

**District of Columbia's Department of Public Works
Residential Waste Sort
October – November 2007**

Introduction:

- The DC Department of Public Works (DPW) performed a hand sort of residentially-generated solid waste during a three-week period between October 23 and November 8, 2007. The goals of the residential waste sort were threefold:
 - Determine how households in DPW's service population manage their waste – what is being recycled and what is being trashed;
 - Determine how much of the District's residential waste stream is available for recycling on an annualized basis; and
 - Look at the recycling behaviors by ward. The purpose of this information is to better tailor DPW's recycling messaging.
- DPW staff sampled the contents of 56 trash loads and 33 recycling loads collected by DPW solid waste collection crews.
- Each sample weighed approximately 300 pounds. A total of 16.1 tons were sorted with the primary purpose of identifying current and potential recycling streams.

Findings:

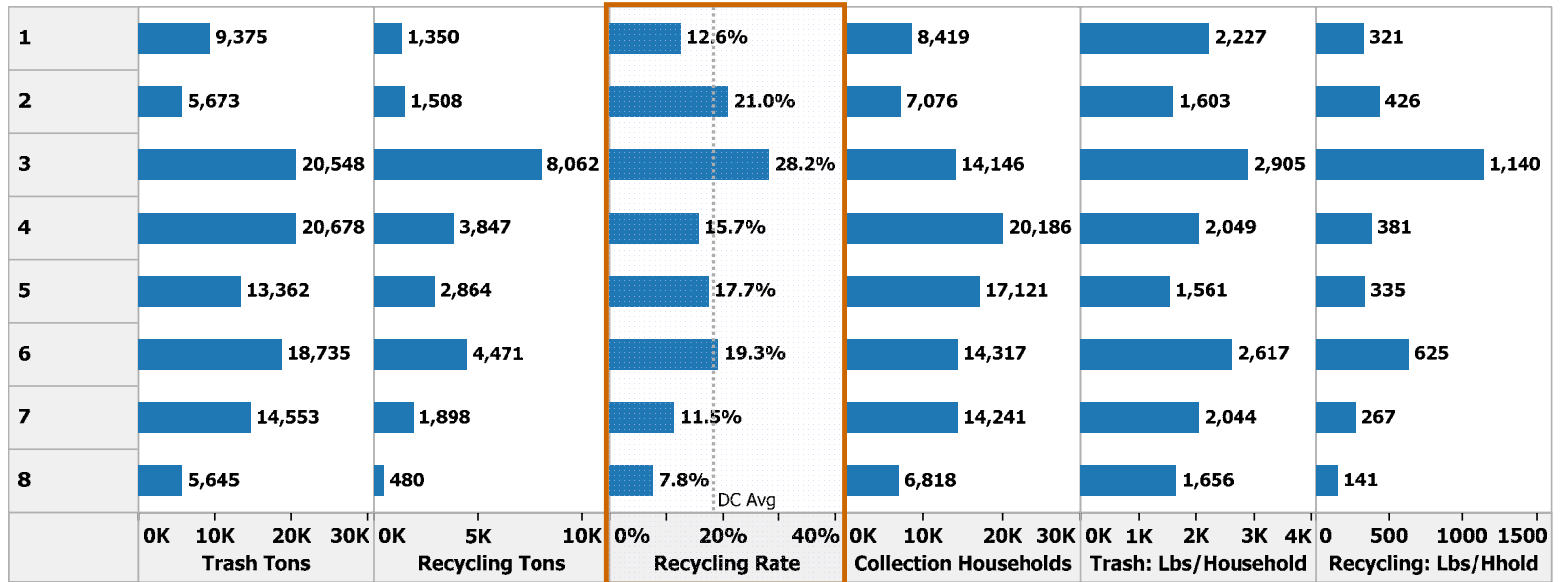
- Twenty-two percent (22%) of what is thrown away by DPW's residential solid waste collection service population is recyclable. This means that in FY 2007, 23,800 tons of recyclable materials were lost to the landfill.
- Increasing paper and metal recycling offers the greatest opportunities for the District to increase the recycling diversion rate for the residential waste stream.
- District residents are recycling newspapers, cardboard, plastic bottles, and green and brown glass at rates higher than the national average for those commodities.
- DPW messaging should highlight the benefits of reuse and source reduction as strategies to better manage the District's solid waste. All messaging should be readily available in both English and Spanish.
- The economic viability of creating additional recycling streams for yard waste and textiles should be analyzed.

