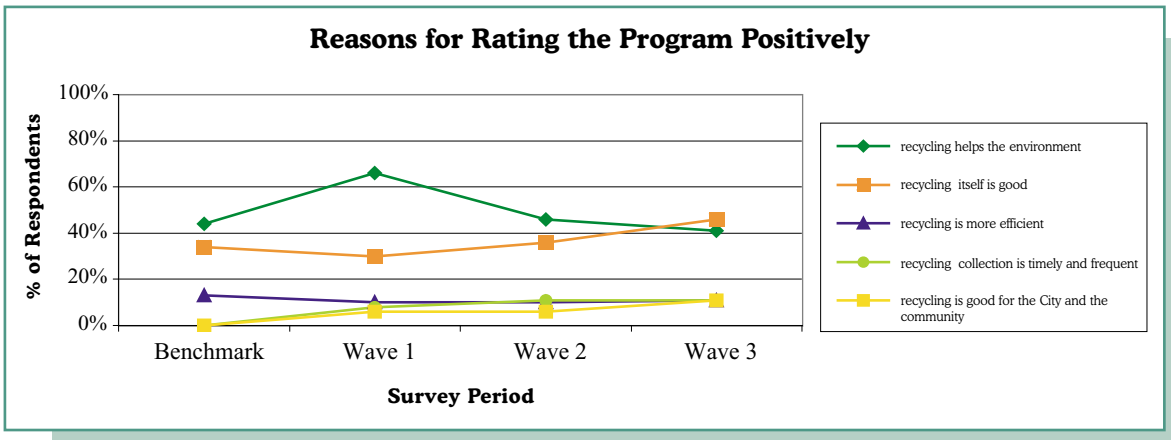
Figure II-2 illustrates how the priority for such reasons has changed. Praise for recycling's

Figure II-1



Benchmark-September 1997
Wave 1-January 1998
Wave 2-January 1999
Wave 3-July 1999

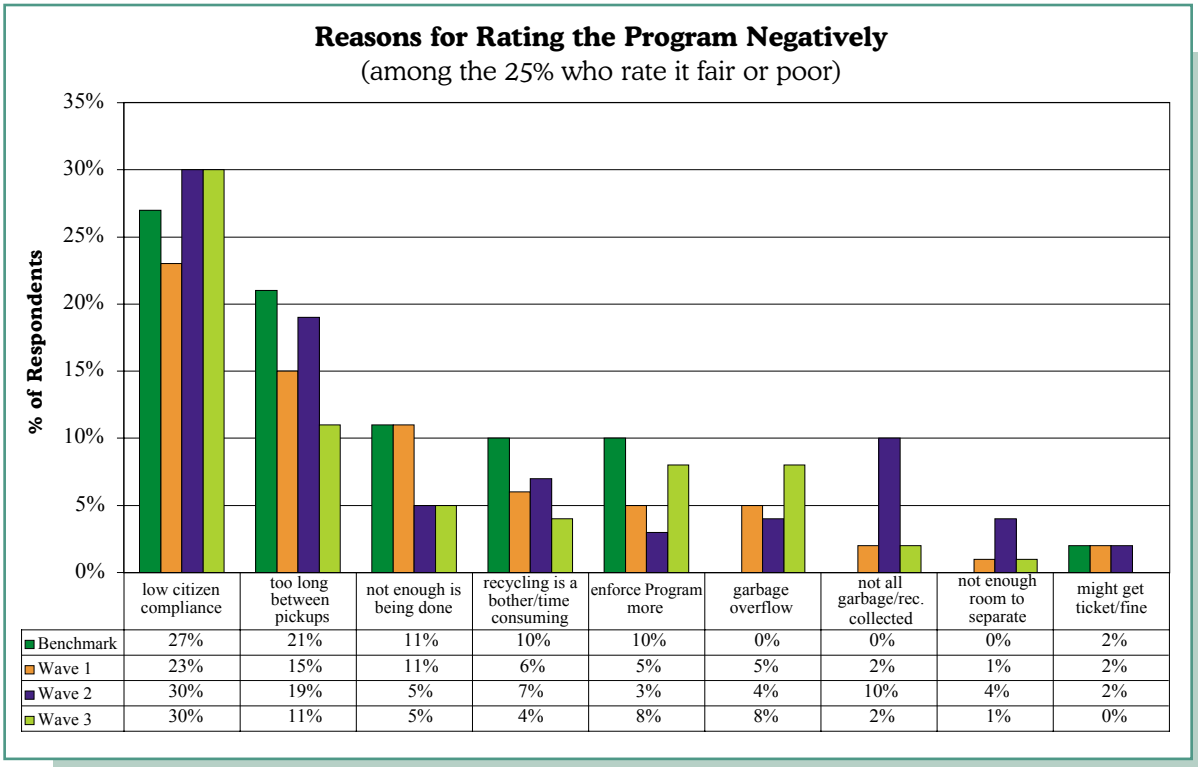
Figure II-2



environmental benefits climbed between Benchmark, when 43% listed it as a positive, to Wave 1, when 66% did, but declined in Wave 2 to 46% and continued to drop to 41% in Wave 3. It should be noted, however, that this decline, was accompanied by an increase in residents' favorable attitudes towards recycling in general.

Overall, far fewer respondents listed negative than positive reasons for their rating of the Program and this trend held constant across the Benchmark, Wave 1, Wave 2, and Wave 3 survey periods. As Figure II-3 shows, respondents' criticisms concerned lack of compliance, length of time between pick-ups, and the bother associated with compliance.[3]

Figure II-3

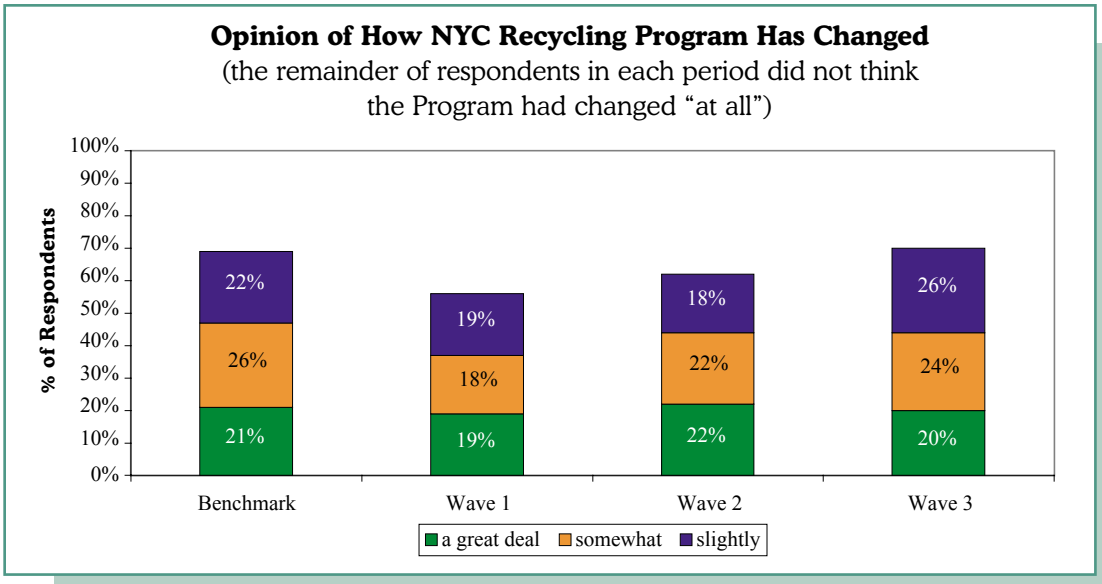


	low citizen compliance	too long between pickups	not enough is being done	recycling is a bother/time consuming	enforce Program more	garbage overflow	not all garbage/rec. collected	not enough room to separate	might get ticket/fine
Benchmark	27%	21%	11%	10%	10%	0%	0%	0%	2%
Wave 1	23%	15%	11%	6%	5%	5%	2%	1%	2%
Wave 2	30%	19%	5%	7%	3%	4%	10%	4%	2%
Wave 3	30%	11%	5%	4%	8%	8%	2%	1%	0%

[3] It should be noted that the issue of length of time between pickups coincided with heavy press coverage of this political issue, as the City Council and Mayor debated the implementation of weekly recycling collection citywide. The elimination of alternate week recycling collection was enacted into law in November 1998; all boroughs are scheduled to receive weekly recycling collection by April 2000. This should alleviate concerns about the length of time between pickups.

Benchmark-September 1997
Wave 1-January 1998
Wave 2-January 1999
Wave 3-July 1999

Figure II-4



Lack of resident compliance was the reason given most often for rating the Program "fair" or "poor." This opinion was held by 23% of those who rated the Program negatively at Wave 1, but jumped to 30% at both Wave 2 and Wave 3.

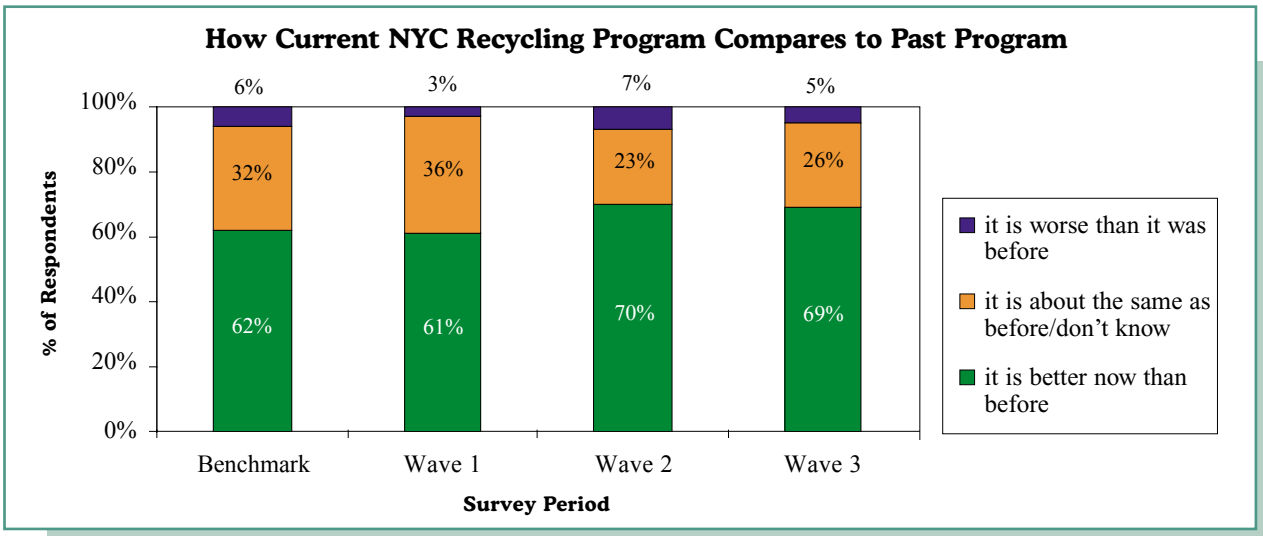
Awareness of Changes to the Recycling Program

At Benchmark and Wave 1, residents were questioned as to whether they were aware of the changes that accompanied Expanded Recycling.

By Wave 2, with Expansion in place for one year, such questions were no longer applicable, so respondents were asked to compare the current Program to when recycling first began in their neighborhood (without specifying when that was). Responses are summarized in Figure II-4.

These results show that the majority of residents believed there had been some change in the Program, although this belief decreased in Wave 1, rose again at Wave 2, and continued to rise in Wave 3.

Figure II-5



Benchmark-September 1997
Wave 1-January 1998
Wave 2-January 1999
Wave 3-July 1999

Among residents who thought the Program has changed, the majority considered it a change for the better. As illustrated in Figure II-5, this positive opinion rose slightly, but significantly, from Benchmark (62% at Benchmark to 69% at Wave 3).

As shown in Figure II-6, reasons for rating the Program as improved were similar to the reasons given for rating it positively, which included the Program's environmental and community benefits, its efficiency, and the frequency of collection. Between Wave 1 and Wave 2, there was a greater emphasis on "recycling" benefits, and a de-emphasis on environmental benefits (this remained steady between Wave 2 and Wave 3). In addition, while none of those interviewed at Benchmark cited "on-time pickups" as a reason for improvement, around 7% did at Wave 1, 15% did at Wave 2, and 17% did at Wave 3.

Figure II-7 on the following page shows that respondents who felt that the Program had changed for the worse (a mere 3% to 7%), cited similar reasons as those given for rating the Program negatively. At Wave 2, the length of time between pickups was most commonly cited, with 51% stating this as a problem. As with previous results about length of time between pickups, it is likely that the jump from 25% to 51% for this complaint between Benchmark/Wave 1 and Wave 2 coincided with the heavy public discussion of this issue that was taking place at the time. By Wave 3, however, this criticism had dropped from 51% to 19%. Another sharp difference between Wave 2 and 3 was the increase in complaints regarding the overflow of garbage. Among those who felt that the Program had changed for the worse, only 2% cited this cause at Wave 2, while 12% did at Wave 3. Other criticisms dealt with lack of citizen compliance, recycling requiring too much time, and minor collection problems.

Knowledge About the Program

Self-Assessed Knowledgeability

In each survey, residents were asked to rate themselves on their understanding of the Recycling Program. The results, as shown in Figure II-8 on the next page, were consistent across the Benchmark, Wave 1, and Wave 2 survey periods. Each time, between 40% and 47% of those surveyed described themselves as "very" or "extremely" knowledgeable, around half "somewhat" knowledgeable, and under 10% "not at all" knowledgeable. By Wave 3, the percentage of those surveyed who described themselves as "very" or "extremely" knowledgeable rose to 54%, with only 2% considering themselves "not at all" knowledgeable.

Surprisingly, when residents were asked whether they would like to be more informed about recycling, the vast majority (around 80%) agreed that they would. This finding was consistent across Benchmark, Wave 1, Wave 2, and Wave 3, which **suggests that residents' perception of their own knowledgeability did not contradict their desire for more information about Program details.**

Figure II-6

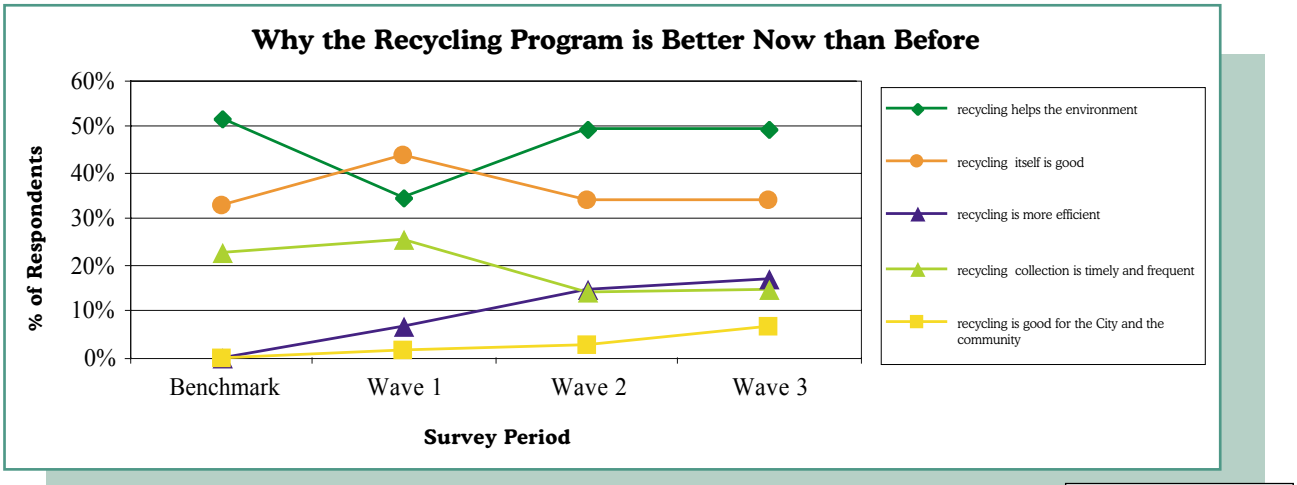


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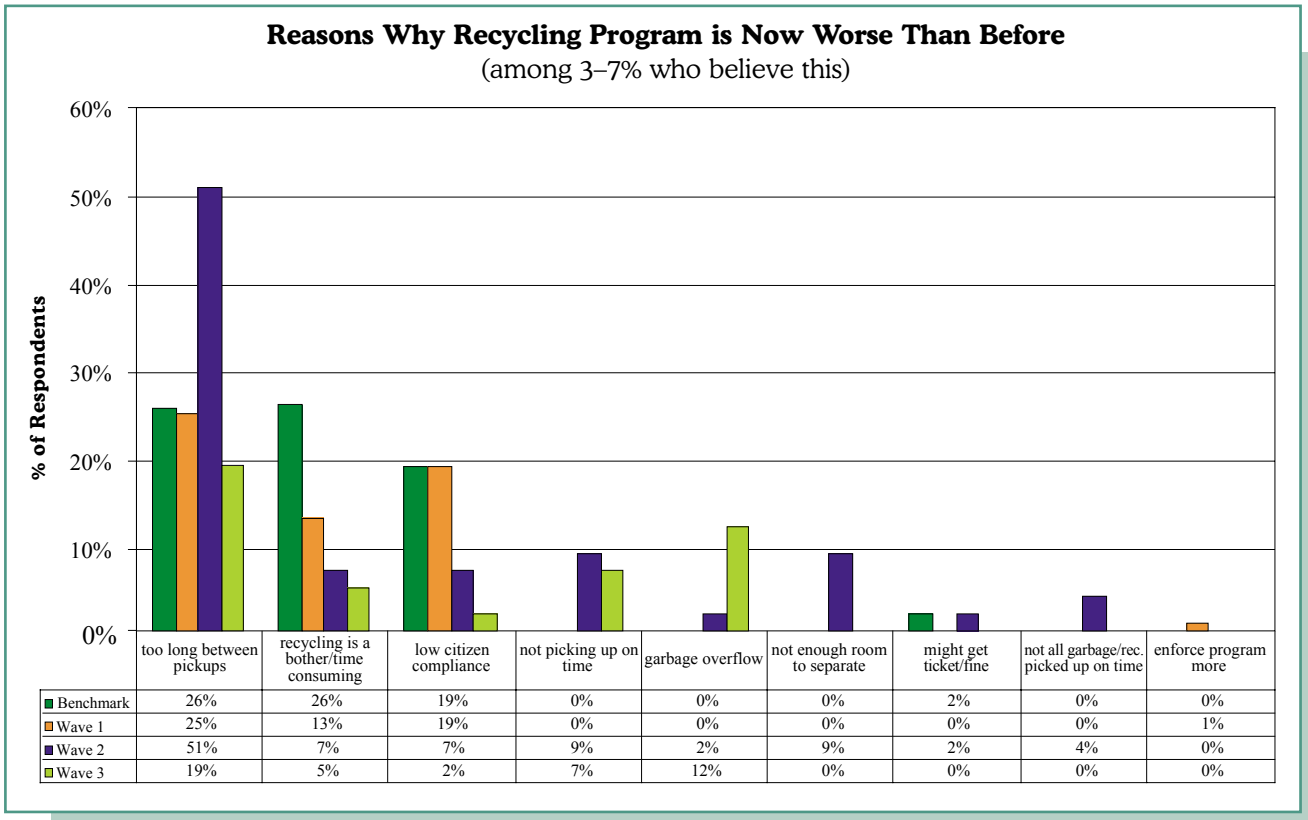
Figure II-7

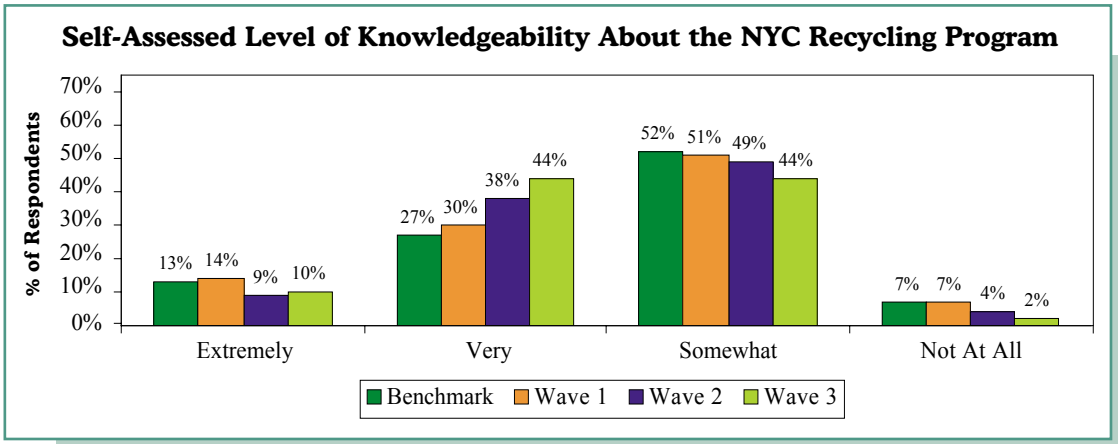


Among residents of each borough, Staten Islanders were most likely to rate themselves as "very" or "extremely" knowledgeable, with over 60% stating this in Wave 3, followed by Manhattan, Queens, and Brooklyn, with the Bronx showing the least confidence (53%). These trends were consistent across Benchmark, Wave 1, Wave 2, and Wave 3.

Confusion

A second measure of knowledge about the Program was taken when residents were asked whether they had "any questions or were confused in any way about the Recycling Program." It was encouraging to find that the vast majority

Figure II-8



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responded "no," and that significantly more felt this way at Wave 1, Wave 2, and Wave 3 than at Benchmark (86–97% vs. 80%).

Figure II-9 below shows that among the small minority of respondents who had questions or were confused about the Program, the most common concern was not being sure about which items were recyclable. Other questions involved the recyclability of varieties of plastic and paper, confusion about what belongs in green or blue bins, and uncertainties about recycling procedures and collection days. In addition, a few respondents cited inconsistencies between DOS and other industry recycling messages. These results suggest that the few residents who had questions about recycling were not confused "in general" but instead were unsure about specific aspects of the Program.

Recyclable Items

The survey directly tested respondents' recycling knowledge by presenting them with a list of commonly discarded items and asking them to identify those they believed to be recyclable. As Table II-4 indicates, residents were correct in identifying most recyclable items, but also frequently misidentified many nonrecyclable items as acceptable under the Program. Overall, these rates of awareness stayed constant between Benchmark, Wave 1, Wave 2, and Wave 3.

These percentages clearly show that there is a high degree of knowledge about the recyclability of items that have been accepted since curbside recycling was first introduced citywide in 1993 (over 80% in most cases). It should be noted, however, that there are still some people unaware that basic items such as soda cans and glass bottles are recyclable. Except for wire hangers and old appliances, awareness of materials added under the Expanded Program is only somewhat lower, ranging from 71 to 86%. Most of the confusion comes from the fact that a sizeable number of residents believed that nondesignated items (such as plastic bags, yogurt containers, hardcover books, ceramics, mirrors, glassware, styrofoam containers, and jar lids), which are not collected by DOS, are recyclable. These

Figure II-9

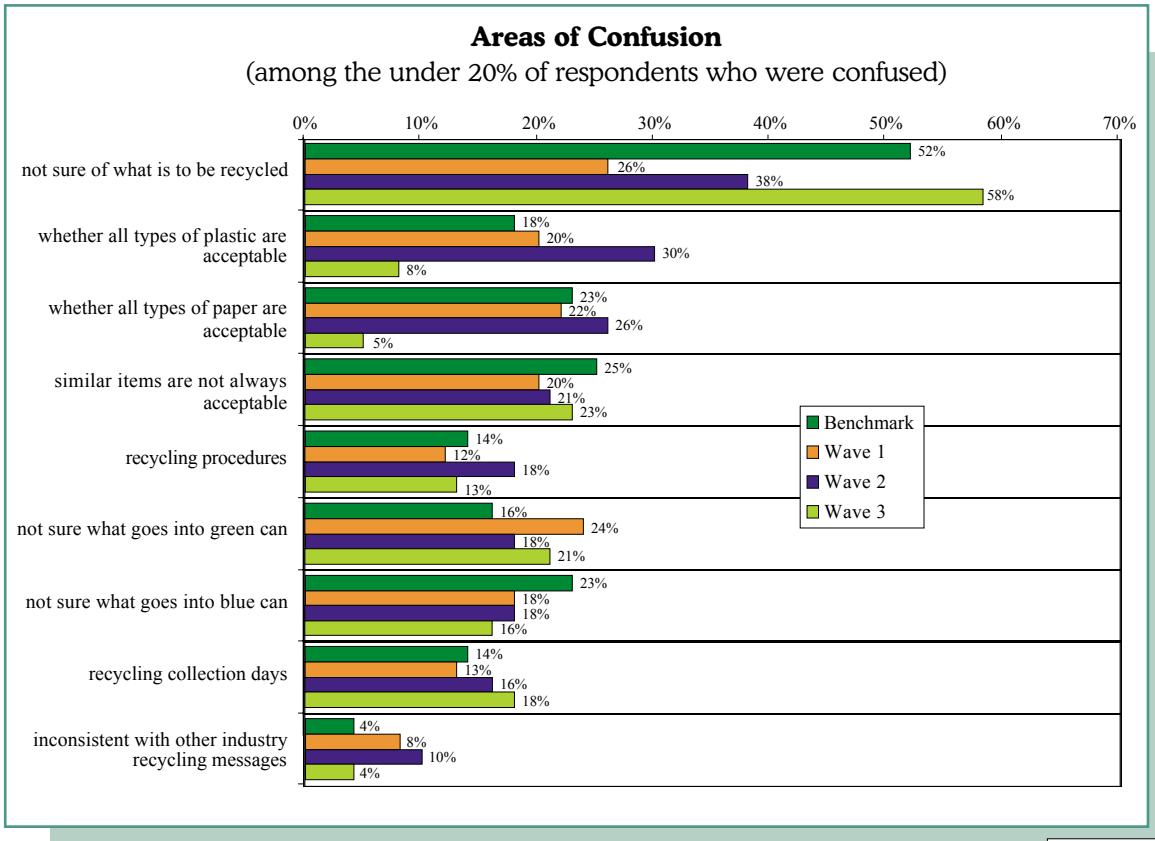

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Table II-4

Respondents' Identification of Items Currently Accepted in the Recycling Program

	Benchmark	Wave 1	Wave 2	Wave 3
Recyclable items before Expanded Recycling				
soda cans	95%	96%	97%	96%
plastic milk/water jugs*	91%	93%	93%	96%
glass bottles	89%	↑93%	90%	92%
aluminum foil	82%	↓78%	81%	↓77%
shampoo/lotion bottles	75%	↑79%	84%	86%
Items added under Expanded Recycling				
paper bags	82%	86%	85%	82%
cereal boxes*	79%	81%	85%	86%
paperback books	79%	81%	86%	78%
mixed paper	76%	↑84%	↓74%	↑78%
discarded mail	71%	72%	71%	72%
wire hangers	49%	47%	54%	59%
old appliances	38%	↑48%	50%	58%
Nonrecyclable items				
plastic bags	67%	67%	63%	64%
yogurt containers*	62%	↑68%	68%	71%
hardcover books	59%	↑69%	71%	71%
bottle caps/jar lids	52%	↑56%	58%	↑66%
ceramics/mirrors/glassware	49%	↑55%	57%	54%
styrofoam cups/plates	43%	↑48%	45%	47%
light bulbs	41%	37%	35%	38%
batteries	31%	↑38%	29%	34%

↓ ↑ indicates significant difference from previous period at the 95% level

* indicates items that were specifically mentioned in Wave 2 advertising campaign

results were remarkably consistent among the five boroughs.

While there has been some improvement since Benchmark in correctly identifying recyclable items, there have also been increases, in some cases, in erroneously identifying nonrecyclables. For example, between Benchmark and Wave 3, there has been a significant increase in the incorrect identification of yogurt containers, hardcover books, bottle caps/jar lids, and styrofoam cups/plates as recyclable items. Furthermore, awareness of the recyclability of a few designated items, aluminum foil most notably, has declined between Benchmark and Wave 3. Such results reinforce the findings (discussed above) that, although residents consider themselves knowledgeable and not confused about recycling, **most carry at least some misinformation, indicating that further public education is needed to clarify what is and is *not* recyclable.**

Changes to Paper Recycling

In the Benchmark and Wave 1 studies, respondents were asked a separate set of questions about how changes to the Recycling Program (under Expansion) affected *paper* recycling in particular. At Benchmark, roughly 50% of respondents believed that paper recycling had changed; by Wave 1, this

Benchmark-September 1997
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Wave 2-January 1999
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rate had fallen to around 25%. In both cases, the majority of those who believed that paper recycling had changed considered it easier than before.

Similar rates of awareness of changes in paper recycling were seen across the board for each borough. This drop from one-half to one-fourth may have one of two explanations. It is possible that either the modifications to paper recycling that were introduced with Expansion[4] had, by Wave 1, become accepted as the "norm," or awareness of how to recycle mixed paper had diminished during that period. While it is difficult to know what caused this shift in awareness, it should be noted that the rate of correctly identifying mixed paper recyclables, as presented in Table II-4 on the previous page, moved from 84% to 74% from Wave 1 to Wave 2.

As a result of these findings, Wave 3 advertising emphasized paper recycling; reinforcing the message that mixed paper goes into a green-labeled can or clear bag. This campaign was launched citywide in April 1999 and, as evidenced by the Wave 3 study, the percentage of residents recognizing mixed paper as recyclable rose to 78%.

Advertising and Other Public Information Awareness

One of the major goals of the Benchmark, Wave 1, Wave 2, and Wave 3 surveys was to measure the effectiveness of the Department's public education efforts. As of the Benchmark survey, the most recent public education had been in the form of Expansion-related literature (direct mail) and some local media placement.[5]

After Benchmark, the animation advertising campaign became the featured public education vehicle, appearing citywide in newspapers, bus shelters, telephone kiosks, and on subways, storefronts, television, and radio.

The Fall 1997 (Wave 1 advertising) campaign focused on the blue/green distinction and the range of materials accepted under the Expanded Program. The Spring-Fall 1998 (Wave 2 advertising) campaign reinforced this. During Fall 1998, the campaign also emphasized that cereal boxes, newspapers, paper egg cartons, and plastic bottles and jugs *were* recyclable, and that other plastic containers, especially yogurt containers and styrofoam egg cartons, were *not*. It also encouraged residents to call the Sanitation Action Center for a recycling checklist (see next page).

The Spring 1999 (Wave 3 advertising) campaign focused on mixed paper recycling, reinforcing the message that all kinds of paper—including mail, envelopes, and paper bags—are recyclable and should be placed in "green" containers (i.e., a labeled green bin, a bin with a green decal, or a clear bag[6]) for collection.

[4] With the introduction of mixed paper (i.e., junk mail, smooth cardboard, and paper bags) residents had the option of setting out paper recyclables in either labeled (preferably green) recycling containers or clear plastic bags. Before the introduction of mixed paper recycling, residents were required to bundle and tie newspapers and magazines.

[5] For more information about BWPRR's public education efforts, please see *NYC Recycles: More Than a Decade of Outreach Activities by the NYC Department of Sanitation*, FY 1986-1999, Fall 1999.

[6] Since green plastic bags are not widely distributed in New York City, the Department tells residents to use clear plastic bags for their mixed paper.

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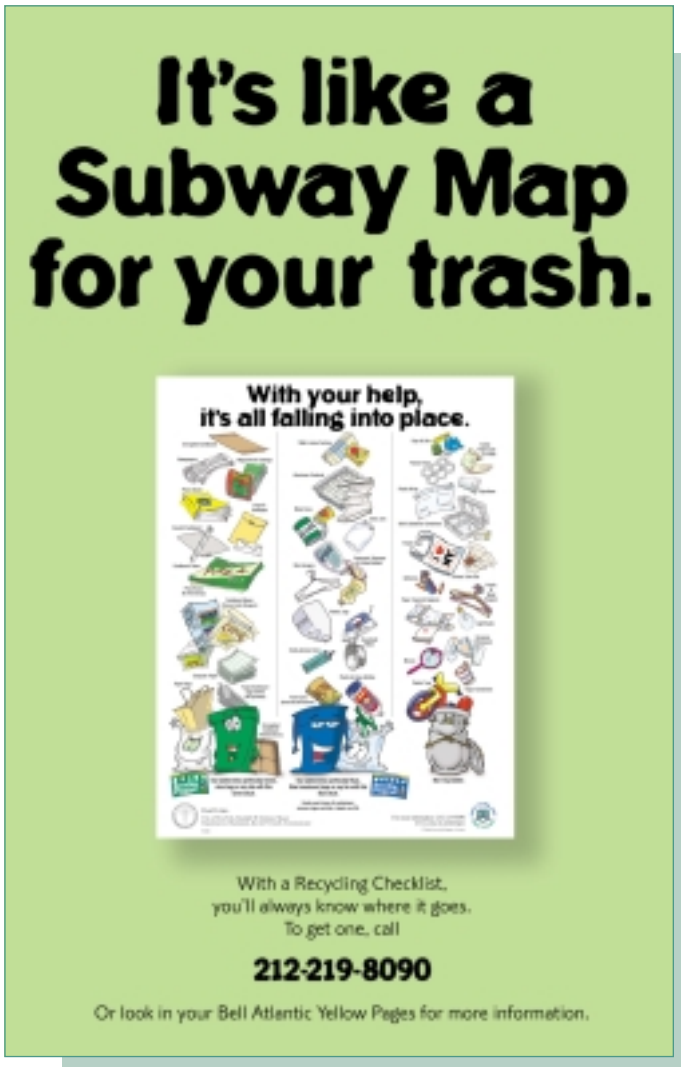
In order to measure the success of these campaigns, residents were asked whether they remembered seeing advertising or receiving literature announcing or reminding them that there had been changes in the NYC Recycling Program. The results surprisingly showed a *marked decrease* in the number of residents who had remembered having seen or received recycling information from Benchmark to Wave 1. While half of those surveyed at Benchmark remembered having seen some DOS information pertinent to recycling, this number dropped to one-third by Wave 1. (See Figure II-10 on the following page.)

It is likely that residents' rates of recall of DOS information was complicated by the fact that Expanded Recycling had been phased in locally prior to the Benchmark survey. As each borough joined the Expanded Program, residents were mailed a comprehensive brochure and other printed materials. In addition, as Expansion was introduced in each borough, advertising ran in targeted local media outlets including print, radio, and television. This meant that at the time of the Benchmark study in October 1997, Queens and Brooklyn residents had been exposed to Expansion-related material only one month before, Manhattan residents roughly six months prior, those living in the Bronx a year and a half, and Staten Island two years prior. It may not be coincidental that the most marked drop-offs in recollection (between Benchmark and Wave 1) were seen in Manhattan and Queens, while recall rates stayed steady in Staten Island. Such a discrepancy suggests that residents' responses might have been based on Expansion-related materials at Benchmark (as opposed to the animation campaign) and that this memory had somewhat diminished at Wave 1.



By the time of the Wave 2 study, Expansion had been in place citywide for over a year, and three citywide cartoon campaigns had been launched (Fall 97, Spring 98, and Fall 98). Questions about recall were therefore reworded to ask whether residents "remembered **advertising** for the Recycling Program." As shown in Figure II-10, those saying "yes" at Wave 2 weighed in at 45%, a significantly higher rate than the 32% who had remembered "some information" about changes at Wave 1.

Respondents who remembered receiving or seeing recycling information were then asked where they had encountered it. As Figure II-11 indicates, residents were much more likely to recall receiving *direct mail* at Benchmark, and significantly more likely to have seen *television* or *billboard ads* at Wave 1. This would be consistent with the idea that respondents remembered Expansion materials at Benchmark and the animation campaign at Wave 1. By Wave 2, recall of television and subway ads increased substantially. Recall for these outlets remained steady at Wave 3.

Benchmark-September 1997
Wave 1-January 1998
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Figure II-10

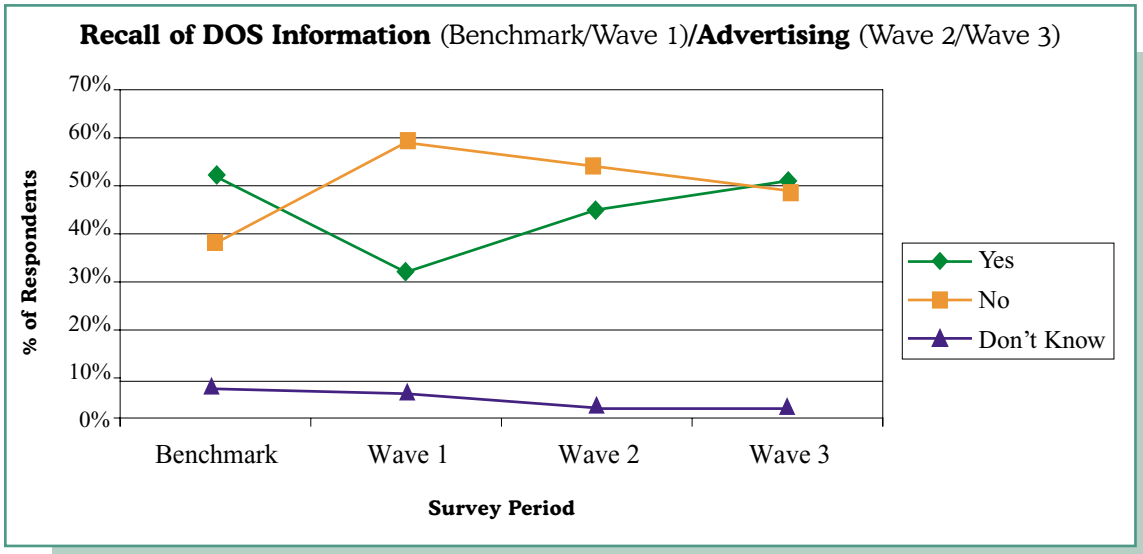
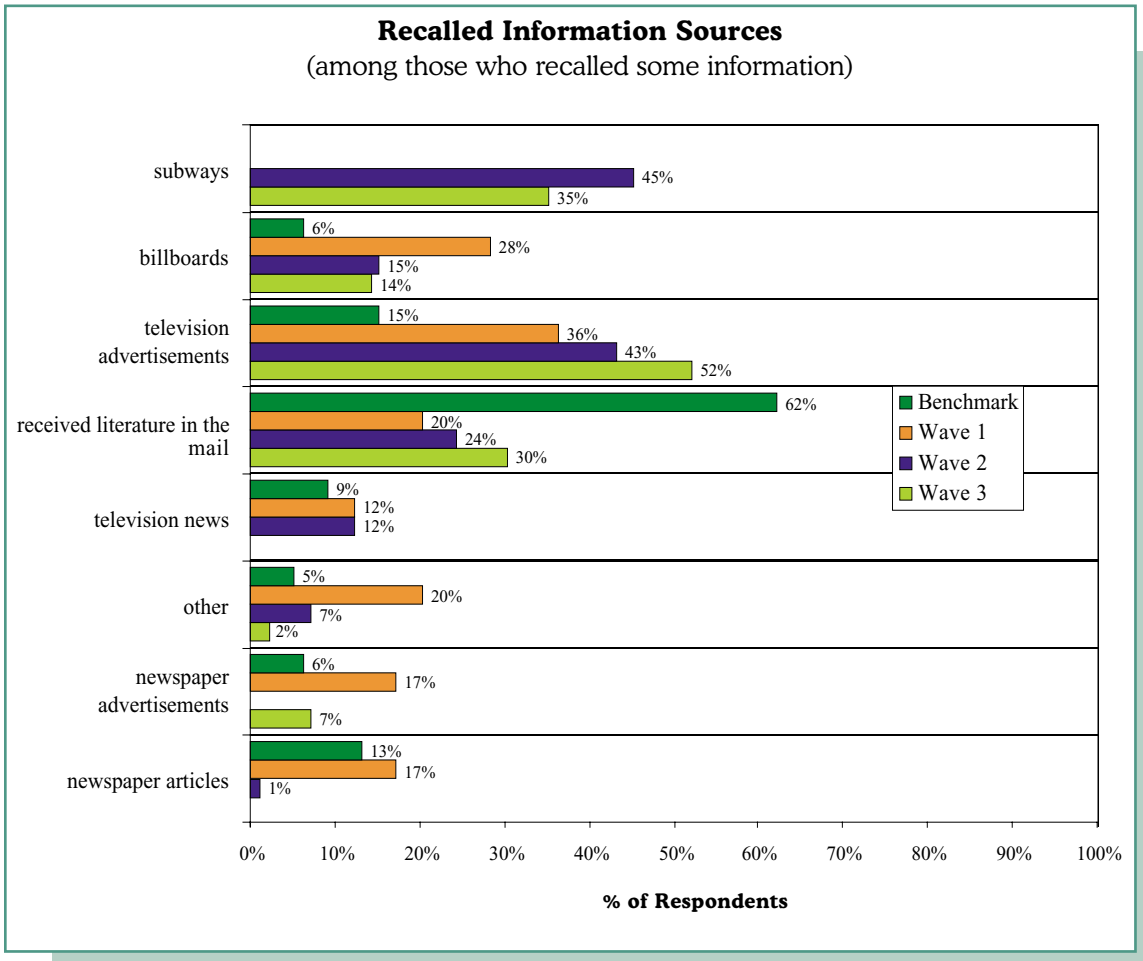


Figure II-11



Benchmark-September 1997
Wave 1-January 1998
Wave 2-January 1999
Wave 3-July 1999

Table II-5

What Was Recalled (Unprompted) by Those Who Reported Seeing or Reading DOS Information*

	Benchmark	Wave 1	Wave 2	Wave 3
Content				
recycling rules	22%	26%	33%	28%
separate items into different color containers	15%	16%	25%	0%
more items added to program	18%	10%	2%	↓ 0%
new ways to separate mail	3%	0%	0%	↓ 0%
pickup/collection times	0%	↑11%	3%	2%
Media				
posters/flyers	0%	4%	13%	↓ 5%
television	9%	2%	10%	7%
brochure	4%	3%	0%	0%
magazine	1%	0%	0%	0%
train/subway/bus	0%	↑10%	7%	5%
Specific advertising mentions				
cartoons	0%	3%	10%	↑18%
cat/cat can't find food in recycling bin	0%	9%	9%	12%
paper/newspaper recycling changes	0%	5%	0%	↓ 0%
wastepaper basket	0%	0%	7%	0%

↑ ↓ **indicates significant difference from previous period at the 95% level**

* Because Wave 2/Wave 3 questions were worded differently than Benchmark/Wave 1 for this topic, statistical comparisons cannot be made.

As Table II-5 shows, residents recalled Expansion-related information (the addition of items to the Program) at greater percentages at Benchmark, but as Waves 1, 2, and 3 of the cartoon campaign were mounted, became more aware of recycling rules, as well as the specific vehicles and images of the campaign (i.e., posters/flyers, transit ads, cartoons, and specific cartoon characters).

Figure II-12 on the next page shows that as of the most recent wave of research, there was geographic variation among residents of the five boroughs in their tendency to recall *subway* advertisements. As would be expected, Staten Island residents were significantly less likely to have recalled DOS ads from this venue.

Recent Changes in Awareness

The Wave 2 and 3 studies contained questions designed specifically to test the effects of the Wave 2 and Wave 3 advertising campaigns. In both studies, residents were asked whether they had become aware of additional items to recycle—or to throw away—since information on recyclability/nonrecyclability of items had been a particular focus in the Wave 2 and 3 campaigns. Roughly half of the respondents in both surveys indicated their awareness had increased. When asked what contributed to their heightened awareness, the vast majority (nearly 80%) cited media/advertising, or information they had gathered from the media/advertising campaign. About 20% also mentioned receiving information from a friend, family member, or building superintendent. A similar number stated that they were now recycling items that they had not recycled several months ago.

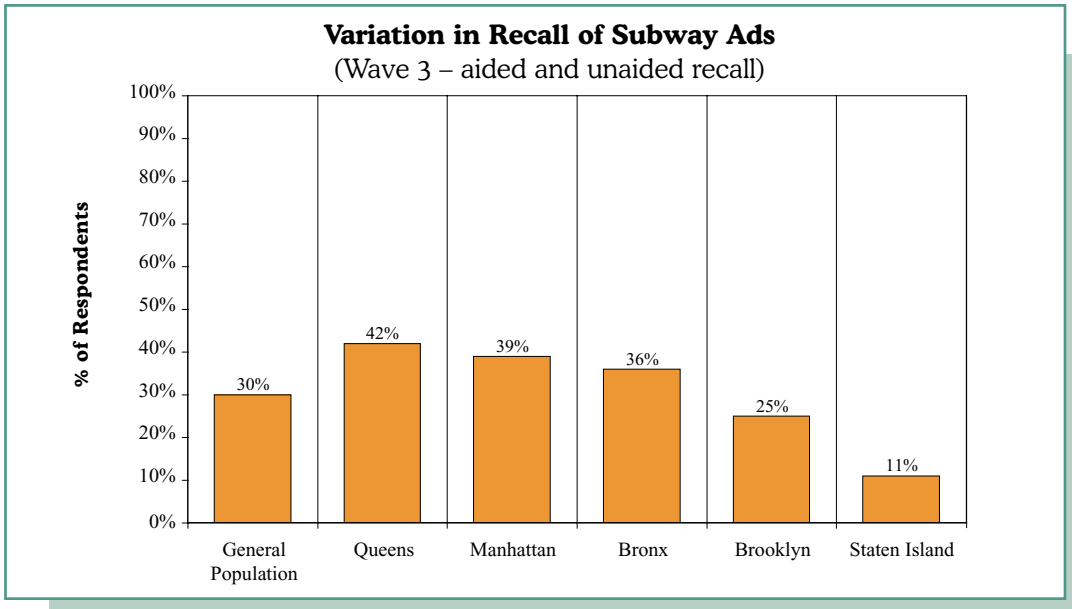
Compliance, Enforcement, and Service—Behaviors and Attitudes

Improved Recycling Rates

To gauge the impact of Program changes and advertising on recycling rates, residents were asked in each survey to estimate the amount of household waste they threw out (as trash or recycling) *before*

Benchmark-September 1997
Wave 1-January 1998
Wave 2-January 1999
Wave 3-July 1999

Figure II-12



and *after* perceived "Program changes." For Benchmark and Wave 1, this referred to before and after *Expansion*, and for Waves 2 and 3 this meant *six months prior* and the present.

At both Benchmark and Wave 1, residents reported an increase in recycling as a result of Expansion-related changes. On average, they remembered throwing away roughly 70% of their total waste as trash before, but only around 50% after, Expansion. By Wave 2, however, perceived changes had leveled off somewhat, with residents recalling throwing out 60% of their waste as trash six months prior and roughly 50% currently. By Wave 3, respondents remembered throwing away roughly 58% as trash six months prior and approximately 50% at present.

In the Wave 2 and 3 studies, a self-reported capture rate (that is, an estimate of the amount of total recyclable material in the residents' waste that they *actually* recycle) was elicited as well. Residents were asked what percentage of items that "should be recycled" they were actually placing in recycling bins. On average, residents reported recycling 75% of what they thought could be recycled at Wave 2, and 73% at Wave 3. This figure was consistent across the boroughs, with the exception of Staten Islanders, who reported recycling 85% of what they should at Wave 2, and 75% at Wave 3.

It should be remembered that these questions were meant to gauge residents' *perception* of their ongoing recycling habits. It is important to keep in mind that self-assessments such as these are usually unreliable in terms of quantifying actual behavior, and clearly overstate recycling when compared to the actual diversion rate (percentage of collected recyclables in the total waste stream) that the Department measures daily using truck tonnages. In the case of New York City's compulsory program, individuals may feel pressured to report more compliance than they actually practice. In addition, since residents do not measure their waste output, they may easily be mistaken about its weight or volume. Nevertheless, self-assessments are useful because they demonstrate that residents have been recycling and/or preventing waste, and that this practice is felt to have improved over time. These results also raise the possibility that residents may perceive a limit as to how much they can and should realistically recycle.

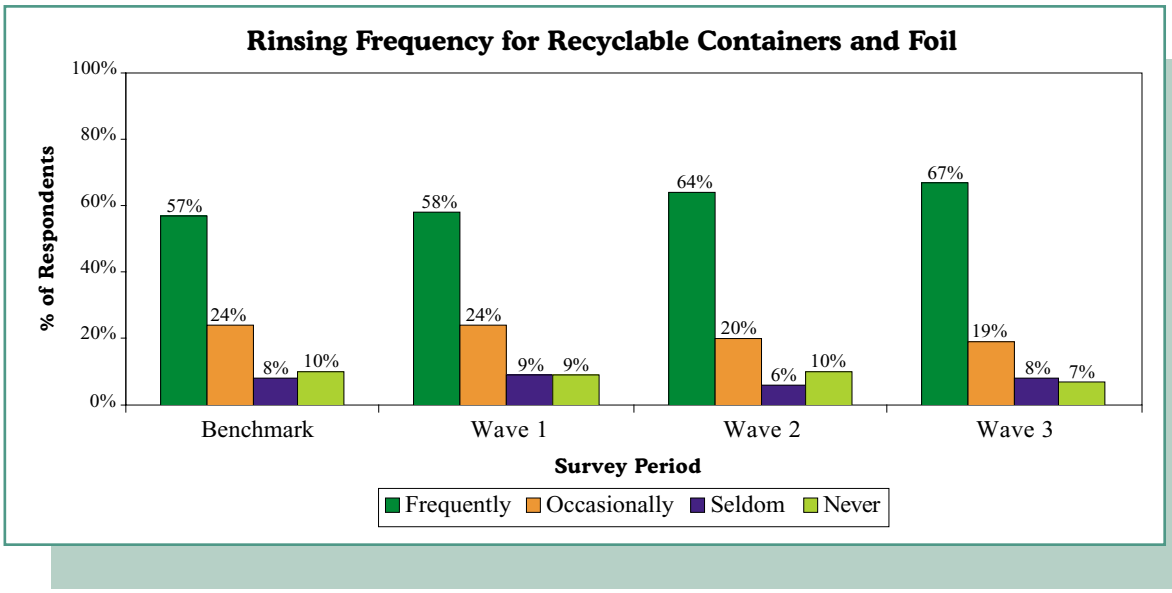
Compliance Behaviors

Rinsing

As shown in Figure II-13 on the next page, the vast majority of residents (over 80%) occasionally or frequently rinse recyclable items before placing them out for collection. Results were very similar for each study period, showing small but steady improvement.

Benchmark-September 1997
Wave 1-January 1998
Wave 2-January 1999
Wave 3-July 1999

Figure II-13



In addition, there were not any marked trends among each borough that differed from the overall average.

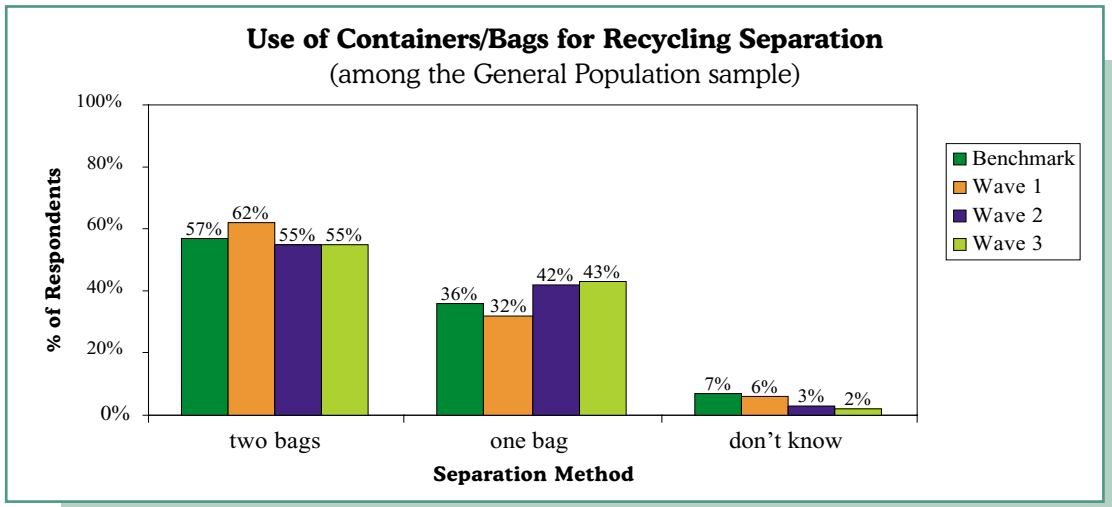
The Two-Container/Bag System

A troubling finding was a slight decline in the use of two containers for recyclables (after an initial increase in compliance with this policy) which is one of the central themes of the animated campaign. As shown in Figure II-14, at Benchmark, 57% of residents in the General Population group reported using this system, with compliance growing to 62% at Wave 1. By Wave 2, however, use of two containers had fallen again to 55% and remained at 55% in Wave 3.

As shown in Figure II-15 on the following page, this decline was most pronounced in Staten Island, where two-container use fell from 59% to 41% between Wave 1 and Wave 2. By Wave 3, this figure rebounded to 48%.

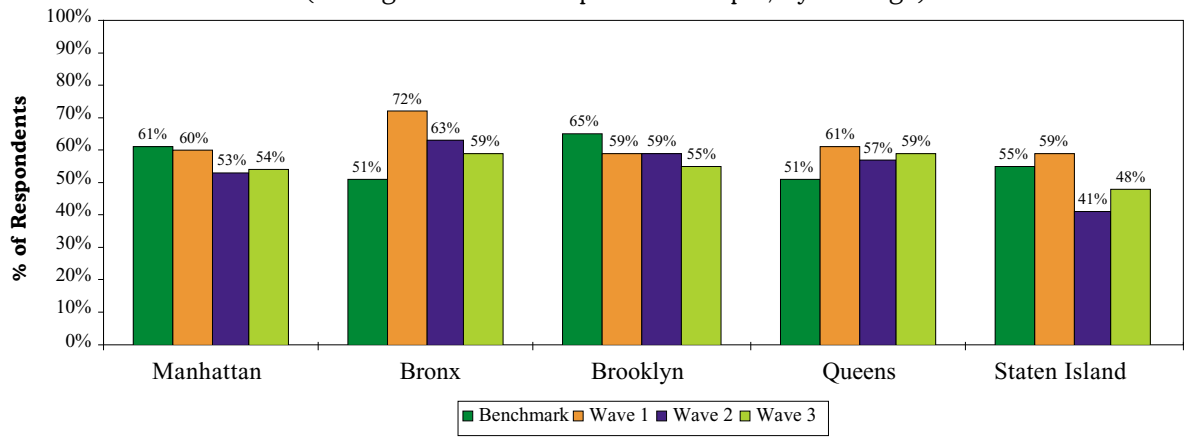
Although differences between use of blue and green containers were not tested in the survey, focus group discussions among homeowners, renters, and building superintendents suggested that there was widespread confusion about the *green*, rather than *blue* system (and corresponding clear vs. blue bags). Feedback suggested that residents were familiar with the concept that "blue"

Figure II-14



Benchmark-September 1997
Wave 1-January 1998
Wave 2-January 1999
Wave 3-July 1999

Figure II-15



is for recycling metal, glass, and plastic, but were frequently not aware that "green/clear" should be used for paper materials.

This may be due to the fact that before *Expansion*, only blue bins, blue bags, and blue-labeled cans were required (and, in some neighborhoods, blue bins were distributed free of charge by the Department) and residents became accustomed to associating this color with recycling. Another partial cause may be that building superintendents collect and bag paper that has been stacked in collection areas by renters—instead of requiring tenants to place paper directly in a green bin or clear bag.

In response to these findings, the Department focused its Spring 1999 advertising campaign on mixed paper recycling. Media outlets included newspapers, real estate publications, subways, storefronts, mall posters, and telephone kiosks. In addition, a letter from the Commissioner was sent to all NYC building owners and managers reminding them of recycling requirements, including those for mixed paper.

Trends in Attitudes About Enforcement, Compliance, and Level of Service

Other factors that affect recycling behavior pertain to the Department's enforcement efforts, perceptions about compliance, and the level of Sanitation service provided. Table II-6 below summarizes the major results for survey questions about recycling enforcement. The survey results indicate widespread

Table II-6

Enforcement

	Benchmark	Wave 1	Wave 2	Wave 3
Nearly half or more of those surveyed completely agree that...				
it is the govt's responsibility to pass and enforce recycling and waste prevention laws	62%	60%	69%	↓49%
there should be stronger enforcement	59%	65%	60%	↓48%
Those who rate the Program negatively say that...				
not enough is being done	11%	11%	5%	5%
program should be enforced more	10%	↓5%	3%	8%

↑ ↓ **indicates difference from previous period at the 95% level**

Benchmark-September 1997
Wave 1-January 1998
Wave 2-January 1999
Wave 3-July 1999

Table II-7

Compliance

	Benchmark	Wave 1	Wave 2	Wave 3
Approximately half of those surveyed completely agree that…				
recycling is second nature to me	50%	53%	59%	↓42%
Fewer believe that…				
recycling takes too much time and effort	12%	12%	12%	↓7%
Those who rate the Program negatively say that...				
lack of citizen compliance is a problem	27%	23%	30%	30%

↑ ↓ **indicates difference from previous period at the 95% level**

awareness of the Department's enforcement efforts and a strong feeling that enforcement should be strengthened. It is interesting to note, however, that perceptions of enforcement do not form the basis of negative ratings of the Program; instead, *lack* of enforcement is criticized.