Goal 1: What is being recycled and what is being trashed - an overview

- DPW provides trash and recycling collection service to 102,324 eligible households in residential buildings with 3 or fewer dwelling units between October 1, 2006 and September 30, 2007 (FY 2007).
- During this period, DPW refuse collection crews collected 133,000 tons of trash and recyclable materials. The District's residential recycling rate for FY 2007 was 17.6%. This means that collectively, District residents receiving DPW-provided trash and recyclable collections threw away more than five times as much material as they recycled.
- On average, each household produced 2,600 pounds of materials that needed disposition during this 12-month period. Less than 1 of every 5 pounds discarded by DPW's service population were recycled.
- The following table provides a snapshot of the waste disposition habits of residences in DPW's service population by ward. The data source is "Trakster", DPW's work management system for solid waste operations. The table first appeared in a CapStat on solid waste operations held on November 15, 2007.
- The table highlights the recycling rate by ward. The statistic illustrates that Ward 3 has the highest recycling rate at 28.2% and that Ward 8 has the lowest at 7.8%. But what does that really mean?
- A closer look at the data in the table also shows that Ward 3 generated a total of 4,053 pounds of materials per household that needed disposition, far exceeding the citywide average of 2,600 pounds. So it makes sense that residences in this area are recycling more...they have more material to dispose than all other wards.
- Ward 8, on the other hand, produces only 1,797 tons per household, far below the District average. Could it be that Ward 8 residents are practicing the first rule of recycling – reduce and reuse – in greater numbers?
- Further, does the Ward 8 recycling rate mean that Ward 8 residents are throwing away materials that could be recycled? Or does this data mean that Ward 8 residents are in fact recycling everything they can and that they just don't purchase materials that can be recycled in greater amounts?
- To answer these questions, DPW decided to look more closely at what collection crews are picking up on their daily routes to see what is thrown away but could be recycled.

Table 1

Trash and Recycling by Ward

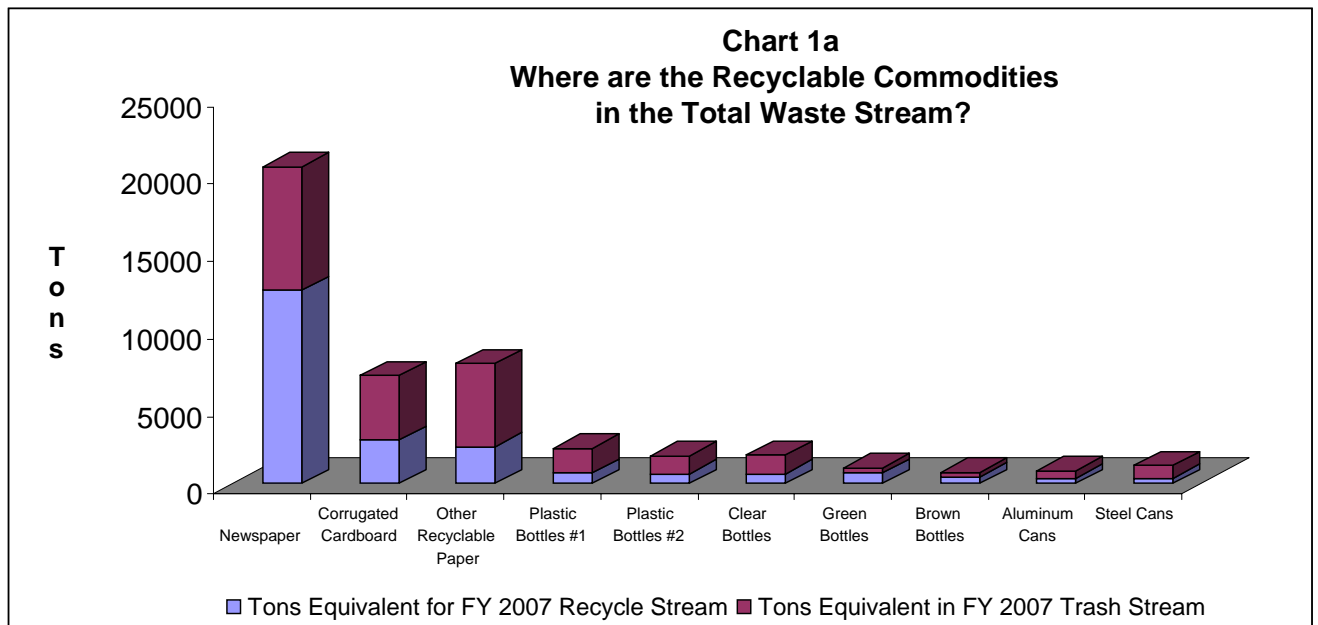


Key Statistic

Source: DPW collection systems. Data from FY2007. Collection households per ward from DPW,

Goal 2: How much of the District’s residential waste stream is available for recycling?