Attitudes about compliance are shown above in Table II-7. Responses on this issue suggest that recycling is seen as part of the daily routine. As with enforcement, *others'* lack of compliance is perceived as the main problem in this area.

Opinions about Sanitation service are also important, since perceptions of inadequate service may hinder recycling compliance. Table II-8 shows that there is modest approval of the timeliness of recycling pickups. Increased criticism regarding the length of time between recycling pickups at Wave 2 was most likely the result of this issue's news coverage. Wave 3 results show this complaint abating, and this trend will likely continue as weekly recycling collection is implemented citywide.

Table II-8

Level of Sanitation Service

	Benchmark	Wave 1	Wave 2	Wave 3
Those who rate the Program positively like that...				
recyclables are picked up on time	0%	6%	↑11%	11%
Those who say the Program has changed for the better do so because...				
recyclables are picked up on time	0%	7%	15%	17%
Those who rate the Program negatively say that...				
it takes too long between pickups	21%	15%	↑19%	↓11%
garbage/recycling overflows in the street	0%	5%	4%	8%
garbage/recycling is not completely picked up	0%	2%	↑10%	↓ 2%
Those who say the Program has changed for the worse complain that...				
it takes too long between pickups	26%	25%	↑51%	↓19%
recyclables are not being picked up on time	0%	0%	9%	7%
garbage/recycling overflows in the street	0%	0%	2%	12%
garbage/recycling is not completely picked up	0%	0%	4%	↓ 0%

↑ ↓ **indicates difference from previous period at the 95% level**

Benchmark-September 1997
Wave 1-January 1998
Wave 2-January 1999
Wave 3-July 1999

Table II-9

Environmental Attitudes

	Benchmark	Wave 1	Wave 2	Wave 3
Over half of those surveyed completely agree that...				
recycling is an important way I can make a difference in my neighborhood	77%	↑80%	79%	↓64%
recycling will reduce landfills	57%	61%	71%	↓59%
Those who rate the Program positively believe that...				
recycling keeps environment/neighborhood clean	24%	↑50%	↓33%	↓26%
recycling helps the environment	20%	↑27%	↓17%	17%
Those who think the Program has changed for the better believe that ...				
recycling keeps environment/neighborhood clean	21%	↑40%	↓32%	33%
recycling helps the environment	11%	5%	3%	2%

↑ ↓ **indicates difference from previous period at the 95% level**

Attitudes About the Relationship Between Recycling and the Environment

Some of the connections people make between recycling and the environment have already been mentioned in the sections covering rating of the Program and opinions about how it has changed. Table II-9 summarizes these volunteered responses, and in addition provides data about the extent to which respondents agreed with statements about environmental benefits. Overall, these responses show that residents tend to relate the environmental benefits of recycling to their neighborhoods and local surroundings (the environment in more general terms was cited to a lesser extent).

Attitudes About Waste Prevention

Waste prevention is the practice of using less, so that less waste is produced. It can be accomplished by purchasing fewer things, buying items with less packaging, using durable items instead of disposables, or reusing and repairing items. Among the issues explored in the surveys were residents' receptivity to the concept of waste prevention, as it may be an effective way to further reduce the City's waste stream. A significant finding, presented in Table II-10, was that there was strong agreement that both the government and the private sector bear the responsibility for waste prevention practices.

Table II-10

Measures of Producer/Government Responsibility for Waste Prevention

	Benchmark	Wave 1	Wave 2	Wave 3
Residents completely agree that...				
it is the govt's responsibility to pass and enforce waste prevention laws	62%	60%	↑69%	↓49%
it is the manufacturer's responsibility to produce less wasteful products/packaging	57%	↑61%	↓54%	↓37%

↑ ↓ **indicates difference from previous period at the 95% level**

Benchmark-September 1997
Wave 1-January 1998
Wave 2-January 1999
Wave 3-July 1999

Table II-11

Early Measures of Waste Prevention

	Benchmark	Wave 1
Complete agreement with statements:		
we reuse plastic bags at home	57%	↑62%
I buy larger/economy size packaging when possible	38%	35%
I reuse/repair items instead of discarding them	28%	30%
I look to buy products with less packaging	26%	29%

↑ ↓ **indicates difference from previous period at the 95% level**

Furthermore, in the Benchmark and Wave 1 studies, several questions focused on residents' own waste prevention practices—none of which are required under the recycling law. This portion of the survey found that the most common waste prevention practice (reported by an average 60% of respondents) was reusing plastic bags. Additional findings are outlined in Table II-11.

In the Wave 2 and Wave 3 studies, waste prevention was explored differently and in more detail. First, respondents were asked to describe what, if anything, they did *beyond recycling* to help reduce waste. In interpreting the response to this question, it is important to remember that, rather than prompting residents with particular practices (as listed above) and asking whether they engaged in any of them, this question solicited unprompted classification of activities as preventing waste beyond recycling.

When questions were phrased in this way, roughly 25% of respondents reported practicing "some form of waste prevention beyond recycling" in their households. Among this group, about 20% in Wave 2 stated, unprompted, that they tended to purchase items with less packaging, and a similar number regularly donated reusable items to charity.

By Wave 3, however, only 11% indicated unprompted that they made purchasing decisions based on packaging and only 8% reported that they regularly donated unwanted items to charity. It is interesting to note that at Wave 3 an increased proportion of respondents did not specify what exactly they were doing to reduce waste beyond recycling, saying only that they "reuse, reduce, and recycle" (46% at Wave 2 and 63% at Wave 3). The fact that respondents persisted to say that they "recycled" in order to prevent waste suggests

Table II-12

Later Measures of Waste Prevention

(ratings of frequency and importance when read the following waste prevention practices)

Waste reduction method	*How often do you do this?*		*How important is it?*	
	Wave 2	**Wave 3**	**Wave 2**	**Wave 3**
	Always/ Frequently	**Always/ Frequently**	**Extremely/ Very**	**Extremely/ Very**
reusing plastic bags at home	73%	↑83%	68%	↓63%
finding alternate uses for things (like a shoe box for storage)	61%	59%	62%	↓47%
buying larger or economy size packaging	51%	47%	52%	↓36%
reusing or repairing broken items instead of discarding	45%	47%	54%	↓43%
looking to buy products with less packaging	33%	↑40%	43%	↓33%
bringing own grocery bags to shop	18%	19%	28%	↓20%
renting an infrequently used item instead of buying	13%	↑20%	21%	↓11%

↑ ↓ **indicates difference from previous period at the 95% level**

Benchmark-September 1997
Wave 1-January 1998
Wave 2-January 1999
Wave 3-July 1999

that they may not be clear about the difference between the terms "waste prevention" and "recycling."

In a separate section of the survey, residents in Wave 2 and 3 were presented with seven potential ways to reduce waste and asked to classify their frequency and importance in their households. When the questions were phrased in this way, the number reporting practicing waste prevention increased significantly, to around 75%. This suggests that a lack of understanding of the term may account for the low number (25%) who reported practicing waste prevention before being prompted. As Table II-12 indicates, the results of this portion of the study were consistent with those found in the Benchmark and Wave 1 studies: the reuse of plastic bags topped the list of common waste prevention practices.

SUBGROUP FINDINGS

The findings reported thus far have pertained to the General Population—that sample of 750 residents in the Benchmark, Wave 1, Wave 2, and Wave 3 studies selected at random from New York City's overall population. In addition to studying how recycling was viewed and experienced by the "average" New Yorker, the Department also investigated attitudes among segments of the population that—for specific reasons—might understand and/or comply with the Recycling Program differently. These included Spanish speakers, New York City Housing Authority (NYCHA) residents, and selected demographic subgroups of the General Population, which were selected for study for the following reasons:

Spanish Speakers
Almost all DOS educational materials are available in Spanish, the most commonly spoken language in New York City next to English. In order to test how advertisements and other DOS messages were reaching this audience, the Department targeted randomly selected residents with Spanish surnames to recruit a sample of 250 who identified Spanish as their primary language.

NYCHA Residents
Recycling arrangements at NYCHA buildings are unlike any other in the City in that many residents are required to carry recyclables to outside containers themselves. Due to this unique situation, groups of 150 NYCHA residents were selected for study. It should be noted that selection for the General Population also included a small percentage of NYCHA residents (around 5%), which corresponds to their representation in the City's population.

Demographic Subgroups
Demographic data collected from all surveyed residents allowed for the investigation of statistically significant differences in responses that coincided with age, gender, income, education, housing status, and other demographic factors.

After each wave of research, Spanish speakers' and NYCHA residents' responses were compared to those of the General Population, while corresponding demographic subgroups (e.g., renters vs. owners, males vs. females) were compared among each other. These comparisons were made to see whether selected groups of New Yorkers vary in their opinions and behaviors in a *substantial and consistently measured way*.

The major finding of all comparisons among subgroups was that, while numerous differences were identified at each individual research wave, many contradicted one another (e.g., on one measure of concern for the environment, Spanish speakers would score higher than the General Population but, on another, would score lower or the same). In addition, there were few overall trends of difference across time periods. This suggests that variations in attitudes or behaviors measured at one research wave, while statistically significant, may have resulted from chance rather than indicating a clear pattern of difference. Nevertheless, some repeated trends did emerge upon longitudinal comparison of Spanish speakers to the General Population. NYCHA residents, on the other hand, did not vary in any consistent way from the population as a whole, despite the fact

Benchmark-September 1997
Wave 1-January 1998
Wave 2-January 1999
Wave 3-July 1999

that many small differences between these groups were found at each wave of research.

Among demographic groups (including income, gender, marital status, ethnicity, employment status, citizenship, length of time living in New York and in the USA, number of persons in the home, home ownership, and age) only two categories accounted for a consistent trend of significant differences: home ownership (owners vs. renters), and income.

Tables II-13 through II-15 on the following pages summarize cases in which responses to survey questions differed in a statistically significant way among subgroups in Waves 2 and 3. (Because there were essentially no repeated trends consistently displayed from Benchmark through Wave 1, data from these studies are not presented.) Since there are over three hundred measures in each survey, the differences noted represent only a small subset of potential areas of difference. **Once again it is important to keep in mind that overall, there was remarkable consistency of responses between subgroups and the General Population.**

Spanish Speakers

As shown in Table II-13, Spanish speakers have been, in general, more positive about the Recycling Program, repeatedly praising its benefits for the environment, the cleanliness of the neighborhood, and the community. This group also appears to practice and value waste prevention more than the public at large. Spanish speakers recall DOS advertising at substantially higher levels than the General Public. (It should be noted that in the Fall of 1998, BWPRR conducted a series of Spanish-language special events in Latino neighborhoods throughout the five boroughs.)

At the same time, Spanish speakers consistently misidentify nonrecyclables as recyclable at higher rates than average, although they have similar rates of correctly naming recyclables. They are also less likely to rinse items, and more say that recycling takes too much time and effort. Yet, compared to the General Population, higher percentages of Spanish speakers call for more recycling enforcement and fewer agree that "no one would really know" if they did not recycle.

Renters vs. Owners

As shown in Table II-14, several consistent trends emerged in research conducted after Waves 2 and 3 of advertising that differentiated renters from homeowners. Renters were more likely to report increased awareness of recycling, although they considered themselves less knowledgeable about recycling and scored lower on the identification of selected recyclables. They more frequently cited lack of compliance as a program negative, but tended more to approve of the environmental and neighborhood benefits of recycling. And while renters were, overall, more likely to have seen recycling advertising, they recycled at a lower rate than owners.

Income Group Variation

Table II-15 summarizes variations among all respondents based on income. As with the other subgroup analyses, variation among subgroups is only reported when statistically significant differences have been measured over more than one wave of research. As outlined, a few trends do appear with Wave 2 and Wave 3. These include a propensity for lower income persons to make slightly more mistakes about what is and is not recyclable, as well as to rinse recyclables less frequently. However, lower income groups express somewhat more comfort with recycling (as reflected in their higher rates of agreement with the statement "recycling is second nature to me") and approve of its local environmental benefits more. They also appear to have seen DOS advertisements on television more often and to recall specific aspects of these ads as they relate to the rules of recycling.

Implications of the Subgroup Analyses

An important finding of the Department's research was the fact that there were few trends of significant difference noted among the various subgroups examined, especially when compared to the hundreds of measures for which there was no consistent significant difference. As the demographic statistics on each table indicate, lower income, rental, and/or Spanish-speaking groups tend—on average—to overlap somewhat, and to be at a disadvantage in terms of education

Table II-13

Statistically Significant Differences Between Spanish-Speaking and General Population Samples

(Waves 2 and 3)

	Wave 2		Wave 3	
	General Population	Spanish Speakers	General Population	Spanish Speakers
Ratings				
More Spanish speakers believe...				
there are positive aspects to the Program	67%	**84%**	76%	**85%**
Program is better because it helps the environment	23%	**68%**	23%	**62%**
Program is better because it helps keep neighborhood clean	21%	**67%**	21%	**61%**
Fewer believe...				
Program is better because more products recycled	15%	**1%**	11%	**1%**
Advertising Awareness				
More Spanish speakers...				
report seeing or hearing DOS advertising	42%	**61%**	43%	**78%**
recall something about advertising, unaided	57%	**69%**	80%	**88%**
recall ads — specifically rules of recycling	28%	**44%**	25%	**37%**
More Spanish speakers think the following nonrecyclables are in fact recyclable...				
hardcovers	68%	**79%**	70%	**83%**
jar lids/caps	54%	**73%**	64%	**81%**
ceramics/mirror/glassware	53%	**75%**	52%	**70%**
styrofoam egg cartons	43%	**61%**	47%	**60%**
styrofoam containers	41%	**56%**	44%	**55%**
batteries	23%	**48%**	31%	**51%**
plastic toys	59%	**76%**	59%	**80%**
lightbulbs	30%	**49%**	37%	**52%**
And are less sure that the following recyclable is recyclable...				
mixed paper	77%	**66%**	85%	**63%**
But correctly identify certain recyclables at a higher rate...				
paint cans	41%	**60%**	57%	**65%**
Overall Spanish speakers are more likely to...				
think the Program has changed a great deal	21%	**29%**	20%	**32%**
Community				
More Spanish speakers...				
say that recycling is good for the City and the community	3%	**12%**	8%	**15%**
Environment				
More Spanish speakers rate the Program positively because...				
it helps the environment	38%	**69%**	37%	**60%**
it helps keep the neighborhood clean	25%	**56%**	23%	**41%**
And believe the Program is improved because...				
it helps the environment	23%	**68%**	23%	**62%**
it helps keep the neighborhood clean	23%	**68%**	26%	**61%**

	Wave 2		Wave 3	
	General Population	Spanish Speakers	General Population	Spanish Speakers
Waste Prevention				
More Spanish speakers practice waste prevention when they...				
bring own grocery bags—always	9%	**17%**	5%	**13%**
bring own grocery bags—always/frequently	16%	**29%**	9%	**26%**
bring own grocery bags—viewed as extremely/very important	25%	**45%**	16%	**35%**
buy items with less packaging—always	16%	**26%**	9%	**24%**
prevent waste by reducing/reusing/recycling	40%	**62%**	56%	**77%**
rent infrequently used items—always	6%	**16%**	2%	**8%**
rent infrequently used items—viewed as extremely important	9%	**22%**	2%	**10%**
rent infrequently used items—viewed as extremely/very important	19%	**33%**	8%	**24%**
reuse/repair items—always/frequently	46%	**49%**	39%	**49%**
Fewer show interest for...				
preventing waste by purchasing based on packaging	25%	**7%**	40%	**26%**
Compliance, Enforcement, Service				
Spanish speakers do not rinse recyclables as much:				
percent frequently rinsing	71%	**48%**	69%	**61%**
And are more likely to state that...				
recycling takes too much time and effort	10%	**24%**	6%	**13%**
But less likely to say that...				
no one would know if I didn't recycle	17%	**10%**	33%	**28%**
Regarding enforcement and service...				
more think there should be stronger enforcement	57%	**72%**	84%	**96%**
fewer say Program is worse because too long between pickups	50%	**43%**	33%	**6%**
fewer rate the Program positively because of timely pickups	16%	**0%**	13%	**6%**
Demographics				
Spanish speakers are more likely to...				
rent/lease	49%	**82%**	57%	**86%**
be employed part-time	70%	**78%**	15%	**33%**
finish education before high school	17%	**26%**	4%	**10%**
finish education with some high school	4%	**14%**	7%	**27%**
be born outside US	26%	**35%**	27%	**86%**
earn under 20K	27%	**80%**	7%	**32%**
have more persons in household (mean)	2.90	**3.29**	2.97	**3.45**
And less likely to...				
live in single-family house	28%	**10%**	29%	**8%**
live in two-family house	16%	**3%**	15%	**10%**
own home	42%	**11%**	43%	**14%**
be employed full-time	53%	**52%**	56%	**44%**
be a college grad	25%	**14%**	23%	**8%**
have attended post-college	13%	**2%**	10%	**1%**
be born in US	73%	**20%**	73%	**15%**
earn over 50,000 per year	26%	**6%**	22%	**7%**
Spanish speakers' income is lower...				
income (median)	42K	**25K**	44K	**20K**
income (mean)	50K	**27K**	49K	**28K**

Table II-14

Statistically Significant Differences Between Renters and Owners
(Waves 2 and 3)

	Wave 2		Wave 3	
Program Rating	Renters	Owners	Renters	Owners
More renters say the Program is better because of increased awareness.	**15%**	4%	**17%**	6%
More owners say the Program is better because more products are recycled.	7%	**22%**	5%	**13%**
Knowledge				
Owners consider themselves more knowledgeable about the Program:				
very knowledgeable	35%	**44%**	40%	**52%**
somewhat knowledgeable	52%	43%	48%	34%
not knowledgeable (somewhat, not at all)	56%	46%	51%	36%
And score higher than renters on identifying many recyclables:				
cereal boxes	83%	**89%**	84%	**91%**
paperbacks	83%	**92%**	75%	**84%**
shampoo/lotion bottles	82%	**88%**	84%	**90%**
aluminum foil	77%	**88%**	72%	**86%**
discarded mail	68%	**75%**	68%	**79%**
Compliance, Enforcement, Service				
Renters are more concerned about compliance:				
think the Program is fair or poor because of lack of compliance	**37%**	21%	**36%**	16%
Although they are, on average, recycling slightly less:				
percent of items now recycled	**75%**	80%	**70%**	77%
percent of items now thrown out as trash	25%	20%	30%	23%
And are less diligent about rinsing recyclables:				
frequently/occasionally rinse	81%	90%	83%	91%
frequently rinse	60%	74%	63%	74%
seldom/never rinse	**19%**	10%	**17%**	9%

	Wave 2		Wave 3	
Advertising	Renters	Owners	Renters	Owners
Renters are more likely to have...				
seen/heard some form of DOS advertising	**48%**	41%	**54%**	43%
seen ads on subways	**49%**	34%	**41%**	19%
recall cartoons	**12%**	5%	**21%**	12%
While owners are more likely to have...				
seen ads on billboards	11%	**24%**	8%	**16%**
Environment				
Renters give more environmental reasons for positive Program ratings...				
citing general environmental benefits	**49%**	40%	**44%**	37%
saying recycling will help to keep neighborhood clean	**37%**	25%	**29%**	22%
stating the Program is better for environmental reasons	**40%**	22%	**38%**	26%
and because it helps keep neighborhood clean	**38%**	20%	**37%**	24%
Although owners tend more to...				
prevent waste by making purchases based on packaging	16%	**31%**	37%	**44%**
Demographics				
Owners are more likely to...				
be married	40%	**59%**	36%	**60%**
earn a higher mean household income	38K	**58K**	36K	**57K**
have studied post-college	8%	**15%**	6%	**11%**
earn over $50,000 per year	16%	**30%**	11%	**30%**
Renters are more likely to...				
be single	**36%**	27%	**41%**	23%
be employed part-time	**21%**	15%	**22%**	15%
have completed some high school	**14%**	8%	**13%**	7%
earn between $21,000 and $29,000 per year	**21%**	6%	**12%**	6%

Table II-15

Statistically Significant Differences Among Income Groups

(Waves 2 and 3)

	Wave 2				Wave 3			
	<20K	21-29K	30-50K	>50K	<20K	21-29K	30-50K	>50K
Knowledge								
Higher-income earners correctly identify recyclables at higher rates:								
glass bottles	84%	85%	91%	**94%**	88%	89%	93%	**98%**
paperbacks	83%	82%	**88%**	81%	71%	79%	78%	**81%**
Lower-income residents incorrectly identify materials as recyclable at higher rates:								
plastic toys	**71%**	69%	56%	55%	**74%**	63%	63%	47%
light bulbs	**46%**	39%	33%	24%	**44%**	41%	36%	31%
styrofoam containers	54%	**58%**	43%	32%	**55%**	52%	47%	39%
batteries	**37%**	35%	23%	25%	**44%**	36%	32%	27%
Compliance, Enforcement, Service								
Rinsing recyclables and income appear to be inversely related:								
frequently rinse	53%	60%	65%	**73%**	55%	61%	**71%**	**71%**
But overall, lower-income residents are more likely to say...								
recycling is second nature to me	**67%**	49%	53%	63%	**51%**	47%	33%	44%
there should be stronger enforcement	**67%**	58%	60%	55%	**60%**	**60%**	42%	48%
Advertising								
Lower-income residents are more likely to...								
have seen ads on TV	45%	**46%**	44%	27%	**63%**	52%	49%	48%
specifically recall ads about the rules of recycling	**46%**	28%	25%	35%	**39%**	33%	23%	22%
Environment								
Those with lower incomes cite environmental/ neighborhood benefits to recycling, saying...								
it keeps the neighborhood clean	**39%**	36%	23%	14%	**32%**	17%	22%	18%
the Program is improved because it helps the environment	**54%**	48%	33%	15%	**48%**	**39%**	30%	20%
the Program is improved because it helps keep neighborhood clean	**52%**	42%	32%	15%	**48%**	**38%**	30%	18%
Waste Prevention								
Lower-income residents are more likely to...								
always reuse plastic bags	**32%**	20%	20%	16%	**29%**	37%	23%	22%
Demographics								
Those with lower incomes are most likely to be...								
female	**69%**	58%	60%	50%	**71%**	68%	64%	53%
hispanic	**52%**	39%	32%	10%	**58%**	42%	32%	14%
born outside US	**52%**	43%	40%	22%	**60%**	46%	27%	23%
divorced	**37%**	18%	11%	10%	**38%**	20%	19%	12%
retired	**34%**	13%	12%	4%	**28%**	16%	12%	9%
employed part-time	**33%**	17%	12%	9%	**35%**	18%	10%	7%
have completed less than high school	**19%**	5%	4%	1%	**10%**	6%	3%	2%
have completed some high school	**28%**	15%	8%	3%	**26%**	9%	5%	2%
a high school graduate	32%	**39%**	24%	15%	31%	**44%**	40%	23%
Those with higher incomes more frequently are...								
born in US	48%	57%	60%	**78%**	40%	54%	73%	**77%**
male	30%	42%	37%	**48%**	29%	32%	36%	**47%**
married	29%	41%	48%	**59%**	30%	16%	42%	**62%**
white	21%	29%	36%	**64%**	16%	41%	48%	**59%**
employed full-time	20%	52%	65%	**78%**	29%	54%	67%	**76%**
college graduates	5%	17%	32%	**34%**	13%	14%	23%	**28%**
have studied post-college	1%	3%	9%	**25%**	1%	5%	4%	**21%**

and employment, as compared to other groups of the population. Does belonging to these groups affect the recycling rate they report on the survey, their approval of the Recycling Program, their appreciation of its benefits, or whether they have encountered DOS advertising and information? In general, the answer is no. Instead, it appears that the City's population is quite homogeneous in terms of attitudes and awareness about recycling. Put another way, it is fairly safe to assume that the overall results reported in earlier portions of this chapter are applicable to a citizenry that is diverse across a number of demographic characteristics.

LOW-DIVERSION DISTRICT STUDIES

In order to gain insight as to why some Sanitation districts were recycling at consistently lower diversion rates than others, the Department conducted additional surveys among residents in these areas. Twenty-three districts in Manhattan, Queens, Brooklyn, and the Bronx that had been recycling at rates below 12% as of the end of Fiscal Year (FY) 1997 were targeted for research.

The "diversion rate" is a measure of how much of the City's total waste is being recycled. It is

Table II-16

Low-Diversion Sanitation Districts in New York City

Low-Diversion District	Neighborhoods in the District
Brooklyn	
1	Greenpoint, Northside, Southside, Williamsburg
3	Bedford Stuyvesant
4	Bushwick
5	East New York, New Lots, Starrett City, Spring Creek, Cypress Hills, Highland Park, Broadway Junction
8	Prospect Heights, Crown Heights, Weeksville
9	Prospect Lefferts Gardens, Wingate
14	Prospect Park South, Ditmas Park, Flatbush, Midwood, Manhattan Terrace
16	Ocean Hill, Brownsville
17	East Flatbush, Rugby, Remsen Village
Manhattan	
10	Central Harlem
11	East Harlem
12	Inwood, Washington Heights
Bronx	
1	Mott Haven, Port Morris, Melrose
2	Longwood, Hunts Point
3	Claremont Village, Morrisania
4	Concourse, Mount Eden, Highbridge
5	University Heights, Morris Heights, Mount Hope, Fordham
6	Belmont, East Tremont, West Farms
9	Soundview, Castle Hill, Clason Point, Unionport, Parkchester, Westchester Square
Queens	
3	Jackson Heights, East Elmhurst, North Corona
4	Elmhurst, South Corona, Lefrak City
12	Jamaica Center, South Jamaica, Hollis, St. Albans, Rochdale
14	Breezy Point, Neponsit, Belle Harbor, Rockaway Park, Seaside, Somerville, Arverne, Edgemere, Far Rockaway

Note: Neighborhood names are taken from *New York: A City of Neighborhoods*, prepared by the NYC Department of City Planning (December 1996).

calculated daily from truck weight data collected at transfer stations, using the formula below. The diversion rate has been used as an indicator of Program success since its inception, and it varies from district to district. In FY 1997, the lowest rate was 5.2% (in district 3 in the Bronx) and the highest was nearly 28% (in Manhattan districts 1, 2, and 8).

Diversion Rate = tons of recyclables collected* / tons collected (trash and recycling)

**tons are recorded when trucks deliver waste to transfer facilities*

Randomly selected residents from the Low-Diversion Districts who met the general study criteria were interviewed concurrently with the Wave 1, Wave 2, and Wave 3 studies. The sample consisted of 50 persons in each of the 23 districts, for a total of 1,150 respondents. Survey results were calculated for each Low-Diversion District, as well as for the *average* of all Low-Diversion Districts, within each borough and throughout the City. Table II-16 on the previous page lists the Low-Diversion Districts by neighborhood name.

Major Areas of Difference Between Low-Diversion Districts and the General Population

Program Rating

As shown in Figure II-16, in Wave 2 and Wave 3, slightly fewer Low-Diversion District residents than members of the General Population rated the Recycling Program as "excellent" or "very good," although the majority of them still approved of the Program (considering it "good"), and listed positive reasons for rating it as they did. Such reasons were similar to those mentioned among the other groups, (i.e., neighborhood cleanliness, citizen cooperation, and a larger number of items included).

However, as shown in Table II-17 on the following page, at Waves 2 and 3, Low-Diversion District residents expressed *more* approval of the Program's environmental benefits than the General Population, as reflected in the reasons given for positive ratings of the Program, and why the Program has improved over time.

Compliance and Enforcement

Low-Diversion District residents' views on compliance and enforcement were overall the same as the General Population, with the majority believing that recycling should be better enforced and low numbers thinking that, "if I did not recycle, no one would really know." It is particularly interesting to note that on average, Low-Diversion District residents reported using the two-bin system at the same rate as the General Population (somewhat more than half complied with this aspect of the Program as of Wave 2 and Wave 3). As discussed earlier in this chapter, confusion about the two-bin/bag system (in particular the meaning and use of the green bin/clear bags for paper) was a problem for the General Population; however, it does not appear that this problem was any more pronounced in Low-Diversion Districts.

Figure II-16

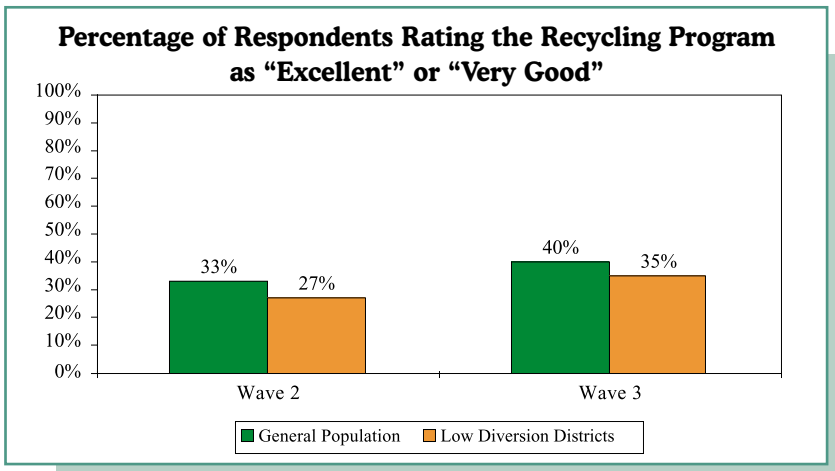


Table II-17

Comparison Between General Population's and Low-Diversion District Residents' Measures of Environmental Benefit of Recycling (Waves 2 and 3)

More Low-Diversion District Residents...		Wave 2 *rate the Program positively...*	Wave 3 *rate the Program positively...*	Wave 2 *say the Program has improved...*	Wave 3 *say the Program has improved...*
for environmental reasons:					
	General Population	38%	37%	23%	23%
	Low-Diversion Districts	**50%**	**42%**	**41%**	**30%**
because it helps to create a clean neighborhood environment:					
	General Population	25%	23%	21%	21%
	Low-Diversion Districts	**36%**	**29%**	**39%**	**29%**

Knowledge

At Wave 1, the percentage of Low-Diversion District residents reporting to be "extremely" or "very knowledgeable" about the Program was lower than the General Population (27% vs. 42%), but similar to that of Housing Authority residents (25%). By Wave 2, this percentage had risen to the same level as the population as a whole (46%), but by Wave 3 had fallen again relative to the General Population (37% vs. 46%). At the same time, at Wave 2, more Low-Diversion District residents than those from the General Population stated that they had no *confusion* whatsoever about the Recycling Program (90% vs. 85%) or specific aspects of it. This trend was not, however, repeated at Wave 3.

With such fluctuation of ratings, it is difficult to say what statistically significant differences in self-reported knowledge mean when comparing Low-Diversion residents to the General Population. In fact, the only somewhat consistent finding on this subject was that while Low-Diversion District residents showed similar rates of correct identification of recyclables, they are slightly more likely to misidentify certain nonrecyclables as recyclable. Table II-18 below shows the differences in misidentification for Wave 3, which are similar to findings from previous waves of research.

Table II-18

Significant Differences Between General Population and Low-Diversion Districts (Wave 3)

		General Population	Low-Diversion Districts
KNOWLEDGE: In general, Low-Diversion District residents are more likely to mistake nondesignated items as recyclable:	plastic takeout containers	74%	**80%**
	yogurt containers	72%	**77%**
	hardcover books	70%	**75%**
	plastic bags	62%	**70%**
	plastic toys	59%	**66%**
	ceramics	52%	**58%**
	styrofoam egg cartons	47%	**61%**
	styrofoam containers	44%	**55%**
	light bulbs	37%	**43%**
	batteries	31%	**37%**

Note: Wave 1 and 2 results were similar to Wave 3.

Recall of Advertising

The percentage of Low-Diversion District residents recalling some aspect of the DOS's advertising campaign was similar to the General Population, showing an increase from Wave 1 to Wave 2 from 28% to 41% and remaining about that level (43%), along with the General Population, at Wave 3. And while there was, in each wave, some variation between the General Population group and the Low Diversion District group on measures of awareness of certain aspects of the advertising campaign (the cartoon characters, the content or message of the ads, or specific places where ads were posted, such as on buses, subways or billboards) there were no consistent trends of differences measured over time.

Individual Low-Diversion Districts

In addition to testing aggregate differences between Low-Diversion Districts *as a group* and the General Population, each individual district's survey scores were examined for statistically significant variation from the Low-Diversion District average and from the General Population average. The results, once again, showed no clear trends that would distinguish any one district from the City as a whole, and consequently, no distinct "profile" of a Low-Diversion District emerged from the findings.

Implications of the Low-Diversion District Findings

It is important to reiterate that in the vast majority of cases Low-Diversion District residents responded similarly to the General Population, suggesting few if any consistent areas in which the two groups diverged. Only two significant trends of difference among Low-Diversion District residents were found: (1) a slightly less enthusiastic approval rating of the Program, and (2) the tendency to misidentify certain nondesignated items as recyclable. While it is possible (though not probable) that lower Program approval might explain lower diversion rates in Low-Diversion Districts, misidentification of recyclables would not have a negative effect on diversion. Instead, rather than attributing low diversion to resident attitudes or lack of knowledge, the evidence strongly suggests that factors not measured by the survey—possibly local building arrangements and local differences in waste composition—may be more relevant to understanding the discrepancy in diversion rates than opinions and knowledge about recycling.

GENERAL CONCLUSIONS

As detailed in the Introduction, several clear trends emerge when looking at New Yorkers' opinions, over time, about recycling.

1. There is clearly widespread approval of the Program and a strong knowledge base about its rules and what is recyclable. This is accompanied by high levels of recognition of the bin and bag cartoon characters that residents are increasingly coming to identify with recycling in the City. These results, taken together, speak well for the Department's public education efforts.

2. Challenges remain. Confusion persists about what is and is not recyclable. The most common complaint that New Yorkers have about the residential Recycling Program is that others are not doing their fair share. These findings point to the need for repeated public education about the recyclability of items and improvements in enforcement.

3. Finally, most of the findings that have been summarized in this chapter are marked and consistent in direction and over time. This argues strongly for the idea that New Yorkers, as diverse as they are, have similar attitudes and behaviors when it comes to recycling.

In the chapters that follow, these issues will be examined from several additional perspectives—among the Chinese community, and those at the "front line" of recycling in the City: Sanitation workers.

Chapter III Chinese Residents

BACKGROUND

After Spanish, Chinese is the next most commonly spoken non-English language in New York City. Consequently, the Department routinely makes its basic public education materials available in Chinese. As discussed in Chapters I and II, Spanish speakers have been included in the Department's ongoing research, to keep abreast of responses to DOS information from this segment of the New York City population. In order to complement this aspect of data gathering, the Department conducted targeted qualitative and quantitative research among two of the City's largest Chinese-speaking communities: Manhattan (Chinatown) and Queens (Flushing).

QUALITATIVE STUDY

In mid-1997, focus groups consisting of residents of two Chinese-speaking neighborhoods (Chinatown and Flushing) were convened. The list of participants was derived from professionals who were active within the Chinese community, including church leaders, school principals, political leaders, and business professionals. Each group included seven to nine respondents; sessions lasted approximately two hours.

Results

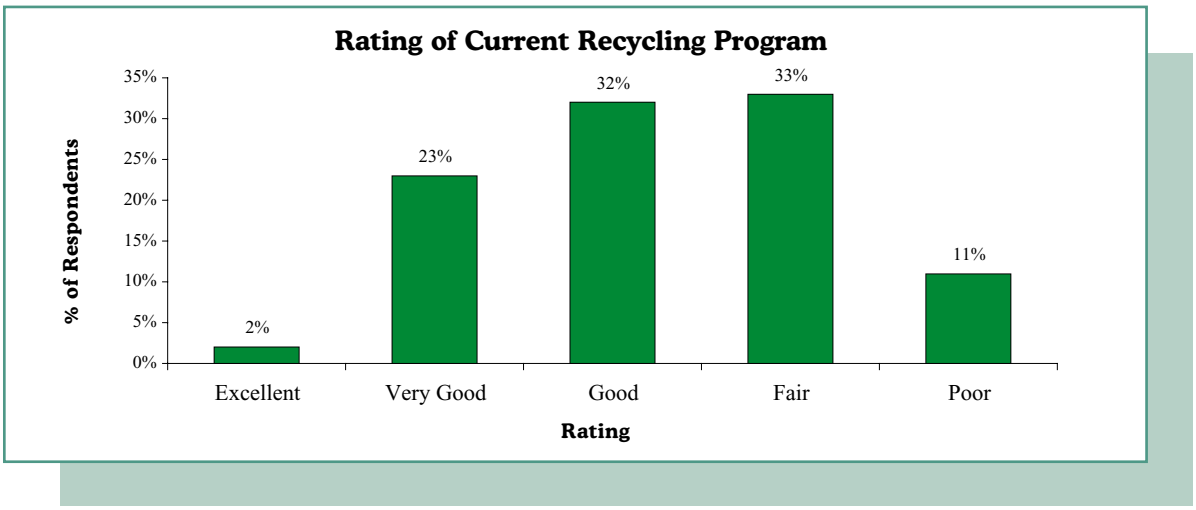
These discussions suggested that there may be specific cultural factors among the Chinese-speaking community that conflict with the Department's goals of waste prevention and recycling. As explained by the group participants, in China the tradition is to sell disposable items that can still be of use. Consequently, "recycling" these items is a foreign concept to many Chinese residents, akin to throwing them, or giving them, away. Chinese people also tend to reuse items as much as they can, and seek to derive the maximum possible use out of each item. Chinese leaders suggested that the Department should make Chinese-speaking residents understand how and why recyclable items will be made into new substances.

Chinese leaders also suggested the Department shy away from broad environmental issues when addressing their community. According to these leaders, such issues may be less tangible than direct concerns, such as keeping the neighborhood clean. Furthermore, a strong motivator within the Chinese-speaking community was reported to be prestige among peers. Compliance with recycling rules was expected to be highest when it is associated with personal accomplishment, measured by the respect of the community and neighbors. Critical to this notion is reward from the City itself, in the form of letters, "points," or other tangible acknowledgments that elicit respect and approval. This is associated with a strong desire to engage in behavior that is considered "good" in the milieu in which Chinese speakers reside. If recycling and waste prevention are considered the "style" in New York City, the group members explained, residents may be more likely to engage in such behavior.

The Chinese leaders stressed the fact that the Department needs to be more creative in its communication with the Chinese community. Even though their children may be learning the importance of recycling and waste management in school, these issues are not generally discussed in the home. Direct communication to adults about the benefits and importance of recycling and waste prevention, in addition to the penalties associated with failure to comply with recycling regulations, is essential for informing new and veteran Chinese immigrants about the City's requirements. The leaders suggested that a Department presence at street fairs in Chinese-speaking areas could be an effective way to educate the community and elicit more active participation.[1]

[1] For more information about the Department's educational efforts, including those involving the Chinese community, see *NYC Recycles: More Than a Decade of Outreach Activities by the NYC Department of Sanitation, FY 1986-1999,* Fall 1999.

Figure III-1



QUANTITATIVE STUDY

Based on the results of the qualitative study, the Department designed a telephone questionnaire to assess the level of familiarity with, and attitudes toward, recycling and waste prevention among Chinese-speaking residents in Manhattan and Queens.

Survey Design

The survey sample included 200 Chinese-speaking respondents, half residing in the Flushing area and half in the Manhattan Chinatown area. All interviews were conducted in Chinese using a questionnaire translated from English, with all answers transcribed into English for computer tabulation. To be included in the survey, respondents had to be personally involved in decisions about the management of waste in the household. Results of the survey were tabulated, with responses expressed as percentages. Statistically significant differences among demographic subgroups were tested at the 90% level—meaning that there is a 90% chance that repeated sampling would give the same results.

Findings

Attitudes and Awareness of Recycling Policy

Survey respondents were asked to rate the NYC Residential Recycling Program on a five-point scale, ranging from poor to excellent. Figure III-1 above illustrates the results.

As shown in this Figure, over half of all respondents rated NYC's Recycling Program "good" or "very good." Almost no one, however, classified the Program as "excellent," and while a small percentage gave the NYC recycling policy a "poor" rating, a substantial number (33%) categorized it as "fair." Participants were then asked to give reasons for their positive or negative ratings of the Program; results are summarized in Figures III-2 and III-3. They show favorable ratings based on improved neighborhood cleanliness, recycling being good for the City, and general "improvement" in the environment. Negative reasons focused on the continued visibility of trash all over the City, and the complaint that people are not participating in the Program. It would appear then that those who saw tangible results from the Program rated it more highly than those who did not.

Figure III-2

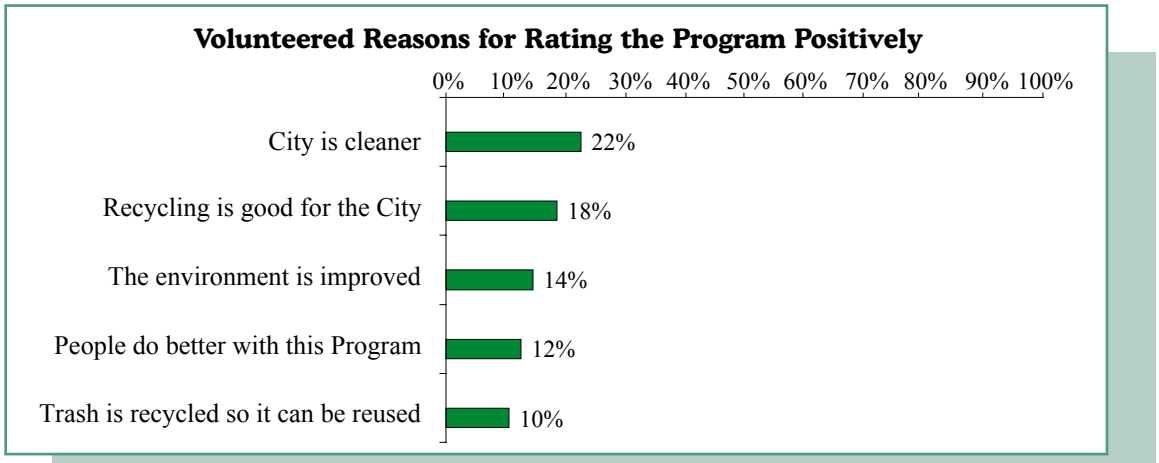
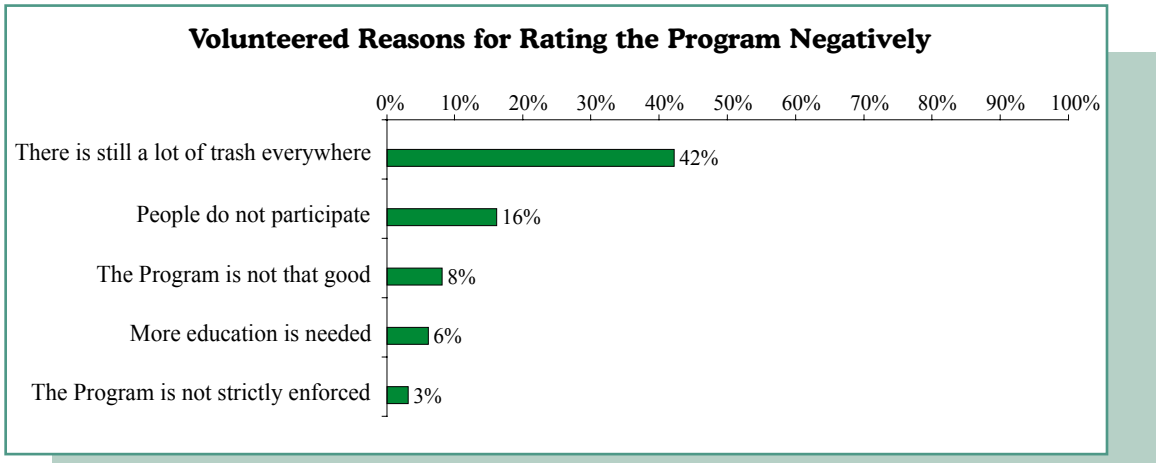


Figure III-3



Knowledge About Recycling

As Figure III-4 on the following page shows, a sizable portion of the survey respondents described themselves as "somewhat" or "not at all" knowledgeable about what is accepted for recycling and what is not, and less than 10% of the total respondents said that they were "extremely knowledgeable."

Although only 31% of the respondents described themselves as "extremely" or "very knowledgeable" about recycling, Figure III-5 shows that 83% said they neither had questions nor were confused over the current recycling policy.

The nature of the confusion/questions by the 17% of residents who did express some confusion is illustrated in Figure III-6 on the following page. The majority of questions focused on not being sure what items should be recycled. Of those who did express confusion, furthermore, only 14% reported ever having sought advice or help to find out more. Most of this group (57%) asked the advice of family members or relatives; very few (14%) contacted the Department of Sanitation.

Figure III-4

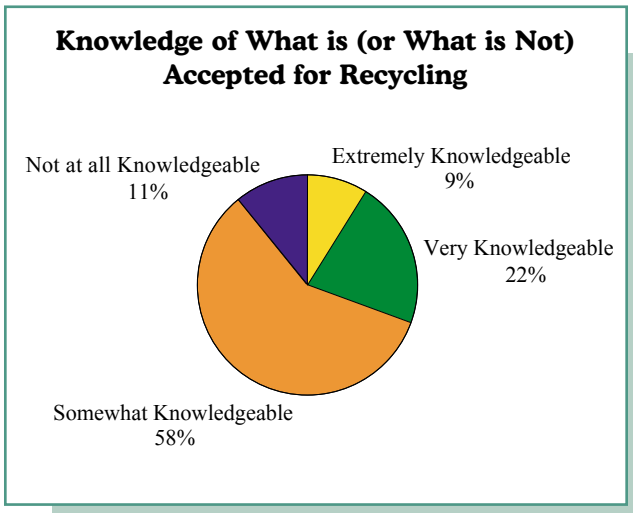


Figure III-5

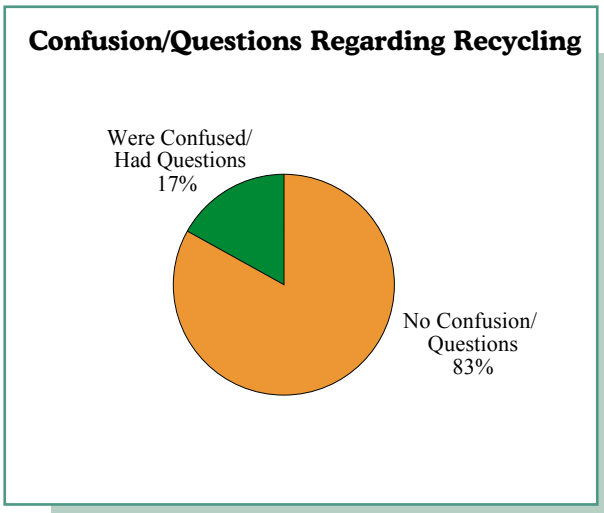
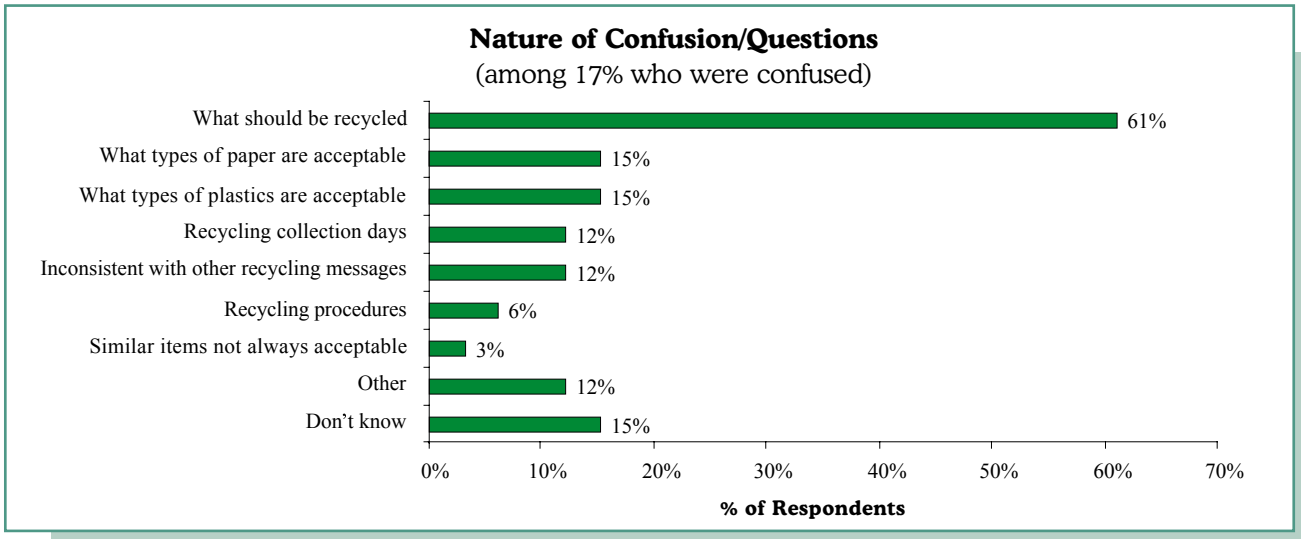


Figure III-6



Familiarity and Compliance with Recycling Rules

Survey respondents were read a list of 18 items that were or were not accepted by the current Recycling Program, in random order. Figure III-7 on the next page highlights the percentages of respondents that correctly identified recyclable items, while Figure III-8 highlights those who misidentified nonrecyclable items as recyclables. As these figures show, a majority of respondents correctly identified those items that are recyclable under current policy. Particularly high percentages were aware that soda cans, glass bottles, paperback books and plastic milk jugs were recyclable, while slightly fewer were aware of paper bags and shampoo/lotion bottles. Except for ceramics/ mirrors/glassware, which were identified as recyclable by 70% of respondents, items that are not recyclable were incorrectly identified as recyclable less than 60% of the time, with yogurt containers, light bulbs, and batteries being misidentified as recyclable less than half the time.

Respondents were also asked how often they rinse out containers before recycling them. As shown in

Figure III-7

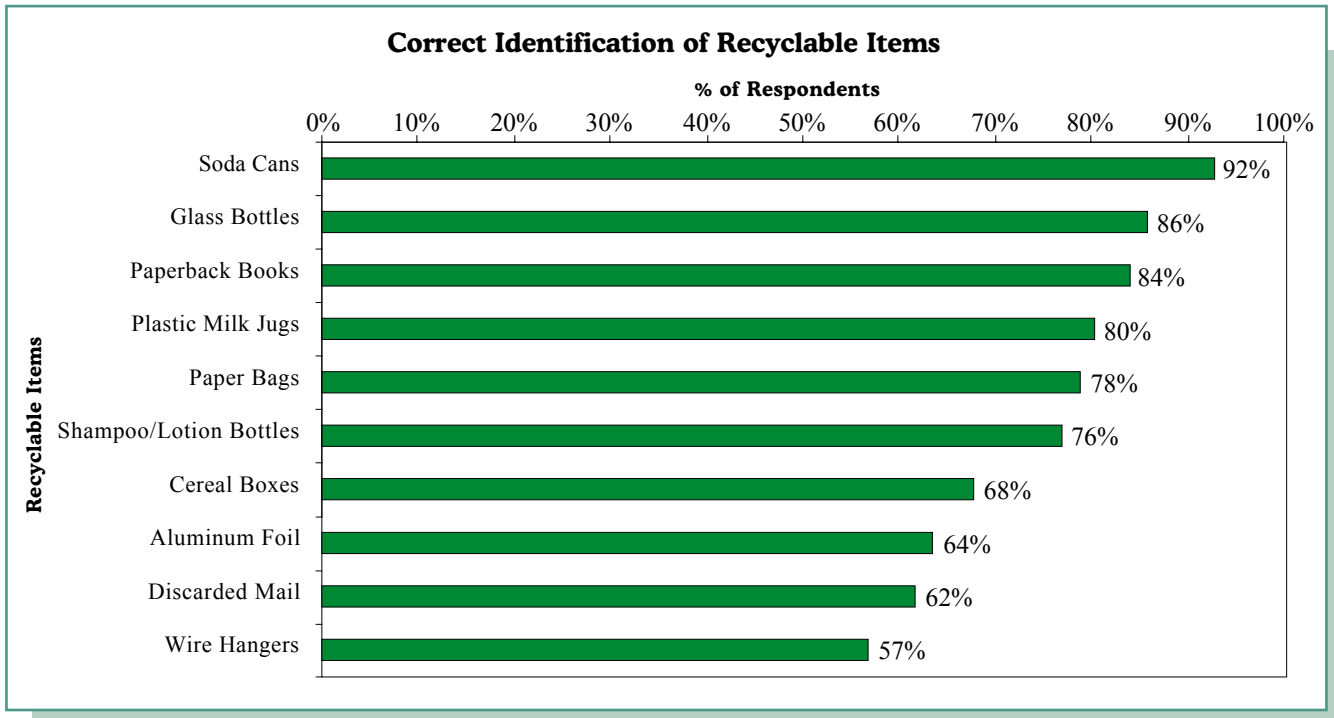


Figure III-8

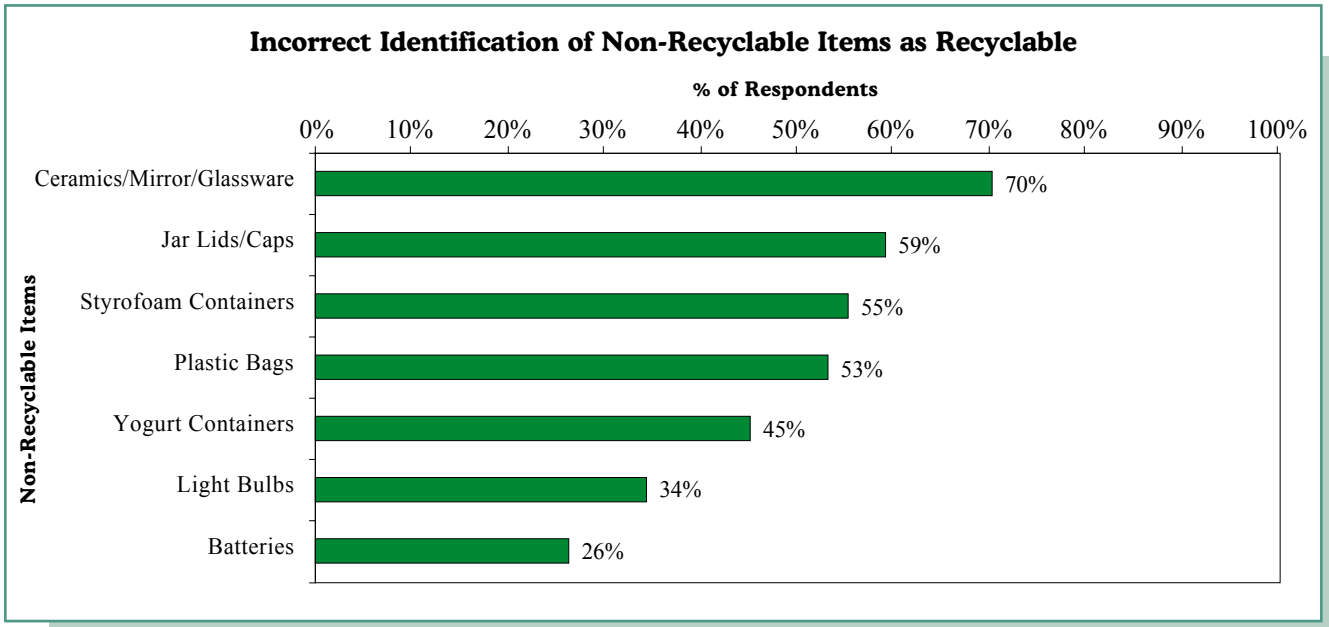
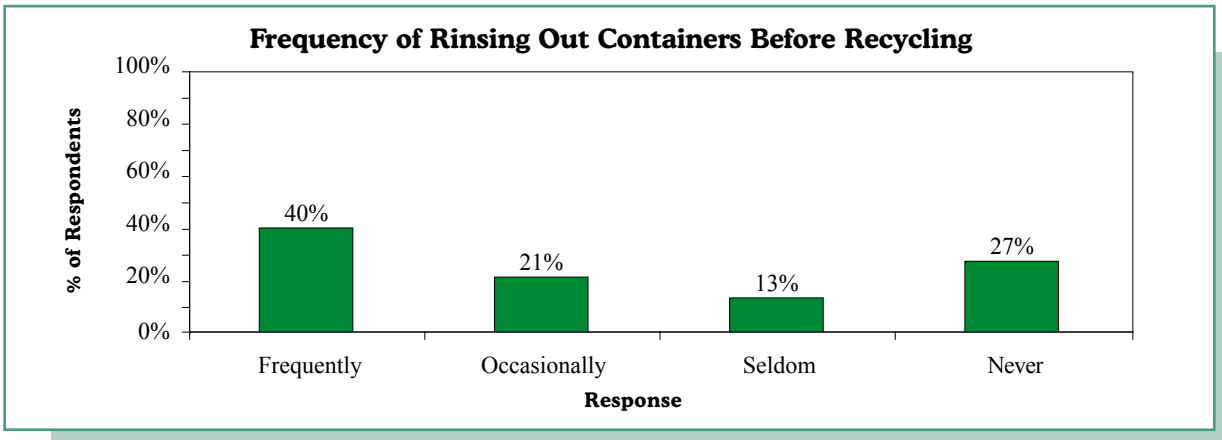


Figure III-9 on the following page, the majority of respondents claimed to rinse out recyclables at least occasionally, with 40% stating that they do so frequently.