- In FY 2007, District households receiving DPW waste collection services generated 133,000 tons of both trash and recycling.
- While the waste sort looked at the composition of only a small sample of this material, it did provide enough data to extrapolate its findings to the entire 133,000 tons.
- The answer to the question, “How much of the District’s residential waste stream is available for recycling?” is **36.2%**. Already District residents recycle 24,380 tons. Another 23,800 tons of potentially recyclable materials are present in the trash. In other words, the potential exists today to more than double the District’s residential recycling rate if everything that could be recycled was recycled.
- Chart 1a illustrates by recyclable commodity the amount already being recycled and the amount still being thrown away.
- These results nearly mirror a comprehensive waste sort conducted by New York City in 2005 which found 35.38% of their residential waste stream to be recyclable. The results of that study may be found at http://www.nyc.gov/html/nycwasteless/html/recycling/waste_char_study.shtml



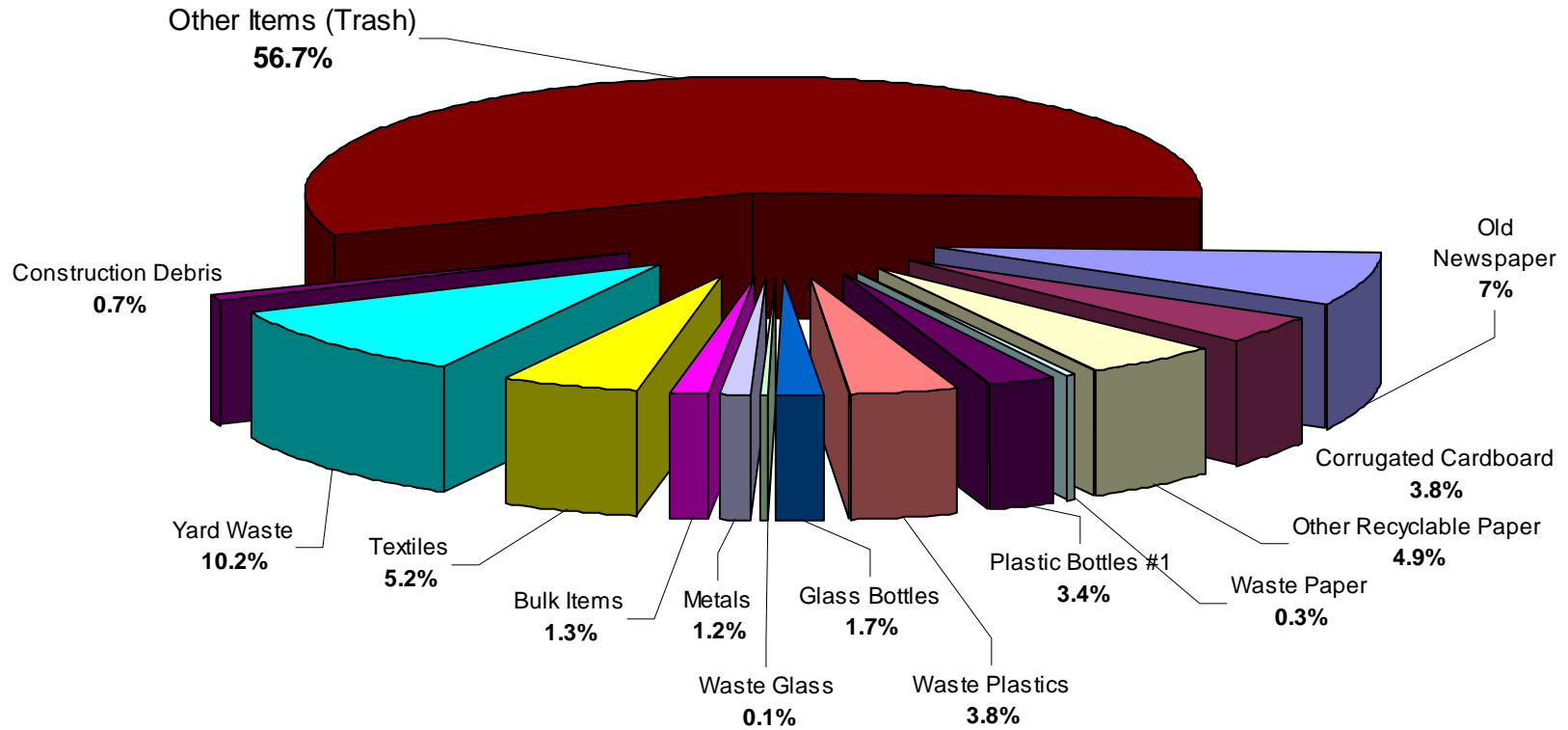
- The following subsections look at the results of the waste sort through the separate trash and recyclable streams.

What is in the Trash Stream?