In addition, participants were asked how many recyclable items (out of every ten potential recyclables) they thought they actually recycled.

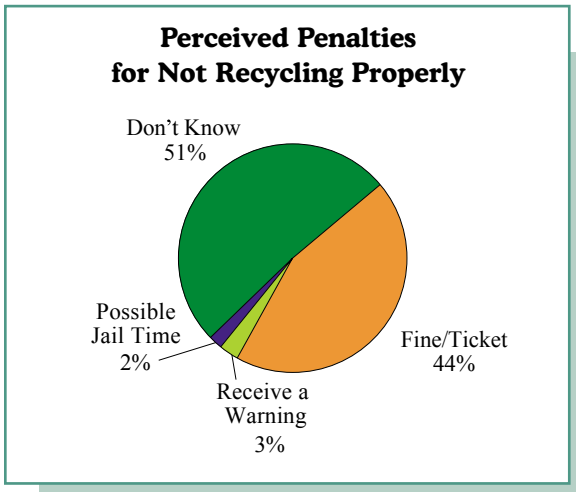
Figure III-9



The mean number for the entire group was 6.2, suggesting that about 6 out of every 10 items known to be recyclable are actually recycled.

Survey questions also revealed that only about half of the Chinese-speaking survey participants (54%) were aware that recycling policy is mandatory, and when asked about the consequences of not recycling, over half (51%) said they did not know, as shown in Figure III-10.

Figure III-10



Awareness of Waste Prevention

In order to test understanding of the term "waste prevention," respondents were asked to define what they believed constituted waste prevention, and were initially given no prompting. As Figure III-11 on the following page shows, roughly a third of respondents (34%) gave accurate definitions of waste prevention ("to reduce trash") as defined by the Department. In spite of this, higher percentages viewed waste prevention as "recycling" (42%), or simply didn't know the definition (50%).

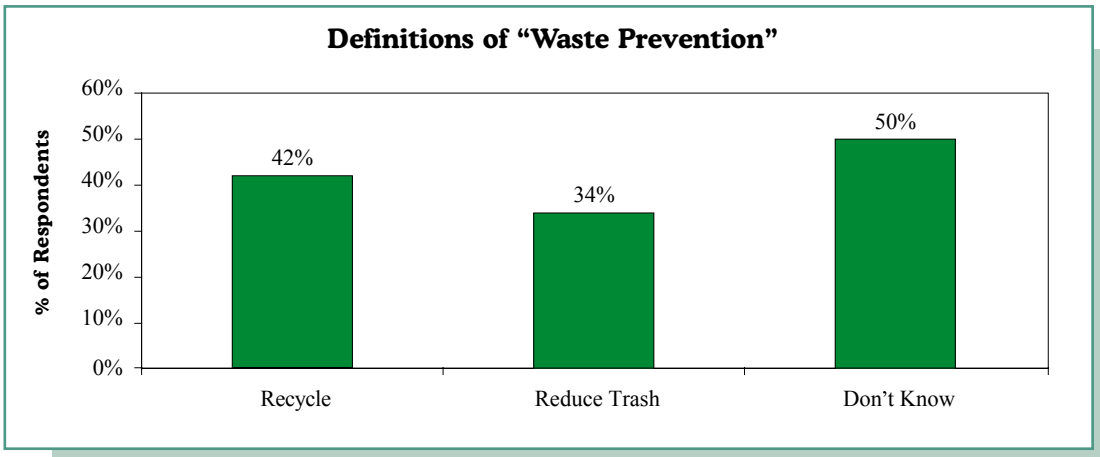
Practicing Correct Waste Prevention

Respondents were then read the following definition and asked to estimate how well the household practiced waste prevention on a 10-point scale:

> *Waste prevention means buying products that have the least amount of packaging or are packaged to last longer. It also means not being wasteful by not buying more of a product than you need and by reusing, donating, or repairing items that you might otherwise throw away as trash or for recycling. Recycling and buying items that contain recycled materials are not waste prevention. Waste prevention reduces the amount of what you set out either for recycling or as trash.*

Most of the respondents gave themselves high ratings for practicing true waste prevention, with a mean score of 6.7. However, when asked what could be done to motivate households to increase their waste prevention practices, over half of the respondents said they did not know (53%), while a few continued to mention recycling.

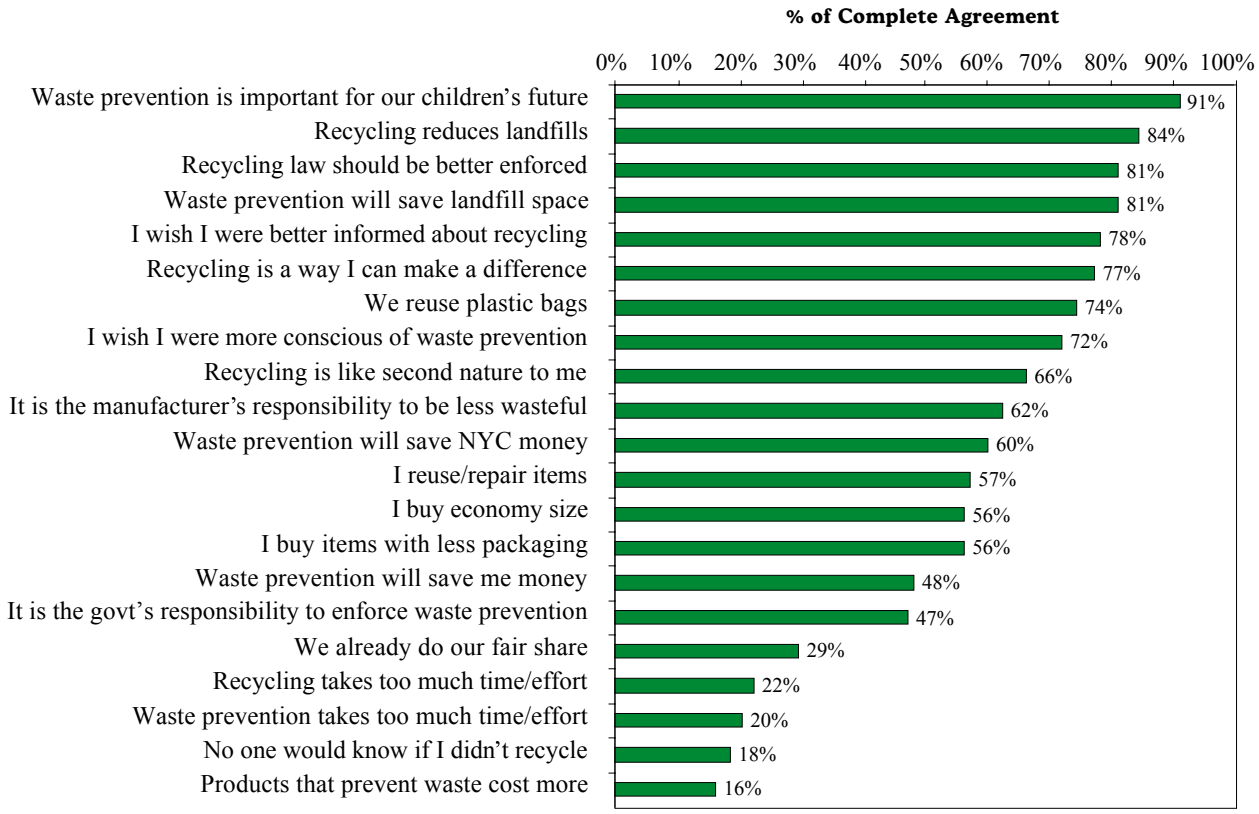
Figure III-11



Recycling and Waste Prevention Attitudes

Survey participants were read a list of 21 statements regarding waste prevention and recycling. In each instance, they were asked the extent to which they agreed with the statement. Figure III-12 highlights the percentage of the Chinese-speaking population that was in complete

Figure III-12



agreement with each statement. As the Figure indicates, over 80% of Chinese-speaking residents completely agree with the four statements that focus on the importance of waste prevention and recycling, their impact on reducing landfills, and the enforcement of recycling policy. A majority also completely agrees that they wish they were more conscious of recycling and waste prevention, and two-thirds completely agree that recycling has become second nature to them. Less than half said they were in complete agreement (or even agreed somewhat) with the statement that recycling compliance and waste prevention take too much time or effort.

Differences Among Subgroups

There were not many substantial differences in awareness and practice of waste prevention and recycling among the demographic subgroups in this sample (such as income groups, age groups, etc.). The only groups that differed significantly on several measures were: (1) those who had lived in New York more than 10 years, and (2) homeowners. Chinese-speaking New Yorkers who have been residents for 10 years or more rated themselves as more practiced at waste prevention than those who have been residents for less time. Homeowners were significantly more likely than renters to report being extremely or very knowledgeable about what is and what is not acceptable for recycling. They also claimed to recycle a significantly higher number of recyclable items than renters did.

GENERAL CONCLUSIONS

Although this research project addressed many of the same questions and issues as the citywide recycling research outlined in Chapters I and II (and the citywide waste prevention research that will be discussed in Chapter VI), it is not possible to compare the two sets of results to look for statistically significant differences, since the survey questions and time frames were not identical. Nevertheless, a general comparison of results does suggest that:

1. Chinese-speaking residents may be slightly less enthusiastic and informed about recycling in New York City, when compared to the General Population or Spanish-speaking residents, although a majority of them still rate the Program favorably and identify major recyclables as such.

2. In keeping with the focus group findings, Chinese residents appear to be less interested in the benefits of recycling for the global environment and more interested in its impacts on neighborhood cleanliness.

3. Furthermore, it is possible that the community's emphasis on reuse and frugality is reflected in a greater than average appreciation and practice of waste prevention.

4. In reviewing the implications of the potential popularity of waste prevention among Chinese residents, it is important to bear in mind that a tendency to engage in waste prevention appears to have more to do with traditional, utilitarian usage and not abstract concern about the environment.

Chapter IV Sanitation Workers

BACKGROUND

As detailed in Chapters I and II, in 1995 the Department began to conduct research on New Yorkers' attitudes about the Recycling Program. Its first study, conducted early in 1995, found that New Yorkers showed some confusion over certain recyclable items. In order to learn more about why this was so, the Department brought together Sanitation workers and supervisors to discuss the Program from the perspective of those on the front line who collect recyclables every day. Over the course of a month in the Spring of 1996, five groups of ten workers participated in a discussion about their work on recycling routes throughout New York City.

In 1997, the City added mixed paper, beverage cartons, and bulk/household metal to the list of items that residents are required to recycle. Expanded Recycling also introduced a two-color-container separation system to divide mixed paper from the rest of the recycling stream. Under this arrangement, green bins/green decals/clear bags signify mixed paper, and blue bins/blue decals/blue bags identify beverage cartons, bottles, cans, metal, and foil.

To promote the citywide expansion, the Department launched a new animation advertising campaign. Posters were placed on subways, bus shelters, and storefronts; commercials ran on television and radio; and ads appeared in newspapers. The campaign featured cartoon characters (green bin, blue bin, and garbage bin) that explained the expanded Recycling Program.[1] In light of the expansion and accompanying advertising efforts, the Department recruited a second group of Sanitation workers and supervisors in May 1999 in order to revisit the same topics that were covered three years prior and elicit opinions about the expansion and the new advertising.

STUDY DESIGN

Because Sanitation workers are salaried employees of the Department, it was important to make a clear distinction between their participation in this research and their normal job responsibilities. In 1996, and again in 1999, senior Sanitation officials issued a memorandum to all employees working on collection routes and their supervisors. The memorandum invited participation in the focus groups and explained the goals of the research. It clearly stated that participation was voluntary and would have no bearing on workers' job status, assuring prospective participants that all of their statements would remain completely confidential. Workers were also advised that the focus groups, for which attendants would receive monetary compensation, would take place outside of work hours.

Employees were then contacted at home by telephone for recruitment. Of those who expressed interest, forty were selected at random for five focus groups in 1996, and approximately eighty were selected for eight groups in 1999. Each group contained workers from the City's five boroughs, but was not otherwise balanced demographically. Different groups of workers were interviewed in 1996 and 1999. The 1996 group consisted of recycling route workers only, while the 1999 groups included those assigned to both recycling and trash routes. Thus the research was not a "follow-up study," but an examination of issues at two points in time.

During evening hours, the selected workers assembled to participate in discussions about their understanding of, and attitudes toward, recycling. A trained group leader moderated the discussion, introducing questions and topics at intervals throughout a two-hour period.

[1] Complete information on recycling advertising campaigns can be found in *NYC Recycles: More Than a Decade of Outreach Activities by the NYC Department of Sanitation, FY 1986-1999*, DOS, Fall 1999.

STUDY QUESTIONS

The agenda for the focus groups was prepared by BWPRR staff. Using this as a guide, the moderator led discussion on the following topics:

1. Understanding of the NYC Recycling Program: including training opportunities, knowledge of what is/is not recyclable, and the blue/green system.
2. Compliance Issues: such as whether residents were recycling properly or at all; the extent of contamination in recycling; and comparisons among neighborhoods and housing types.
3. Collection and Disposal Issues: when and how recyclables are collected, and experiences in the garages and with processors.

In addition, 1999 focus groups were shown examples of the newest public education materials and asked for their reactions.

FINDINGS

Understanding of the Program

In 1996

In the 1996 discussion groups, workers noted that some residents seemed to be confused about which items to recycle and how to place recyclables in bins and bags. (This confusion was also suggested in the 1995 resident survey.)

When the workers were questioned about how informed they felt about the Recycling Program, most responded that they were familiar with the basic rules, while a few reported confusion over the recyclability of certain items. It should be noted that, in 1996, not all boroughs were recycling the same materials; Staten Island and the Bronx were recycling the three additional material groups (mixed paper, beverage cartons, and household/bulk metal), while the other boroughs were not. Also, municipal, uniformed employees are not subject to a New York City residency requirement. Therefore, those workers subject to different recycling requirements at home vs. on the job may have been more likely to be somewhat confused.

In 1999

In the 1999 focus groups, workers expressed a more positive and optimistic view of residents' understanding of the Program. They noted that overall, New Yorkers had become more comfortable with recycling rules and requirements, but felt that residents still showed a degree of confusion about certain items. Workers also thought that there was some confusion among residents about recycling collection days (since some districts/boroughs switched to weekly pickups while others remained alternate week).

When questioned about their own understanding, most rated themselves quite knowledgeable about which items were and were not recyclable in NYC. Some noted that they had received educational materials and briefings about the Program. However, when tested, a few were confused about some kinds of plastic containers and whether the following were recyclable at all:[2]

- televisions
- computers
- batteries (car and household)
- paint cans
- aerosol cans
- hardcover books
- mirrors/ceramics/glassware
- tires
- plastic toys

The supervisors interviewed considered themselves particularly knowledgeable about the Program and, when tested, correctly identified the majority of recyclable items as such.

[2] Of the items listed, only paint and aerosol cans are accepted for recycling in New York City.

Compliance Issues

In 1996

In 1996, most workers in the focus groups noted that some households on their routes were not in full compliance with the Recycling Law. Referring to observations on-the-job, they noted the following problems caused by residents not recycling properly:

- garbage mixed in with recyclables (often placed at the bottom of the recycling bag or bin)
- recyclables improperly discarded in the garbage
- nondesignated plastic and glass mixed in the metal/glass/plastic (MGP) stream
- newspapers bundled improperly (with materials other than twine or string)
- misuse of plastic bags: recyclables in black bags or trash in blue/clear bags
- haphazard and confusing stacking of trash and recyclables at curbside
- failure to cut up and/or tie cardboard
- recyclables placed at the curb on an incorrect day
- indiscriminate use of recycling bins without regard to blue/green coding system

Many workers, furthermore, felt that residents were aware that recycling was mandatory, but did not understand how, or take the time, to fully comply.

In 1999

By 1999, workers and supervisors noted marked improvement in compliance. Remaining compliance problems mentioned by the workers involved the improper use of bins and bags—with trash, green and blue bins sometimes used indiscriminately for garbage, paper, and MGP without regard to the color-coding system. There was also general agreement that apartment dwellers were more prone to improperly discard recyclables than homeowners, but that homeowners were more concerned about fines. Specifically mentioned was the problem tenants had recycling mixed paper when building managers failed to provide green containers. It is interesting to note that this issue also came up in DOS surveys of apartment dwellers, which showed that landlords frequently provide blue, but not green, bins. Workers also observed that proper compliance seemed to be linked to the socio-economic demography of the neighborhood; there was better compliance in higher-income areas.[3]

Collection and Disposal Issues

In most focus group discussions, workers clearly indicated that contamination of the waste stream occurred *before* refuse was placed at the curb; this meant that residents were improperly including trash with recyclables in their bins and bags. There was strong consensus that contamination was *not* compounded during collection. Moreover, when asked whether possible events in the garage—such as using incompletely washed garbage trucks for recycling collection or tossing garage waste into parked recycling trucks—could be a source of contamination, workers indicated that such occurrences were rare and would not, to their knowledge, have any effect on recycling contamination.

Reaction to DOS's Animation Campaign

In the 1999 focus groups, Sanitation workers and supervisors were shown the main component of the Department's new public education campaign—a Recycling Checklist flyer that shows, through cartoon representations, which items are and are not recyclable. The flyer depicts recyclable items falling into the correct bins and bags, and nonrecyclable items falling into a trash can (see next page).

Virtually all were very positive about the new flyer and the animation campaign in general. They were also enthusiastic about having the Checklist on posters in their garages and on recycling trucks, especially for reference when answering questions for residents.

[3] Although survey results given in Chapter II suggest that income does not directly correlate with compliance.

GENERAL CONCLUSIONS

The results of the two discussion groups with Sanitation workers, conducted at different points in the evolution of the Recycling Program, confirm that:

1. Residential attitudes towards the Program have become more positive and New Yorkers have become more knowledgeable.

2. While contamination continues to be an issue in the City's recycling stream, very little of it comes from Sanitation employees' actions. When they are uncertain, workers place materials in garbage trucks rather than in recycling trucks.

3. This means that continued efforts to ensure that residents recycle only designated items are appropriate for minimizing contamination of the recycling stream and for improving the capture rate.

This chapter concludes reporting on the research done to date on recycling issues in New York City. The same survey administered to residents in the waves of research described in Chapter II continues to be used to monitor advertising efforts, with Waves 4 and 5 of research planned for the upcoming year. As data is gathered, it will be added to the longitudinal comparisons outlined in this part of the report. The sections that follow depart from New York City's existing Recycling Program and will describe research on alternatives to traditional recycling that has been conducted since 1995.

Chapter V Textile Recycling

BACKGROUND

In late 1995, the Department conducted a telephone survey to collect information about residents' attitudes towards textile recycling in the Park Slope Intensive Recycling Zone (the "Zone") in Brooklyn. The neighborhood of Park Slope had been chosen in 1990 as a test zone for the collection of additional kinds of materials, starting with mixed paper and a wide variety of plastics. In November of 1991, part of the Intensive Zone began recycling food waste ("organics"). In 1993, beverage cartons and textiles were added to the materials collected from the entire Intensive Zone. By concentrating these pilot programs in one specific area of the City (and one where residents were especially environmentally committed), the Department sought to measure the most optimistic outcomes of new methods to recycle municipal solid waste.

With each addition of materials to be collected for recycling in the Intensive Zone, the Department mailed (or distributed) informational brochures to residents. The brochure that was mailed in 1993 addressed textile recycling, instructing residents to leave unwanted clothing, rugs, and bedding with paper and cardboard for curbside collection. At the same time, it encouraged residents to donate unwanted clothes to charities and listed some of the major charitable organizations in New York City (such as the Salvation Army, Goodwill, and the Coalition for the Homeless). After this mailing, the Department promoted the Intensive Recycling Program through local outdoor advertising and reminder postcards. These media, however, did not address textile recycling directly.

The results of market research on other aspects of the Intensive Recycling Program in Park Slope are discussed in Chapter VII. This chapter focuses on 1995 research about residents' opinions of—and experiences specifically with—textile recycling.

SURVEY DESIGN

For the telephone survey, 150 respondents were selected at random from a list of Zone residents. Residency was established by cross-checking three-digit telephone prefixes, specific addresses, and census tract numbers. The sample was balanced for gender, income, household size, employment, and marital status. Seventy-nine percent of respondents were aged 25–46.

Results of the survey were tabulated for all respondents, as were subtotals by age, income, and other demographic indicators. In addition, subgroups of residents who reported being "aware" or "unaware" of the Zone were analyzed separately. Statistically significant differences among the subgroups were tested at the 90% level—meaning that there is a 90% chance that repeated sampling would give the same results.

SURVEY FINDINGS

Rating of the Program

The positive view of the Recycling Program held by Zone residents was consistent with results of other studies of recycling attitudes citywide which have been conducted since 1995. As shown in Figure V-1, residents of the Zone rated the program

Figure V-1

Overall Rating of the Recycling Program
(among all Zone residents sampled)

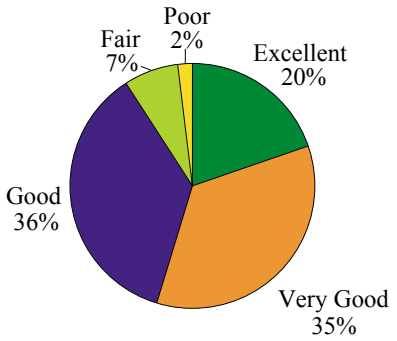
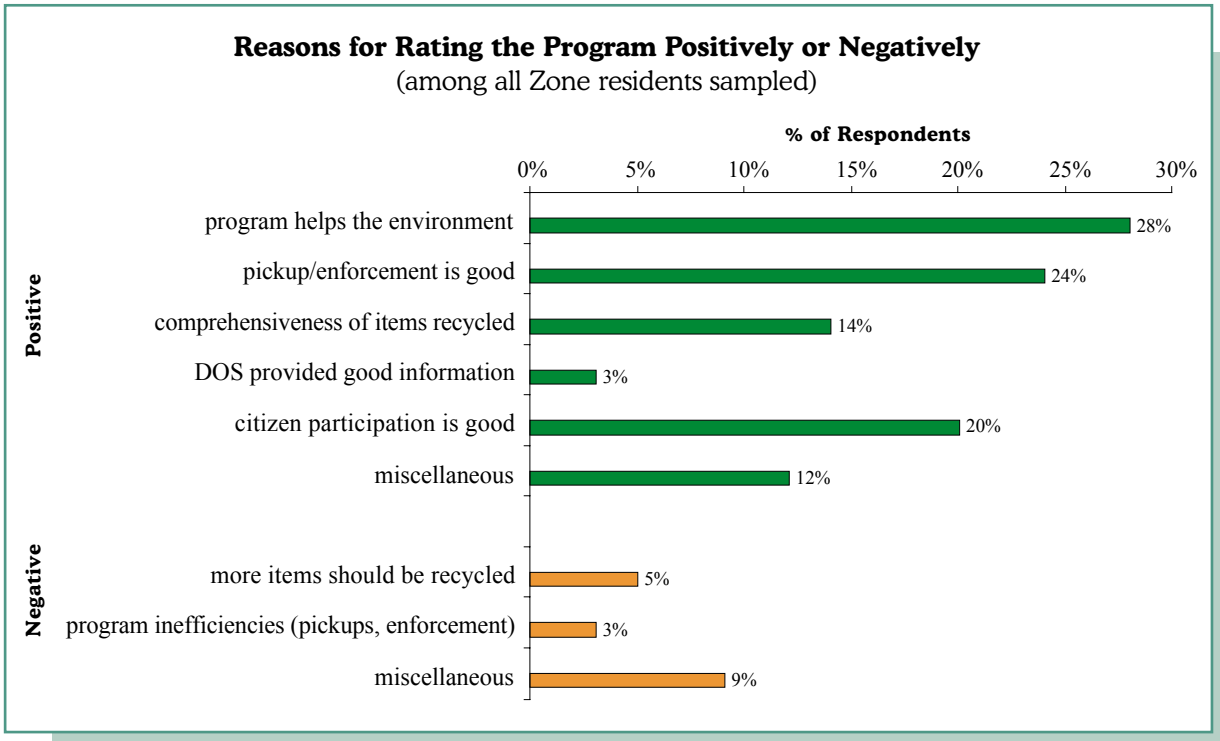


Figure V-2



very favorably, with over 90% stating it was "excellent," "very good," or "good." Only 9% of the sample rated the Program "fair" or "poor."

Respondents listed a number of reasons to support their positive ratings: recycling helped the environment and/or reduced landfills, curbside pickup was convenient, a wide variety of items could be recycled, and citizen participation was good. The few who rated the program unfavorably cited justifications that included: problems with the efficiency or enforcement of the program, not including enough categories of material for recycling, and miscellaneous other reasons which included the need for expanded citizen education. Positive and negative reasons for Program rating are summarized in Figure V-2.

Textile Recycling Behavior

The survey revealed very low levels of textile recycling participation throughout the Intensive Recycling Zone. Figure V-3 shows that only 10% of respondents reported at least occasionally recycling textiles, while 64% stated that they never did.

Instead, respondents reported donating 69% of unwanted textiles to charity, leaving only 20% for recycling, and placing 11% in the trash, as shown in Figure V-4 on the next page.

Figure V-3

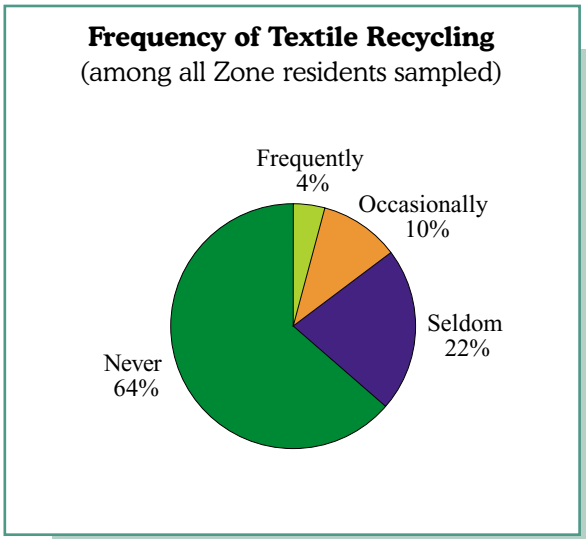
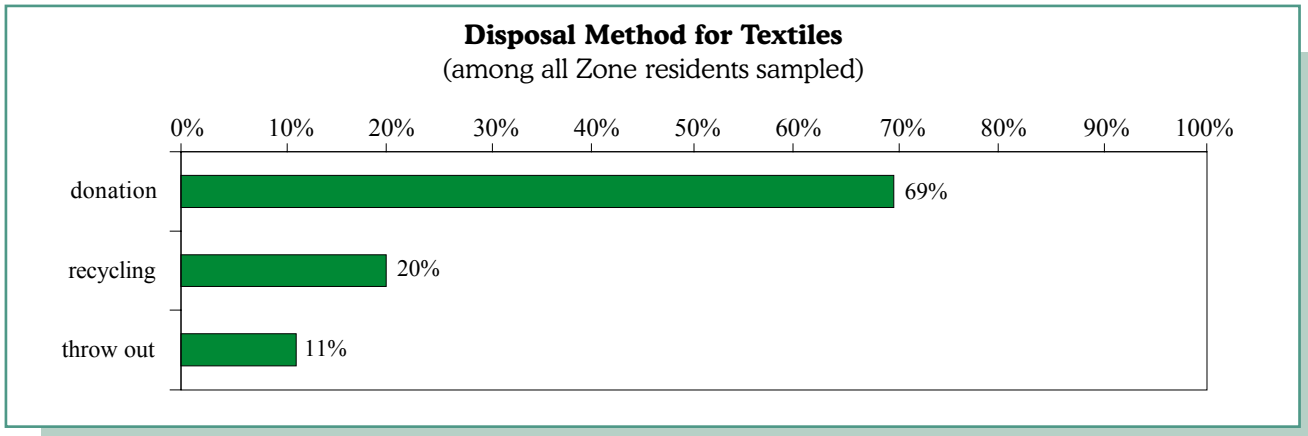


Figure V-4



Of those who did recycle textiles, relatively few respondents (16%) reported any problems as shown in Figure V-5.

Figure V-6 shows that, out of this small group, the problems encountered included the fact that the Program was perceived as confusing, that bags were torn open by scavengers, and that pickup service was not adequate.

The issue of scavenging arose again, when it was found that among the residents who reported this as a problem, nearly three-quarters

Figure V-5

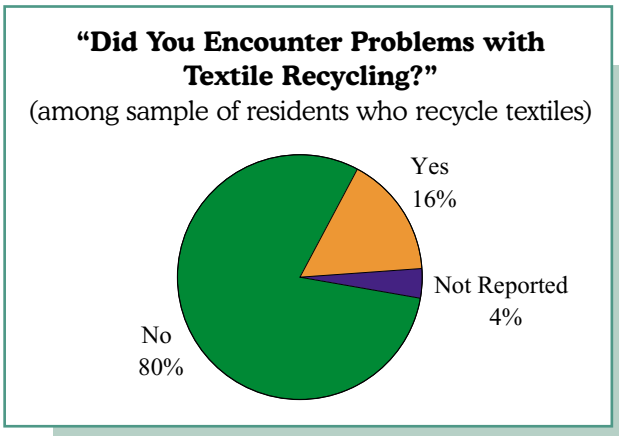
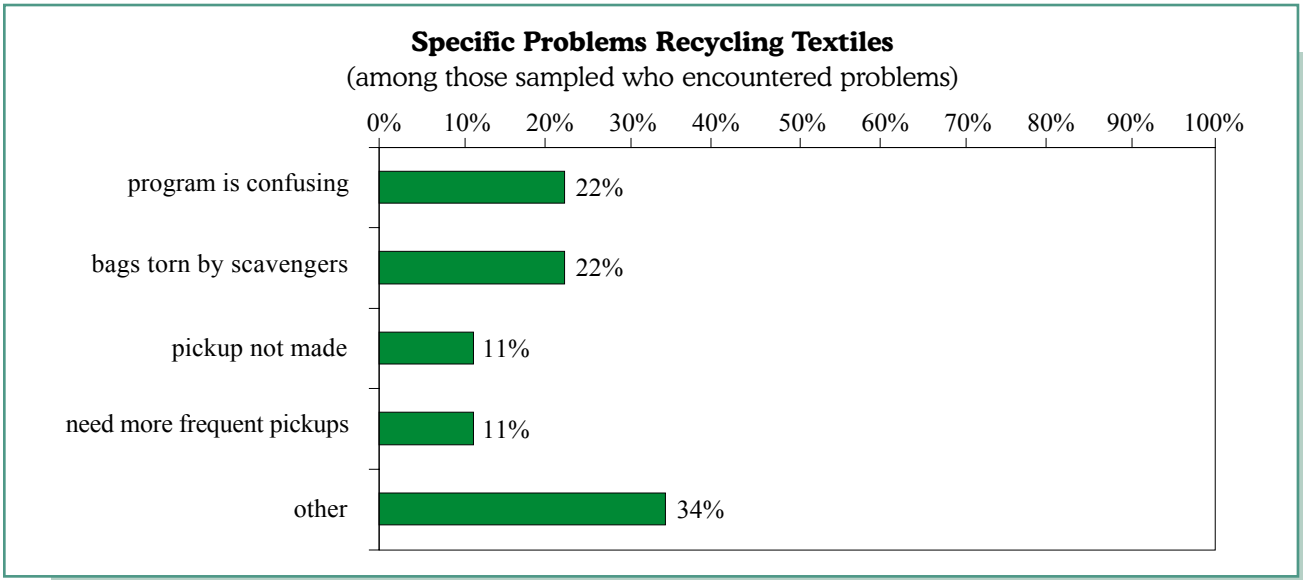


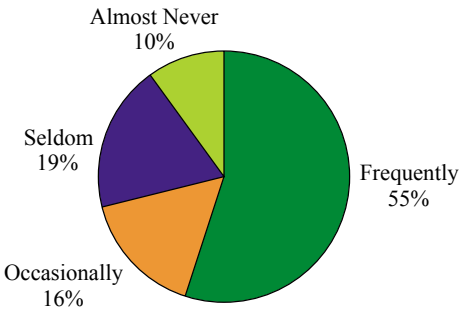
Figure V-6



believed that textiles were frequently or occasionally taken from curbside by someone other than Department personnel, usually a homeless person. These results are summarized in Figure V-7.

Figure V-7

Perceived Frequency of Non-DOS Personnel Taking Textiles from Curbside
(among those sampled who reported scavenging as a problem)



GENERAL CONCLUSIONS

The Department's survey of Park Slope Intensive Zone residents found the following with regard to textile recycling:

1. During the Intensive Zone pilot, only a small subset of residents recycled textiles.
2. Instead, it appeared that donating to charity was the preferred method of disposal.
3. This may be because charity donation has a much greater precedent than curbside collection of textiles, and avoids the problems associated with scavenging that residents occasionally reported encountering in this pilot.

Chapter VI Waste Prevention

BACKGROUND

As described in Chapters I, II, and III, the Department's ongoing citywide market research on recycling included a series of questions about residents' waste prevention habits and interests. Waste prevention involves an overall reduction in the amount of total waste (trash and recycling) a household produces, which can impact how much the Department must transport and process.

Some basic waste prevention methods are:

- buying items with less packaging, such as concentrated formula or economy size products
- buying items that can be reused
- using durable dishware, glasses, and utensils instead of plastic disposables
- reusing supermarket bags or using a permanent shopping bag
- donating clothes or other items
- repairing items instead of throwing them away
- removing names from junk mail lists

It should be noted that waste prevention does *not* specifically encompass recycling, purchasing goods made from recycled material, or general environmental improvements such as cleaner streets or clean air (although these activities are compatible with the goals of waste prevention).

In 1996, the Department conducted a special study on the topic of waste prevention, as a supplement to the questions on this subject in its general recycling research (as outlined in Chapter II).

The study consisted of both qualitative and quantitative research, and covered the following areas of inquiry:

1. **Waste Prevention Awareness and Activity**—are residents aware of what waste prevention is, and its methods? Are they currently practicing any of those methods?
2. **Frequency of Waste Prevention**—if so, how frequently do respondents practice various waste prevention methods?
3. **Attitudes toward Waste Prevention Practices**—including waste prevention behavior and responsibilities of consumers, manufacturers, and the government.
4. **Need for Information**—what would be instrumental in encouraging residents to engage in more waste prevention and reuse?

QUALITATIVE STUDY

Researchers convened eight focus groups comprised of diverse population segments, carefully screening to ensure that each group of 8–10 respondents included male and female members of varying age, income, and ethnicity. All five boroughs were represented in the samples. The eight focus groups were arranged by household size and type of dwelling in the following way:

	Multiple Dwelling	Single/Two/Three Family Dwelling
1–4 Member Household	2 groups	2 groups
5 or More Member Household	2 groups	2 groups

Each group session lasted between one and a half and two hours.

Results

The qualitative study indicated that an overwhelming majority of New Yorkers did not understand the term "waste prevention" and generally equated it with recycling. Prior to learning the true meaning of the term (as defined by the Department), respondents almost universally believed that recycling was a principal element in waste prevention. In spite of this confusion, respondents were generally aware that waste prevention involved practices beyond simply recycling, including saving electricity, water, and fuel. Some were aware of other waste prevention techniques, such as avoiding over-packaged items, reusing supermarket bags, or using permanent bags for shopping.

Nevertheless, participants continued to mention recycling methods as ways they could prevent waste, even after they were familiarized with the differences between the two concepts. Continued clarification of waste prevention and recycling as separate did not prevent participants from confusing the two throughout the discussion.

Participants were aware of various waste prevention strategies, such as re-serving leftover food, using less paper, using cloth diapers, buying products based on less packaging, etc. While participants indicated that they would be able to adjust their behavior to include such waste prevention techniques, many believed that this would require a conscious change in lifestyle.

Many stated that they felt that waste prevention methods focused too much on consumers and not enough on manufacturers, who have control over the ways items are packaged. They believed that the government should enact laws that require manufacturers of consumer items to use less packaging. Even if manufacturers were to be more waste-conscious in their packaging, however, participants indicated that they would still purchase their brands of preference. They also claimed that environmentally friendly products tended to be more expensive, but did not equate the additional expense with a better value.

Participants were asked how they could change their behavior to produce less overall waste and most believed this would involve dramatic changes in the household. Many continued to confuse waste prevention with recycling. Almost no one referred to waste prevention techniques such as repairing appliances or eliminating junk mail. Most felt they could be more aware of waste prevention, yet they also believed that commercial entities should be targeted for public education as well. Very few argued that new waste prevention laws should be aimed at consumers.

QUANTITATIVE STUDY

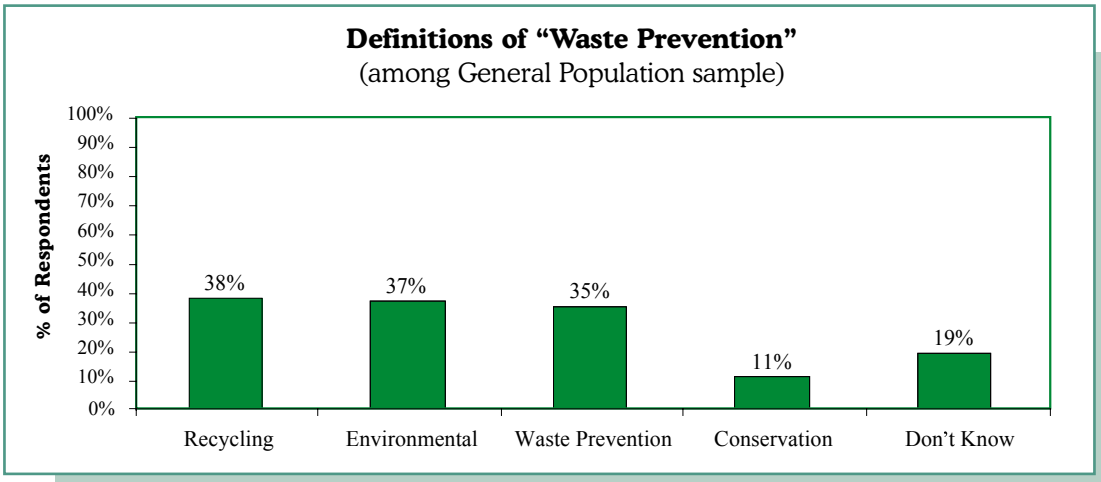
Based on the results of the qualitative study, the Department designed a telephone questionnaire to assess the level of familiarity with, and attitudes toward, waste prevention among residents in all five boroughs.

Survey Design

Survey respondents were selected at random. The sample included 500 persons chosen from the General Population—roughly 100 residents of each of the five boroughs who were selected to represent a cross-section of the City's population in terms of income, housing type, age, gender, and other demographic variables. In addition, 200 more respondents (50 from each borough, except Staten Island) were identified from a random list of persons with Spanish surnames, and were selected for the survey specifically because they spoke Spanish. All of these interviews were conducted in Spanish by professionally trained interviewers using a translated English questionnaire. The study also targeted 100 residents of New York City Housing Authority (NYCHA) buildings (identified at random from housing lists).

To be included in the survey, respondents had to be personally involved in purchasing and waste management decisions in the household. Results of the survey were tabulated, with responses expressed in percentages. Statistically significant differences among subgroups were tested at the 90% level, which means that there is a 90% chance that repeated sampling would give the same results.

Figure VI-1



Findings

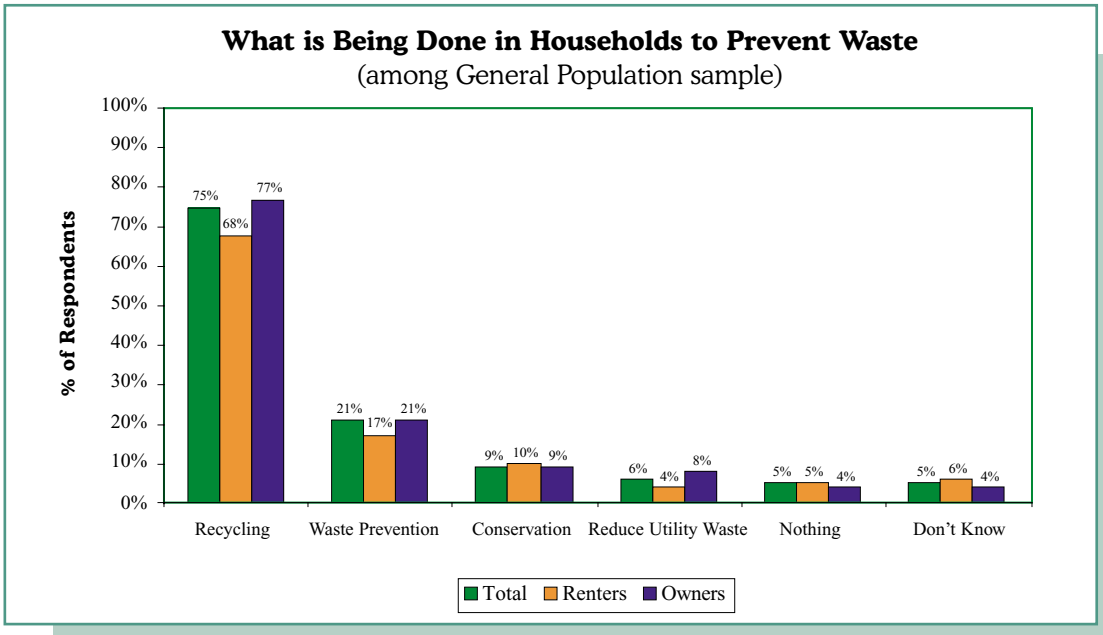
Awareness of Waste Prevention

Respondents were asked to define what they believed constituted "waste prevention," with no initial prompting. As Figure VI-1 shows, while a substantial portion of the General Population sample (35%) gave definitions that fell under "waste prevention" as defined above, slightly higher percentages offered definitions that belonged in "recycling" (38%) or "environmental" (37%) categories. Ninety-seven percent of those giving "environmental" definitions equated waste prevention with keeping trash from piling up in dumps. Nineteen percent of the General Population could not define waste prevention; this was true for 35% of Housing Authority residents and 25% of Spanish speakers.

Practicing Waste Prevention in the Home

Prior to receiving the definition of "waste prevention," respondents were asked what their households were doing to prevent waste. Figure VI-2 shows the frequency of responses to this

Figure VI-2



question, including a comparison between renters and owners. A sizeable majority (75%) mentioned some type of recycling activity, while only 21% mentioned activities that can be truly classified as waste prevention (e.g., reusing items, donating usable items, etc.). Owners (77%) were significantly more likely to mention recycling activities than renters (68%). Spanish speakers and NYCHA residents responded similarly to the General Population.

Respondents were then asked to rate how active their households were in practicing waste prevention (on a scale from 1 to 10, with 1 being inactive and 10 being very active). Figure VI-3 shows the results, by subgroup. It shows the mean rating for the General Population at around 6. The only significant difference among subgroups was in the Spanish-speaking population, which rated itself significantly higher (7.14) than the General Population or any particular borough.

When asked why they were not practicing more waste prevention techniques, most residents cited reasons that related to inconvenience, or a lack of awareness or information. As Figure VI-4 on the following page demonstrates, 25% of respondents in the General Population sample gave no reason or said they didn't know, with renters significantly more likely to respond that way than owners (30% vs. 19%). A few residents, furthermore, stated that since they were already recycling, they felt they did not have to participate in any further waste reduction activities.

There were some significant differences found between the General Population sample and the other groups. NYCHA residents were less likely to consider waste prevention inconvenient (27% vs. 39%) and to lack time for waste prevention (4% vs. 11%), but more prone to not provide any reason for greater participation in this activity (47% vs. 25%). Spanish speakers, on the other hand, were more likely to give the reason "I'm already recycling" as a barrier to further waste prevention participation (14% vs. 5%), and gave other reasons to the effect of "I'm doing the best I can" far more frequently (21% vs. 9%). Taken together, these differences suggest that in relation to the General Population, NYCHA residents show less interest in waste prevention; while Spanish speakers feel that they are already doing their share of waste reduction.

Figure VI-3

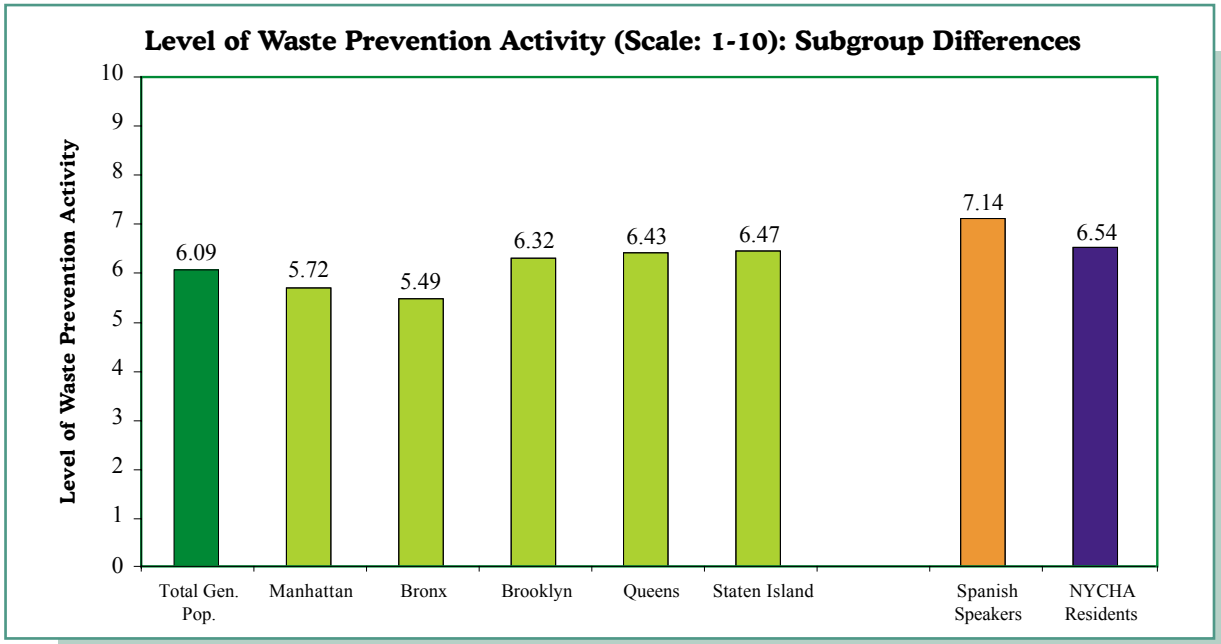
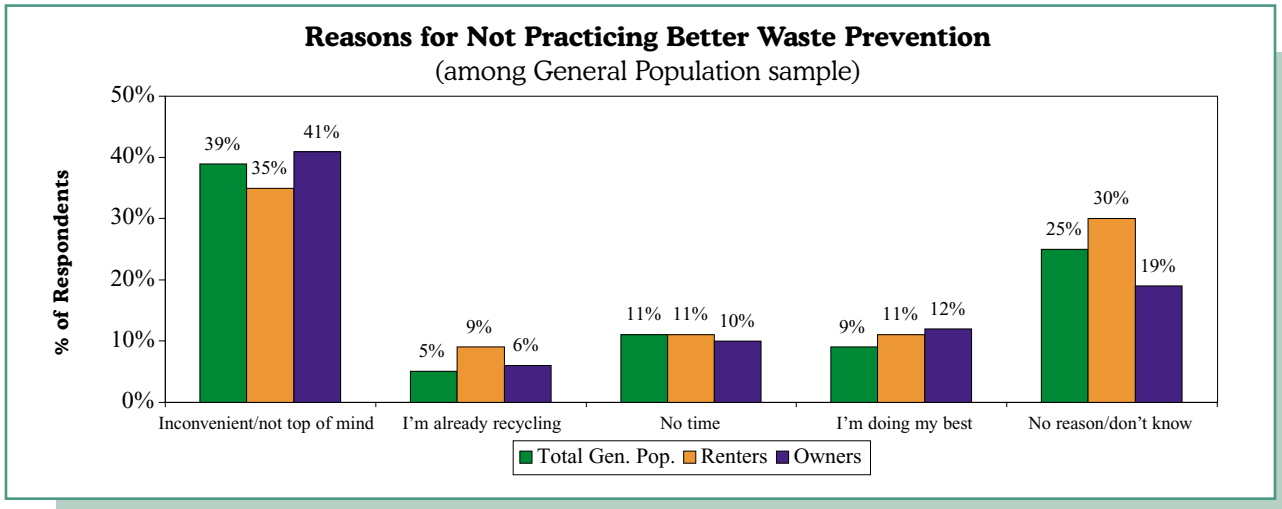


Figure VI-4



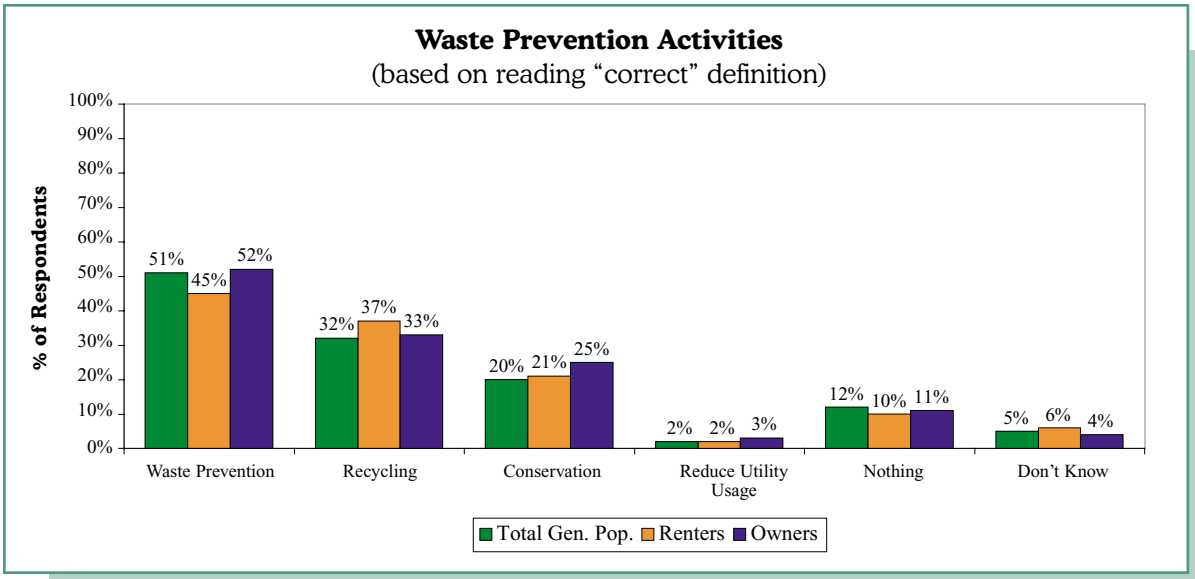
"Correct" Waste Prevention Methods

Respondents were then read the following definition of waste prevention and again asked what their households were doing to prevent waste:

> *Waste prevention means buying products that have the least amount of packaging or are packaged to last longer. It also means not being wasteful by not buying more of a product than you need and reusing, donating, or repairing items that you might otherwise throw away as trash or for recycling. Recycling and buying items that contain recycled materials are not waste prevention. Waste prevention reduces the amount of what you set out for either recycling or as trash.*

Figure VI-5 illustrates the dramatic increase in the number of responses that fell under the correct definition of waste prevention after residents were read this explanation. Fifty-one percent of the

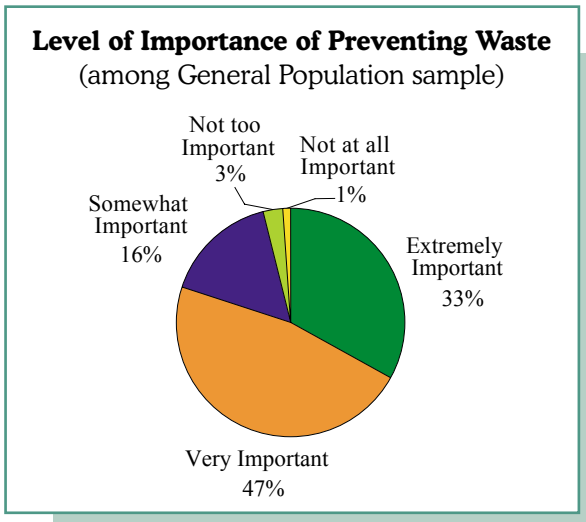
Figure VI-5



General Population cited waste prevention methods practiced in the home, a substantial increase over the original 18%. However, 32% of the General Population still cited recycling activities as a means of waste prevention. Figure VI-5 also demonstrates the contrast between renters and owners in practicing true waste prevention methods (45% vs. 52%).

Additionally, while Spanish-speaking residents rated their levels of waste prevention activity significantly higher than the General Population, they were less likely to cite "correct" waste prevention methods than the General Population (41% vs. 51%). NYCHA residents, who rated themselves similar to the General Population in terms of practicing waste prevention, were even less likely to "correctly" identify waste prevention as such; only 38% listed "correct" waste prevention activities after being read the definition, as opposed to 51% in the General Population.

Figure VI-6



Importance of Waste Prevention

While only about one-half of the General Population reports practicing waste prevention, Figure VI-6 shows that 80% classified the prevention of waste in their households as "extremely important" (33%) or "very important" (47%), and only 3% felt that preventing waste was not too important. In comparison, a significantly higher percentage of Spanish speakers (91%) rated waste prevention "extremely" or "very important," while NYCHA residents' responses on this question were essentially identical to the General Population.

When asked about the advantages of waste prevention, more than half of the General Population cited environmental benefits (e.g., less pollution, cleaner streets, less space needed for landfills). Staten Islanders, as Figure VI-7 illustrates, were significantly more likely to cite environmental advantages than the other boroughs. Miscellaneous advantages included saving money, reducing litter and garbage in general, improved health, and fewer pests. Manhattan residents in particular mentioned saving money (21%), while a significant number of Brooklyn residents mentioned reduced garbage (25%).

When asked about the disadvantages of practicing household waste prevention, 65% answered that

Figure VI-7

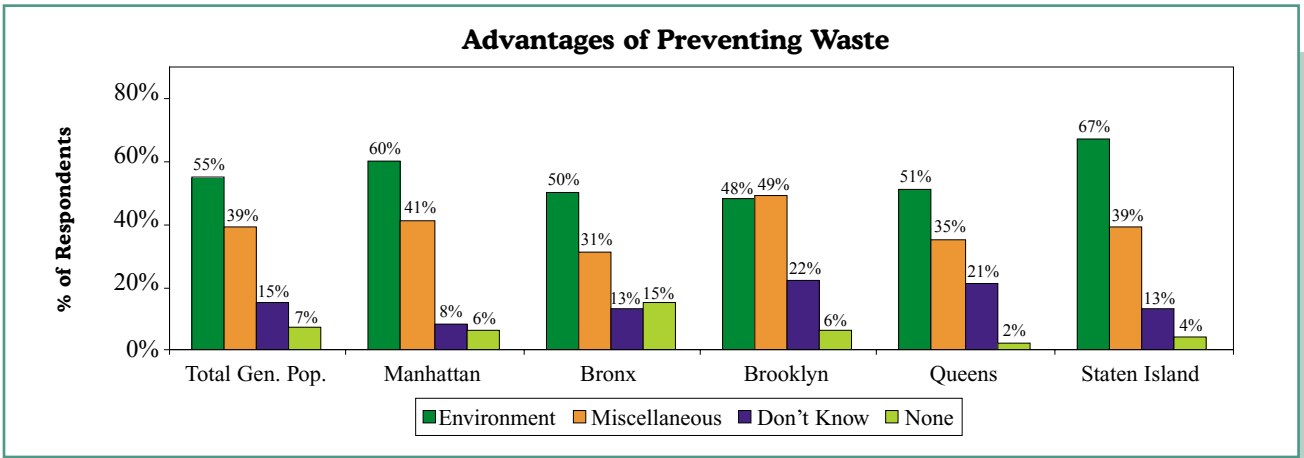
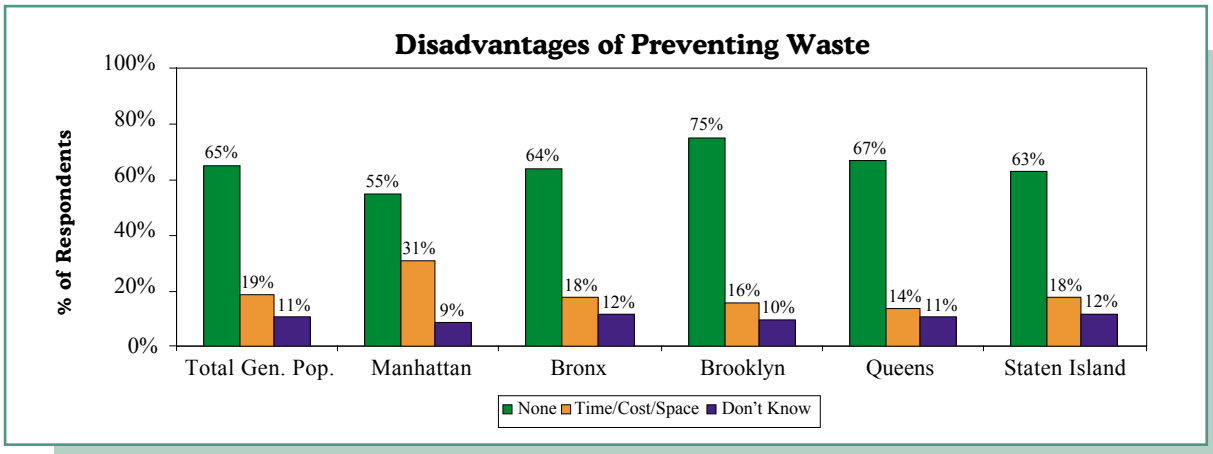


Figure VI-8



there were no disadvantages, with Brooklyn residents significantly more likely to feel this way (75%). Nineteen percent of the General Population responded that it was either too-time-consuming and inconvenient, too costly, or that they had inadequate space; this was especially true among Manhattan residents (31%). Figure VI-8 highlights these findings. These results were consistent with those obtained for the Spanish speaking and NYCHA subgroups as well.

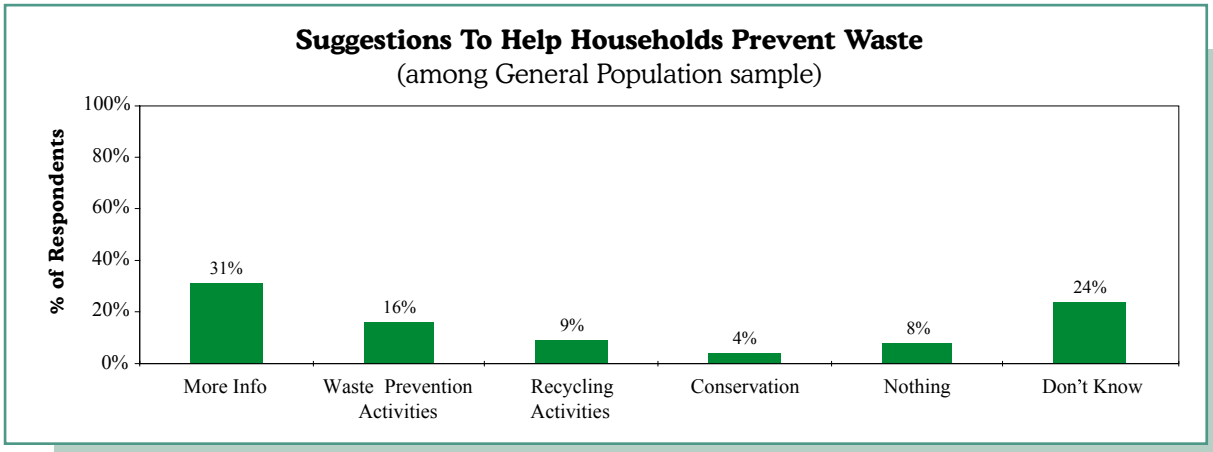
Helping Residents Prevent Waste

Residents were asked what could be done to help their households increase their waste prevention practices. As Figure VI-9 shows, 31% of the General Population felt that more information and a heightened awareness (e.g., more educational materials and community meetings) would help them improve their level of household waste prevention, while 16% volunteered specific waste prevention practices, and 9% made suggestions that fell under the definition for recycling. Thirty-two percent of the residents either gave no response to this question, or said they didn't know.

The only significant divergences from these percentages in the General Population were as follows:

- Owners were significantly more likely than renters to suggest specific waste prevention activities in the home as ways to help households prevent waste (21% vs. 10%).
- NYCHA residents were more likely to give recycling-related suggestions (13%) or to say they didn't have any suggestions (45%) than the General Population (at 9% and 24%, respectively).

Figure VI-9



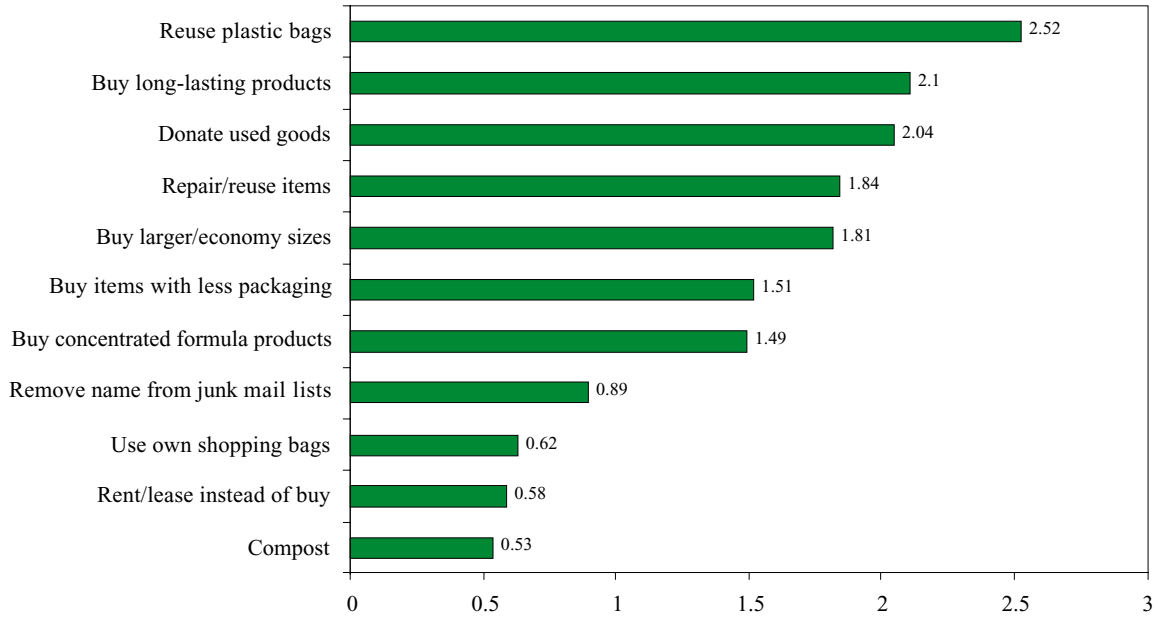
Frequency of Waste Prevention Methods

Respondents were read a list of ways they could prevent waste. For each, they were asked if they always, frequently, occasionally, or never practiced that particular method of waste prevention. Each of these four ratings corresponded to a number from 0 to 3. A mean score was calculated for each method; the closer the mean was to 3, the greater the frequency of the waste prevention activity. Figure VI-10 shows the means for the General Population for each waste prevention method. Results suggested that only three practices are performed on a frequent basis: the reuse of plastic bags (with a mean rating of 2.52), the purchase of long-lasting products (2.10) and the donation of used goods (2.04). Several other methods of waste prevention were practiced less often: the purchase of goods in economy size packaging (1.81), the repair or reuse of items (1.84), the purchase of similar goods that use less packaging (1.51), and the purchase of concentrated formula products (1.49). The last few practices drew mean ratings that were below "occasional."

Several significant differences between Spanish speakers and other groups were found: Spanish speakers were more likely to purchase economy sizes (at a frequency of 2.13) than the General Population (1.81) or NYCHA residents (1.71), and much more likely to bring their own shopping bags to the store (at a frequency of 1.32 vs. .62 for the General Population and .64 for NYCHA residents), yet were less likely to report repairing or reusing items instead of throwing them away (1.43 vs. 1.84 and 1.77, respectively). Differences between the General Population and NYCHA residents, however, were negligible.

Figure VI-10

Frequency of Waste Prevention Practices
(among General Population sample)
0=Never; 1=Occasionally; 2=Frequently; 3=Always



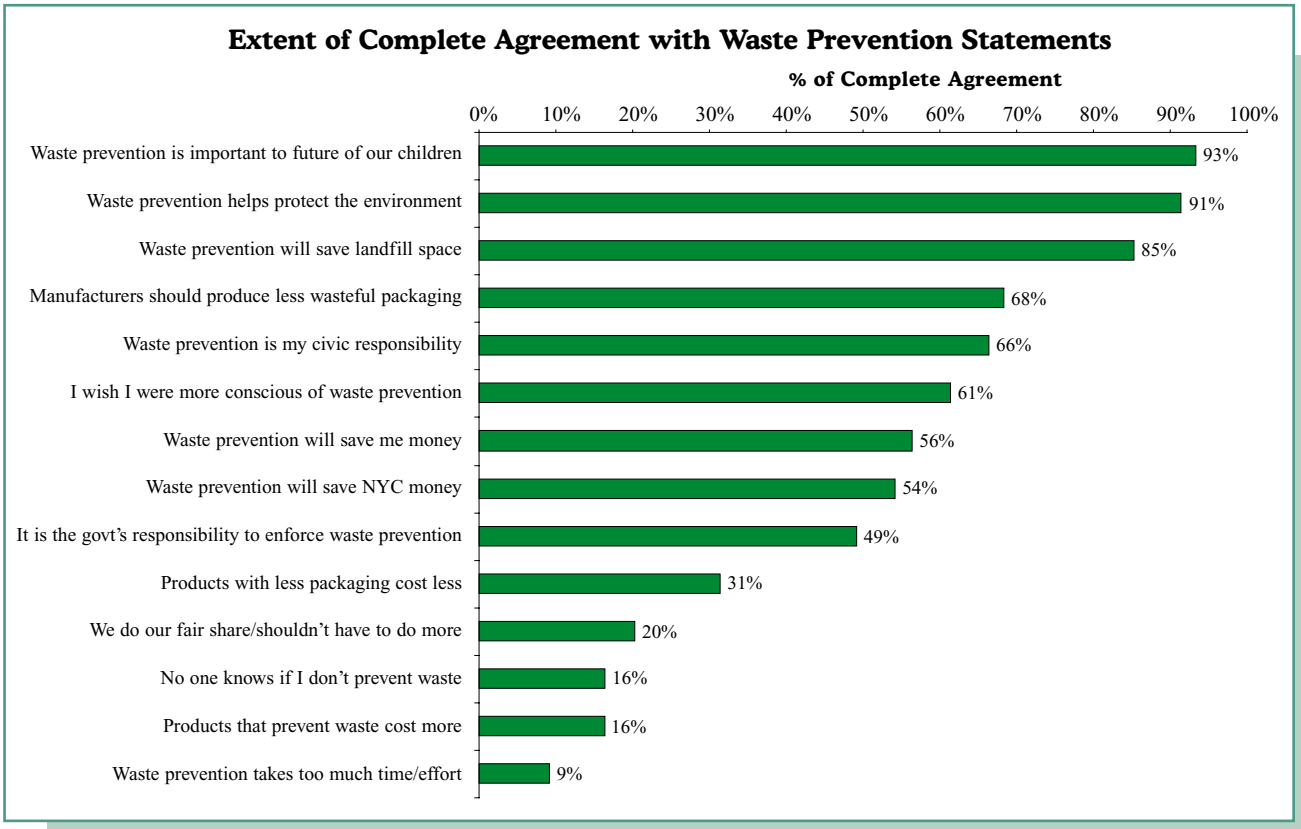
Attitudes Toward Waste Prevention

Respondents were read a list of 14 statements describing how they might feel about waste prevention, and were asked to what extent they agreed with each statement. Figure VI-11 highlights the percentage of the General Population in complete agreement with each statement. As these graphs indicate, residents strongly agreed with positive statements regarding waste prevention and environmental concerns. Residents also supported statements regarding civic responsibility, manufacturers' responsibility to prevent waste, and saving money. Only 9% of the General Population were in complete agreement that waste prevention took too much time and effort.

Major differences among the General Population and subgroups include the following:

- Renters were significantly more prone than owners to agree that waste prevention would save them money (62% vs. 55%) and to say that they wished they were more conscious about the topic (63% vs. 54%).
- Compared to the General Population, Spanish speakers were significantly more likely to say that waste prevention is their civic responsibility (82% vs. 66%), that it will save NYC money (71% vs. 61%), that it will save them money (70% vs. 56%), and that they would like to be more conscious of it (75% vs. 54%). Comparisons between Spanish speakers and NYCHA residents (who resembled the General Population), revealed similar results.

Figure VI-11



GENERAL CONCLUSIONS

The research on waste prevention summarized in this chapter strongly indicates that:

1. There is a widespread lack of understanding of the term "waste prevention" among City residents.

2. However, once they understand the concept, residents report believing waste prevention is important, with many advantages and few disadvantages.

3. Nevertheless, they also think that actively preventing waste would require a substantial change in the way their household operates on a daily basis.

4. Residents feel that the inconvenience of waste prevention activities overrides their environmental benefits, despite strong agreement with the importance of those benefits. The fact that some focus group participants associated certain waste prevention activities with higher costs may indicate that economic considerations also prevail over environmental concerns.

5. Residents also had a strong sense that producers, as much or more so than consumers, should bear the burden of waste prevention and that any government regulations should focus on the way goods are packaged.

6. Participants suggested, however, that reduced packaging would not necessarily be a factor in their choice of consumer goods. Brand loyalty (possibly a result of cost and perceived product value) seems to more strongly influence consumer choice than environmentally friendly packaging. The belief that environmentally friendly products are more expensive may also turn customers away from products that reduce waste.

7. This research also confirms earlier findings, discussed in Chapter II, which show that reusing plastic bags is the most commonly reported waste prevention activity. High on this list as well is the donation of clothing to charity, as discussed in the previous chapter.

8. Differences among subgroups suggest that waste prevention may be perceived differently among NYCHA residents and Spanish speakers, as opposed to the General Population. In particular, both the NYCHA and Spanish groups were less likely to correctly define or give examples of waste prevention, and more frequently confused it with recycling or simply did not know what it meant. However, Spanish speakers (in comparison to both NYCHA residents and the General Population), reported higher rates of waste prevention activities (regardless of whether they termed them as such), and, after receiving definitions of waste prevention, rated it more important and positive than the other groups surveyed.

The final section of this Report will cover a third alternative to traditional recycling—one that targets the organic fraction of the waste stream.

Chapter VII Organic Waste Recycling and Quantity-Based User Fees

BACKGROUND

During the first six months of 1997, the Department conducted research among NYC residents to gauge their attitudes about several forms of **organic waste recycling,** including backyard composting, source separation of food waste, and in-sink garbage disposals. The research also looked at public reaction to the idea of implementing **Quantity-Based User Fees (QBUF's)**—charges residents, landlords, and others would have to pay for garbage pickup—which provide an economic incentive for consumers to divert waste from trash to recycling. Later that year, as part of its ongoing citywide recycling research, the Department collected supplementary data about grass recycling, another organic waste recycling option.

Composting

When metal, glass, plastic, and paper are recycled, they are broken down into components and reformed into useable products. Composting, one form of organic waste recycling, follows the same model; food and yard waste that would normally end up in landfills is instead converted into a beneficial end product. Under controlled conditions, composting can occur without impacting public health, causing odors, or attracting vermin.

Finished compost is used to enrich and stabilize soil as it adds nutrients to plants, and prevents erosion in sandy or clay areas by retaining moisture and inorganic materials. Compost also attracts and nourishes earthworms, whose tunnels aerate the soil and improve drainage, bringing up minerals from the subsoil. Although compost is not technically fertilizer, it contains plant nutrients and essential trace elements that release slowly into the earth. Compost may be applied as mulch or mixed into soil on farms, in residential yards and gardens, in street tree planters, or in parklands and other property.

There are several options for composting that can be incorporated into a waste management program. Municipalities may direct residents to **source-separate organic materials** from their waste, as they do now for metal, glass, plastic, and newspapers. While this method generally ensures a clean stream of organics for composting, it also poses logistical difficulties in terms of education and outreach, collection routes, facility siting, and storage. In 1992, the Department initiated a pilot to test the feasibility of residential source-separation of organics in Park Slope, Brooklyn.

The pilot demonstrated that residents in medium-density ("brownstone") housing, when educated through extensive and constant outreach programs, *were* willing to source-separate their organic waste. In fact, the Park Slope program achieved capture rates for food waste that approximated 50%.[1]

In 1993, however, a similar pilot conducted in Starrett City, Brooklyn (which has higher-density housing more typical of the City) resulted in minimal food waste diversion which was so contaminated that it could not be composted. Moreover, the cost of adding a fourth truck route, at maximum load rates of 5 tons per truck (compared to an average of 10 tons per truck for garbage, 8 tons per truck for paper recycling, and 7 tons per truck for leaf collection) precluded consideration of this program for citywide expansion.

Such findings highlight the expense and difficulty of collecting source-separated food waste in densely populated areas such as New York City. Even in countries such as Germany and Holland, where source-separated composting plays a significant role as a waste management strategy, such programs are not carried out with equal success in high-rise buildings in the larger, denser cities such as Berlin and Amsterdam.[2]

A second organic-waste-recycling option—**backyard composting**—eliminates the need for a separate

[1] The percentage of food in the waste stream of this area in Brooklyn was estimated from data collected in 1990 for the Department's citywide waste composition study. The tonnage of food collected during the pilot allowed for the calculation of a capture rate of 50%, meaning that 50% of the food that is normally in the waste stream was separated for collection.

[2] Cornell Waste Management Institute. Report on *Roundtable Two: Reducing the NYC Waste Stream: The Potential Role for Composting,* April 3, 1999.

collection route or centralized composting facility. Backyard composting programs typically involve subsidized or free distribution of compost bins to residents in a community, paired with education for residents about managing their food and yard wastes at home. This raises awareness of solid waste issues, often leading to a reevaluation of purchasing decisions and disposal habits.

The efficacy of this option, of course, depends on voluntary participation of a majority of residents. In addition, it presupposes that residents have access to backyards. In a busy and densely populated city like New York, both of these factors are especially relevant. In 1997 and 1998, the Department thoroughly pilot-tested backyard composting as a municipal waste management option and summarized the results in the 1999 report entitled *Backyard Composting in New York City: A Comprehensive Program Evaluation*. Currently, DOS sponsors backyard composting programs through the City's four Botanical Gardens.

Other Forms of Organic Waste Recycling

Grass recycling involves leaving cut clippings on the lawn after mowing. Clippings decompose naturally, returning nutrients and moisture to the soil; they are a natural alternative to chemical fertilizers. While grass recycling can be carried out with any type of lawnmower, some residents opt to use a special "mulching" or "recycling" mower that dices clippings more finely than traditional models.

Since 1993, the Department has promoted voluntary grass recycling in an attempt to decrease the 78,000 tons of clippings that are collected at curbside each year. Working with the Botanical Gardens, the Department has sponsored seasonal "Leave It On The Lawn" campaigns that, through posters and print ads, urge homeowners to use mowers that deposit grass clippings back on the lawn instead of bagging them for disposal. The campaigns have also featured periodic subsidized sales of mulching lawnmowers.

In-sink garbage disposals, which pulverize food waste and flush it away with wastewater, represent another organic-waste-management option. Until recently, garbage disposals were banned in New York City. In 1997, the Department of Environmental Protection issued a report, *The Impact of Food Waste Disposers in Combined Sewer Areas of New York City,* which concluded a two-year study of the impacts of grease and food solids on environmental and operational aspects of the City's wastewater treatment system. The report recommended lifting the ban on garbage disposals, finding that no adverse impacts on water quality or plant operations would occur given predicted rates of use. Later that year, City legislation ended the prohibition.

The high costs of installation and concerns about plumbing in older buildings have limited the public response to this policy change, but encouraging the use of garbage disposals remains an option for the Department to consider as it looks at organics in the waste stream. It is important to point out that since the use of garbage disposals does not produce a useable end product *per se*,[3] it cannot truly be considered recycling. However, the diversion benefits of garbage disposals make them appropriate to study along with other composting alternatives.

Quantity-Based User Fees

In New York City, local taxes fund the operations of the Department of Sanitation—spreading the costs of collection equally among all residents. An alternative to common taxes for waste services are **Quantity-Based User Fees (QBUF's)**, which consist of a per bag or per pound charge for garbage collection that is paid by each individual resident, with no charge for recycling collection. This system provides an incentive for residents to divert as much waste as possible from garbage to recycling and to practice waste prevention.

While QBUF's provide direct benefits to consumers for recycling, they may lead to problems of illegal dumping and are frequently opposed by residents who do not perceive a direct relationship between their tax bill and the collection services they receive. QBUF programs have been implemented with varying results in a number of U.S. municipalities and are common throughout Europe. Many in New York City's environmental community have called for the study of QBUF's. The market research

[3] It should be noted that some sewage sludge is exported by the Department of Environmental Protection, and is used commercially as fertilizer.

summarized in this Report is not intended to be a comprehensive assessment of their feasibility; however, it does shed light on citizen reaction to the idea.

STUDY DESIGN

Focus Groups

At the outset of the study, focus groups of eight to ten volunteers were convened to participate in open-ended discussions about their understanding of and attitudes toward recycling, organic waste, composting, garbage disposals, and user-based fees. Four groups were composed of residents of Park Slope, Brooklyn (an "intensive" recycling zone where a voluntary program of separation of organics had been in place for several years), balanced to include persons who had reported both positive and negative experiences with composting. Two groups were comprised of building superintendents who were selected to represent a variety of sizes and types of rental apartment houses, condominiums, and co-ops throughout the five boroughs. Further research was then conducted among eight groups of men and women recruited from the General Population, who were screened to reflect the City's diverse range of incomes, ethnic groups, dwelling types, and household sizes throughout the five boroughs.

Telephone Survey

Issues identified in focus group discussions were used to develop a survey questionnaire. The survey was administered by telephone to approximately 500 City residents (100 per borough), selected to be representative of the population as a whole in terms of dwelling type, household size, income, gender, and ethnicity. In addition, 100 Housing Authority residents and 200 Spanish-speaking New Yorkers were targeted for the survey to learn about attitudes of these groups in particular. Results of the surveys were quantified and summarized with statistically significant trends and differences noted at the 90% level—meaning that there is a 90% chance that repeated sampling would give the same results.

Topics

The focus groups and the telephone survey covered the following issues:

1. Understanding of the terms "organic waste" and "composting"
2. Reactions to the idea of a voluntary, city-wide, backyard composting program
3. Opinions about segregating household organic waste for pickup
4. Views on household garbage disposals
5. Benefits and drawbacks of QBUF's
6. Receptivity to implementing QBUF's throughout the City
7. General attitudes about the City's current recycling program and waste management
8. Lawn-mowing habits and opinions on grass recycling

FOCUS GROUP RESULTS

Organic Waste Recycling

Among those who participated in the focus group discussions, only some were familiar with the terms "organic waste" and "composting"—usually those with some first- or second-hand composting experience. Little enthusiasm for backyard composting was expressed by members of the General Population group who had access to a backyard. Most considered it a bother and possible source of odors and vermin, and something that they would not be interested in doing. However, home gardeners among the General Population, as well as most Park Slope residents, were far more receptive to backyard composting.

Most group participants were quite resistant to the idea of separating organic waste for collection. They generally considered such an approach good for the environment, but unrealistic as a waste management option in New York City. Objections centered around expectations that unsanitary conditions, odors, and mess would result from separating organics and storing them for pickup. This was compounded by the fact that participants assumed that organics would be picked up with the same frequency as recyclables (i.e., once every two weeks).[4]

On the other hand, residents expressed strong support for the idea of using garbage disposals for organic waste. Group members considered this method cleaner and more convenient than other options, and expressed only minor concerns about plumbing and the costs of installation.

Focus group discussions did not include grass recycling; this topic was covered in later surveys that were part of general recycling research.

Quantity-Based User Fees

Among focus group participants, there was nearly complete opposition to the idea of the City implementing quantity-based user fees. Residents felt that New York City taxes should be sufficient to cover collection costs, that fees would encourage illegal dumping, and that City streets would become dirtier as a result of such a program. Homeowners felt that they would be unfairly singled out for enforcement and fines; superintendents suspected that such a program would be impossible to fairly implement in apartment buildings.

Recycling in General

Focus group members expressed some confusion about what to recycle, a feeling that recycling enforcement unfairly targets homeowners, and dissatisfaction with the then alternate-week pickups. Nevertheless, they generally reported feeling more accustomed to recycling than they had in the past. Group members resisted the idea of having to comply with additional programs to reduce waste, which were viewed as burdensome, and not justified by the tangible benefits so far demonstrated by the recycling of metal, glass, plastic and paper under the City's Recycling Program.

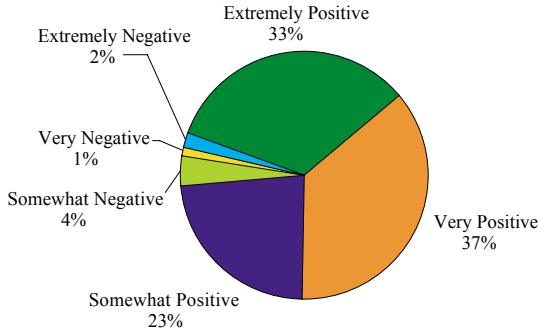
TELEPHONE SURVEY RESULTS

Recycling and Waste Awareness

As in other market research studies that the City has conducted, survey respondents expressed strong approval of the City's Recycling Program. As shown in Figure VII-1, the vast majority (93%) of the roughly 800 residents interviewed expressed a **positive attitude toward recycling**, and nearly 70% were "extremely" or "very" positive.

Figure VII-1

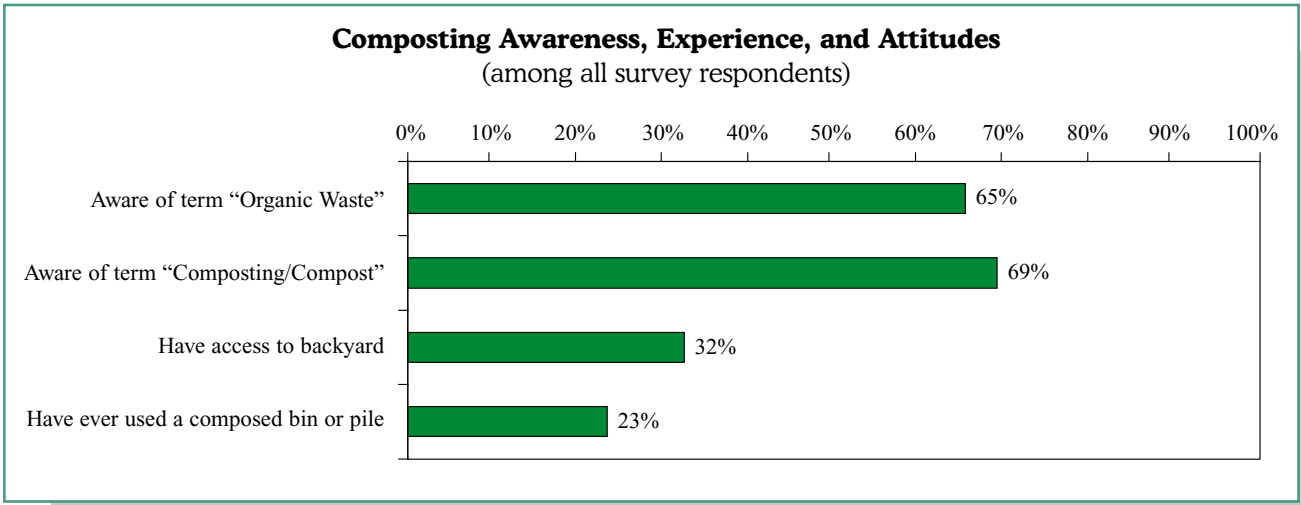
Attitudes Toward NYC Recycling Program
(among all survey respondents)



In addition, over 80% of residents reported occasionally, frequently, or always buying or conserving products to reduce waste.

[4] Weekly recycling pickups will be implemented in all districts citywide by April 2000.

Figure VII-2



Composting Awareness, Experience, and Attitudes

Figure VII-2 shows that the majority of respondents had heard of the terms "organic waste" and "compost" or "composting." Yet despite this familiarity, those surveyed reported little direct experience in these areas—only 23% had ever used a compost bin or compost pile themselves at any point in their lives. This small percentage is not surprising, as only one-third of all City residents reported having access to a backyard.

Figures VII-3 and VII-4 summarize results for the minority of residents with composting experience. Sixty percent rated the experience as "excellent" or "very good," and close to 50% reported that they still maintain their bins or piles.

Among all respondents (not just those with backyards), 75% saw advantages to organic waste recycling, citing the use of compost as fertilizer and environmental cleanliness as benefits, as shown in Figure VII-5 on the following page. The advantages listed were consistent for the different types of organic recycling that could be practiced (backyard composting, source separation of organics for collection, and garbage disposals).

Figure VII-3

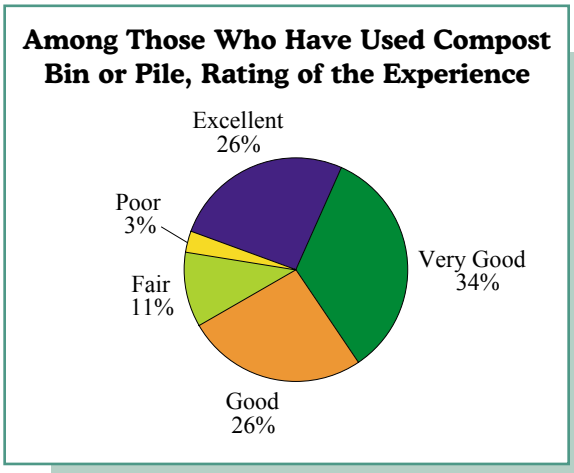


Figure VII-4

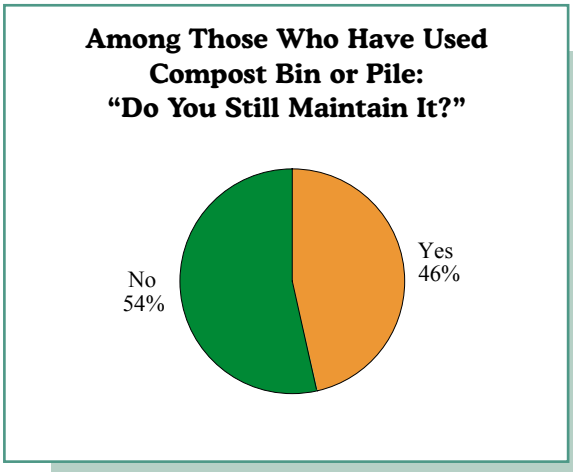
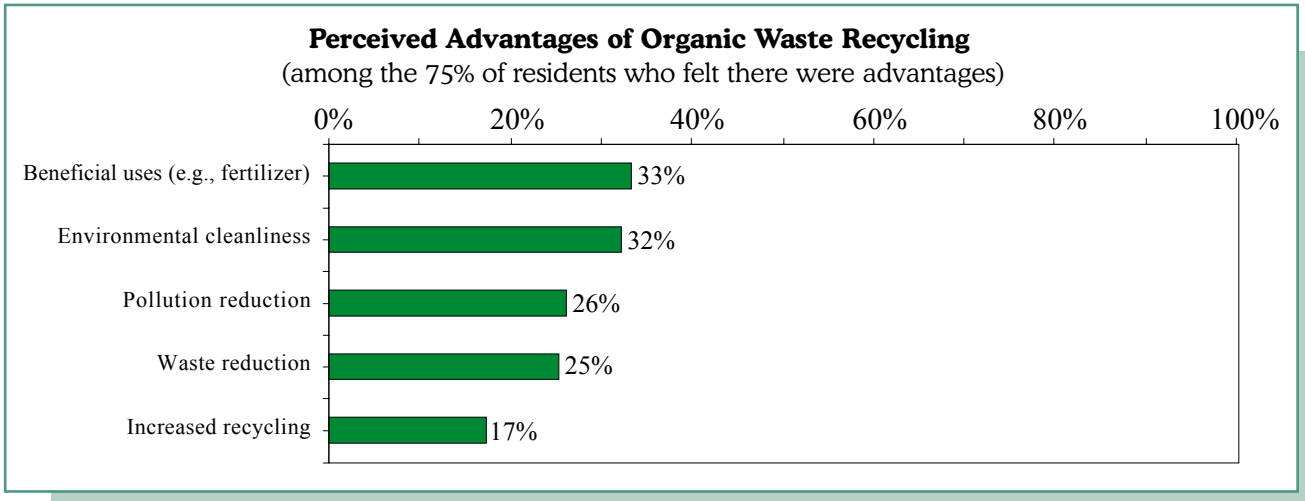
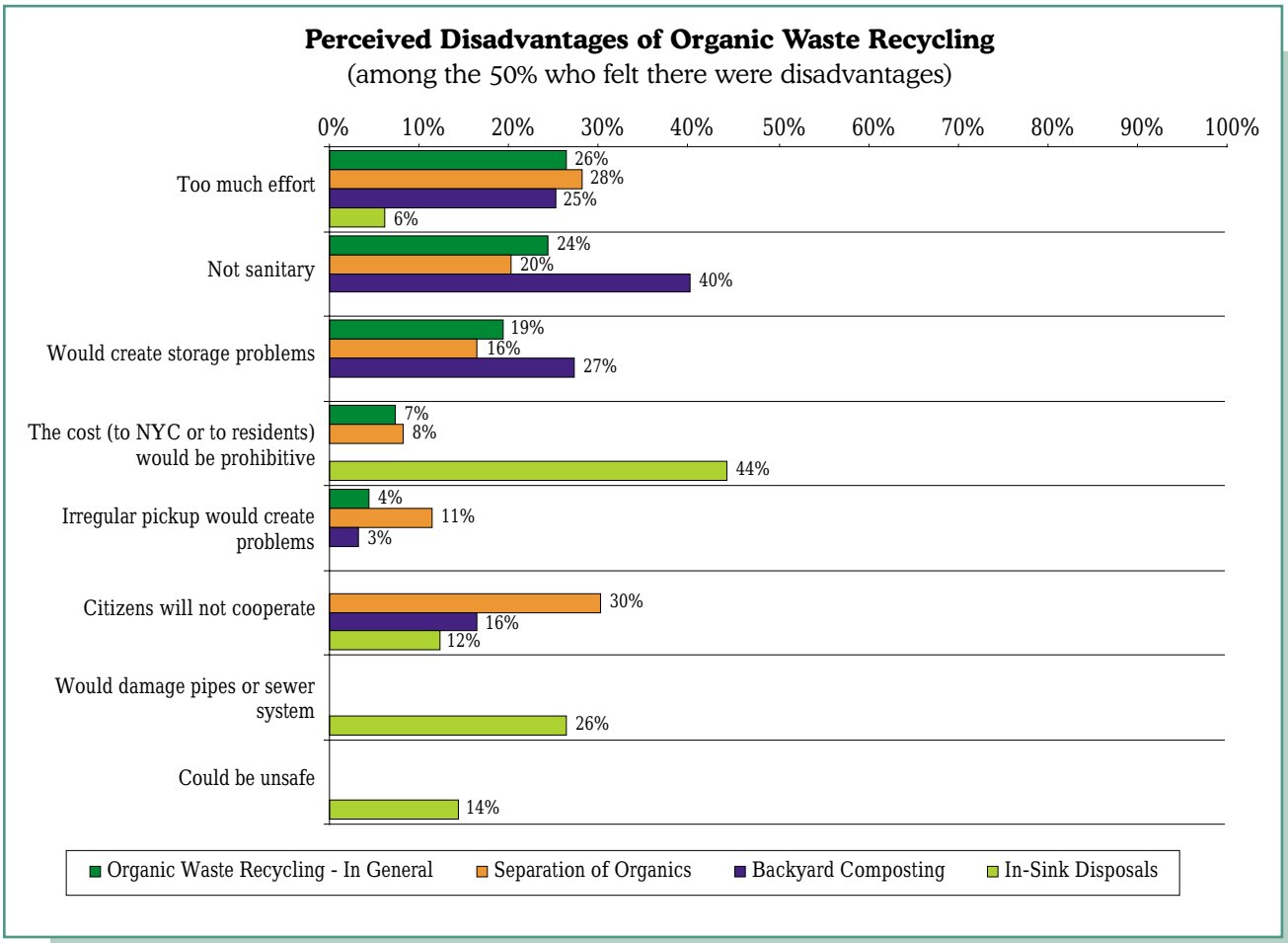


Figure VII-5



In addition, half of those surveyed also saw disadvantages to organic waste recycling (see Figure VII-6). These included envisioned unsanitary conditions, odors, and vermin that food waste would attract, as well as the labor and time involved in separating and storing organics.

Figure VII-6



New Program Receptivity

The results of the telephone survey found that, in general, residents were more receptive to the idea of City government considering new waste management programs than the focus groups had suggested. As shown in Figure VII-7, most somewhat or completely agreed that organic waste recycling—in general—should be considered in NYC. Unlike the focus groups, the vast majority supported considering separation and collection of organics, with 87% agreeing that NYC should think about such an option. The 13% who disagreed on this issue cited lack of citizen cooperation, unsanitary conditions, storage problems, or infrequency of pickups as barriers to such a program—echoing ideas expressed by focus group participants.

The survey also found that more than 70% of all respondents agreed that NYC should consider backyard composting as an option for waste management, suggesting more enthusiasm than the focus groups revealed. Those who disagreed listed common problems associated with organic waste recycling—odors, vermin, storage problems, and lack of compliance.

As with the focus groups, most (79%) agreed that garbage disposals should be considered as a policy in New York City, and half of those surveyed stated that they might be willing to pay some or all of the costs of installing a garbage disposal. Among the 21% who disagreed, concerns about cost and possible strain on plumbing systems were cited.

In the most striking departure from focus group results, the majority (57%) of residents at least somewhat agreed that NYC should consider a user-based fee policy, although only 20% completely agreed. Despite this, over half of the respondents also felt that there would be drawbacks to such a policy—primarily citing the charges that residents would incur, potential problems with unfair enforcement and lack of compliance, and difficulties in implementation.

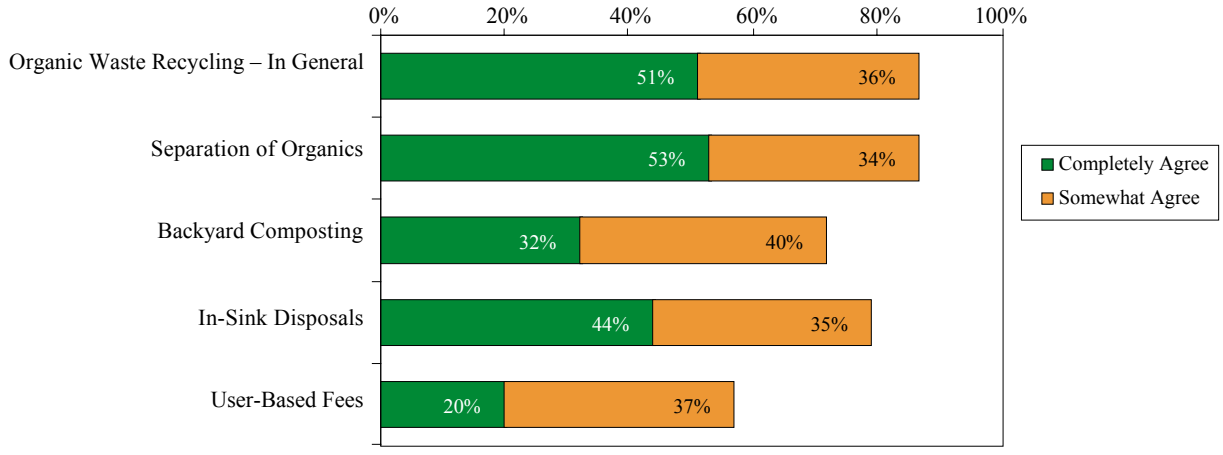
It is important to keep in mind that the focus group discussions addressed receptivity to program options in a free format, while the survey questions measured only agreement with the idea that New York City should *consider* a particular policy. This may have contributed to the disparity in results.

SUBGROUP FINDINGS

In order to identify how results for subgroups of respondents differed from the survey sample as a whole, results were tabulated separately for

Figure VII-7

Level of Agreement that NYC Should Consider Various Waste Management Policies
(among all residents surveyed)



Spanish speakers, those living in NYCHA buildings, and General Population residents of each borough. In general, the subgroups reflected the overall trends seen among all respondents. However, there were some areas in which subgroups differed from the General Population in ways that were statistically significant.

Spanish Speakers

For some measures, Spanish speakers appeared more receptive to recycling and composting than the General Population. For example, 85% were "extremely" or "very positive" about recycling, as opposed to 69% for the General Population. Seventy percent completely agreed that organic waste recycling (in general) should be considered in NYC, while only 33% of the General Population did. Spanish speakers were not very aware of the Spanish term for "organic waste," but were slightly more aware of the term "composting" than the General Population. This was seen despite the fact that only 19% of Spanish speakers reported having access to backyards, as opposed to 33% of all respondents.

Ninety-five percent of Spanish speakers (contrasted with 80% of the General Population) felt that organic separation and collection should be considered as an option; and 69% (vs. 60%) supported considering user-based fees. Spanish speakers' agreement with the possible use of garbage disposals as a disposal option was similar to the General Population, but fewer Spanish speakers (39% vs. 50%) were willing to incur the associated costs.

Spanish speakers were more strongly in favor of the City considering QBUF's than any other group. While roughly half of NYCHA and General Population members agreed that this option should be studied, nearly 70% of Spanish speakers thought so.

NYCHA Residents

Responses from NYCHA residents suggested that they had less experience with composting than the General Population. As with Spanish speakers, fewer NYCHA residents had access to backyards (17% vs. 33% for the General Population), and only 14% had ever composted, a figure significantly lower than the 25% for the General Population.

Only 55% of NYCHA residents reported being "extremely" or "very positive" about recycling (as opposed to 69% of the General Population) and the majority (62%) cited drawbacks to organic recycling (while only 43% of the General Population did). However, Housing Authority residents were more supportive of one option for organics recycling—separation and collection. Ninety percent agreed that this policy should be considered, as opposed to 80% of the General Population.

Variation in the Boroughs

Figure VII-8 shows variation in backyard access in the five boroughs. It is not surprising that residents of Staten Island, the City's most suburban borough, more frequently reported having access to backyards (78% vs. 33% citywide).

Figure VII-8

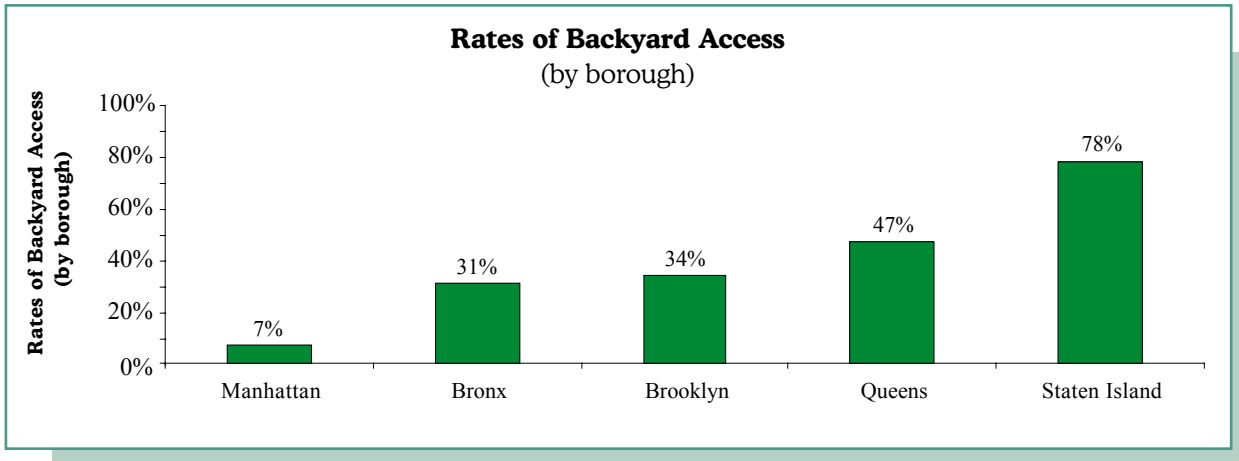
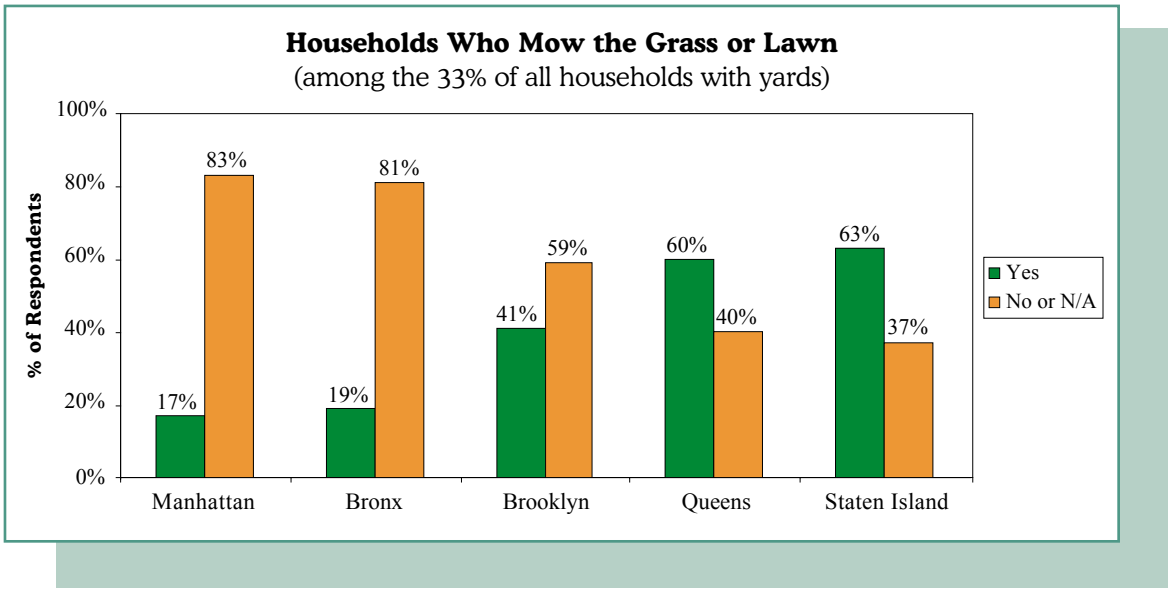


Figure VII-9



In contrast to other boroughs, Staten Islanders were also more likely to have composting experience (36% vs. 25% citywide) and to cite "pollution reduction" as a benefit (46% vs.19%–30%).

In addition, 81% of Staten Islanders and Manhattanites were familiar with the term "composting," as opposed to 58%–65% of residents from the other boroughs. Manhattan residents alone showed significantly less concern about the financial impact of user-based fees (38% vs. 50% citywide). Aside from these variations, responses from each borough on any of the other questions previously discussed were essentially the same.

GRASS RECYCLING RESULTS

Surveys on residential attitudes towards grass recycling were conducted as part of the Department's ongoing, citywide recycling research and were done separately from the research on other organic-waste-recycling methods. Results showed that on average citywide, roughly half of the residents with backyards or side yards mow their grass, although, as Figure VII-9 shows, lawn mowing is much more prevalent in Staten Island and Queens than in other boroughs, and quite infrequent in Manhattan.

Close to 30% of residents who do mow their lawns use outside services; the balance handle this chore themselves. The study also showed that among the households that mow their lawns, 27% leave clippings on the lawn, suggesting that the "Leave It On the Lawn" campaign, or other sources of information, is having some effect. However, the finding that 67% of these households still bag grass clippings demonstrates the need for continued and expanded educational outreach in this area (see Figures VII-10 and VII-11 on the next page).

Figure VII-10

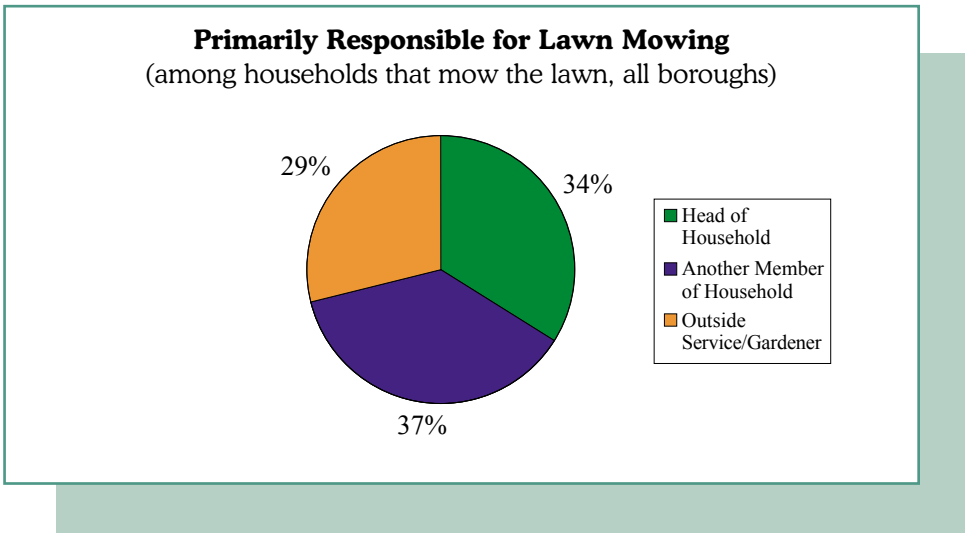


Figure VII-11

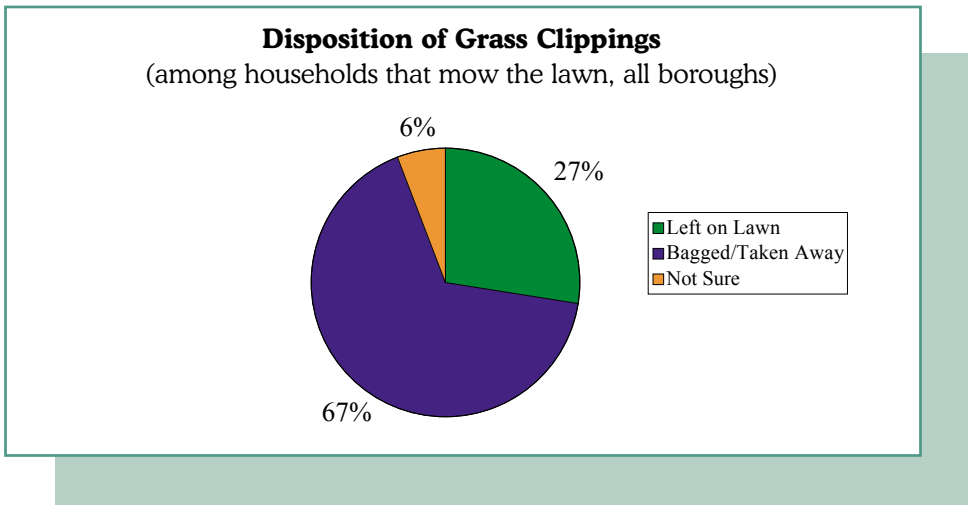
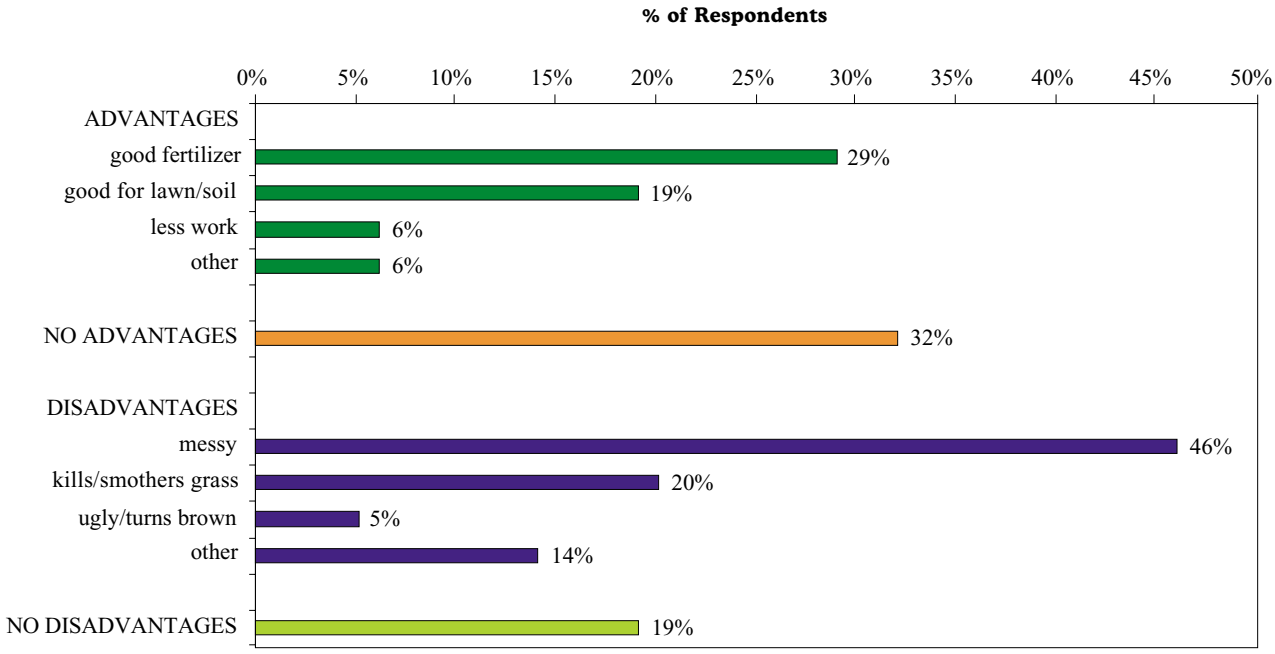


Figure VII-12 on the following page summarizes some of the perceived benefits and disadvantages of leaving clippings on the lawn. Close to 30% of residents who mow their lawns think that clippings make good fertilizer, and nearly 20% think that the clippings are good for the lawn or soil. At the same time, few consider this method less work or see other advantages, and many (32%) see no advantages whatsoever to grass recycling. While 19% see no disadvantages either, nearly half believe that leaving clippings on the lawn is "messy," and 25% say that it kills, smothers, or discolors the grass.

Figure VII-12

Advantages and Disadvantages of Leaving Grass Clippings on the Lawn
(among households that mow the lawn, all boroughs)



GENERAL CONCLUSIONS

The qualitative and quantitative results of the organic waste studies yielded important information about how New Yorkers would react to new recycling policies.

1. Among those who can afford them, in-sink garbage disposals represent the most attractive form of organic waste management, and there appears to be enthusiasm for *voluntary* backyard composting among those who would actively enjoy its benefits.

2. The idea of separating the organic component of garbage for collection and centralized composting was less appealing to New Yorkers, although it did find a measure of support, especially among NYCHA residents. NYCHA residents are currently required to carry separated waste and recyclables to external containers and it is possible that this experience may have something to do with their willingness to further separate food waste. Nevertheless, there remain operational difficulties associated with collecting and processing organics, along with the dearth of sites within the City for centralized composting facilities.

3. The research results on quantity-based user fees were contradictory. Focus group participants expressed strong resistance to such a policy, while survey respondents appeared more open to the idea that the City should "consider" QBUF's. A clearer definition of the specifics of a fee-for-service program would have to be communicated during future research to accurately evaluate public acceptance of QBUF's.