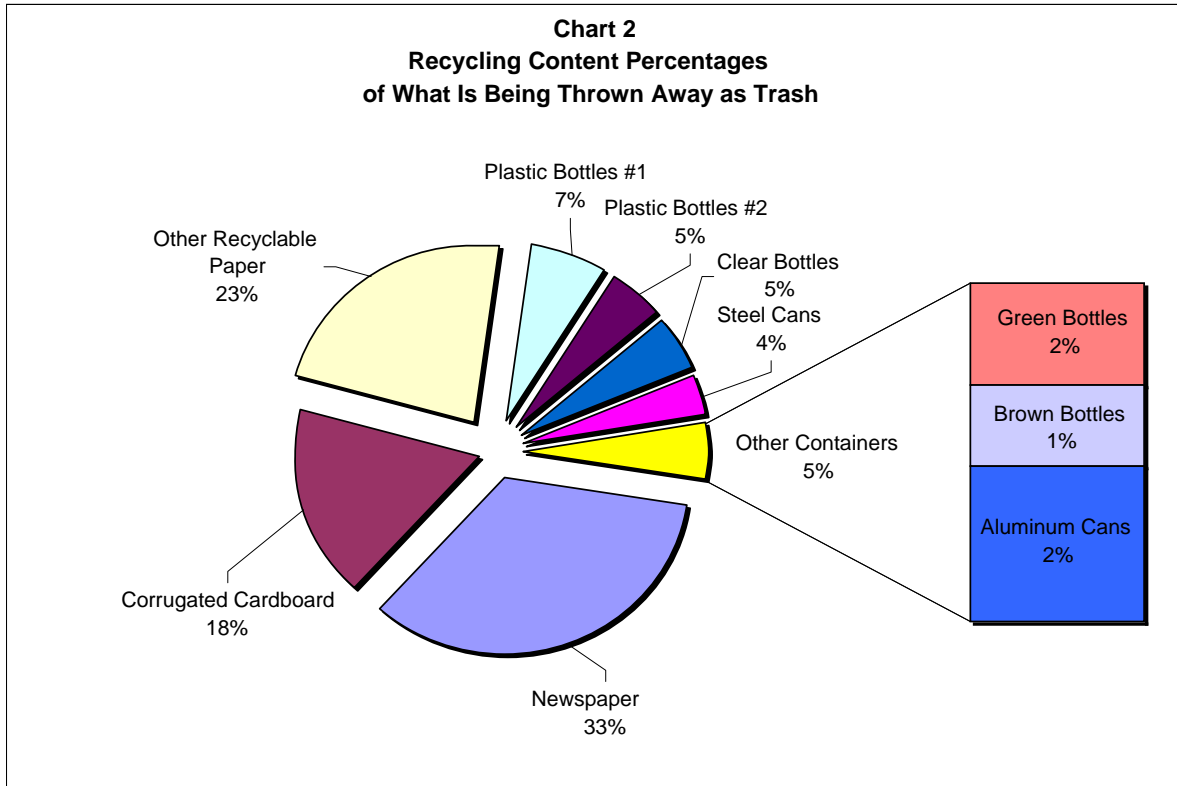
- DPW used the waste sort to determine what materials were being thrown away that could have been recycled as a first step towards identifying strategies to motivate District residents to recycle more.
- In addition, the sort focused on other commodity streams that other jurisdictions are successfully recycling in sufficient amounts, namely textiles and yard waste.
- The sort did not look at the composition of what is conventionally viewed as trash (e.g., food waste, dirty diapers, and discarded small appliances like fans or toasters). Those items are accounted for in the “Other Items” category.
- DPW staff sorted 56 trash load samples from across the District. Overall, more than 21,800 pounds of materials were sifted through.
- Chart 1b illustrates the findings from the trash samples. Twenty-two percent (4,710 tons) of what was in the trash could have been recycled under the District’s current residential recycling collection program.
- Extrapolating these findings to the entire 108,569 tons collected by DPW trash collection crews in FY 2007 means that an additional 23,800 tons were potentially recyclable, but thrown away instead. If DPW were able to capture all of this material, it would more than double the District’s residential recycling rate to 36.2%.
- Increasing recycling has economic benefits for the city in addition to environmental considerations. Under current market conditions it costs \$60 per ton to haul and dispose of one ton of trash. It currently costs the District \$25 per ton to haul and process one ton of recycling. If DPW were successful in convincing residents to recycle an additional 30% of the paper, glass, plastics and metals that are now being thrown away, this would translate to a savings of \$250,800 and an increase in the diversion rate to 21.4%.
- Chart 1b also illustrates that two of the larger streams that are currently trashed are yard waste (10.2% of the sample- 2,234 tons) and discarded textiles (5.2% of the sample – 1,146 tons). These two streams are prominent enough to warrant DPW to look closer at the economics of providing more reuse and recycling opportunities for these two waste streams.

Chart 1b

**District of Columbia Waste Audit
What's in the Trash that Gets Thrown Away**



- Chart 2 breaks down the recyclables in the sampled trash into their individual commodities.

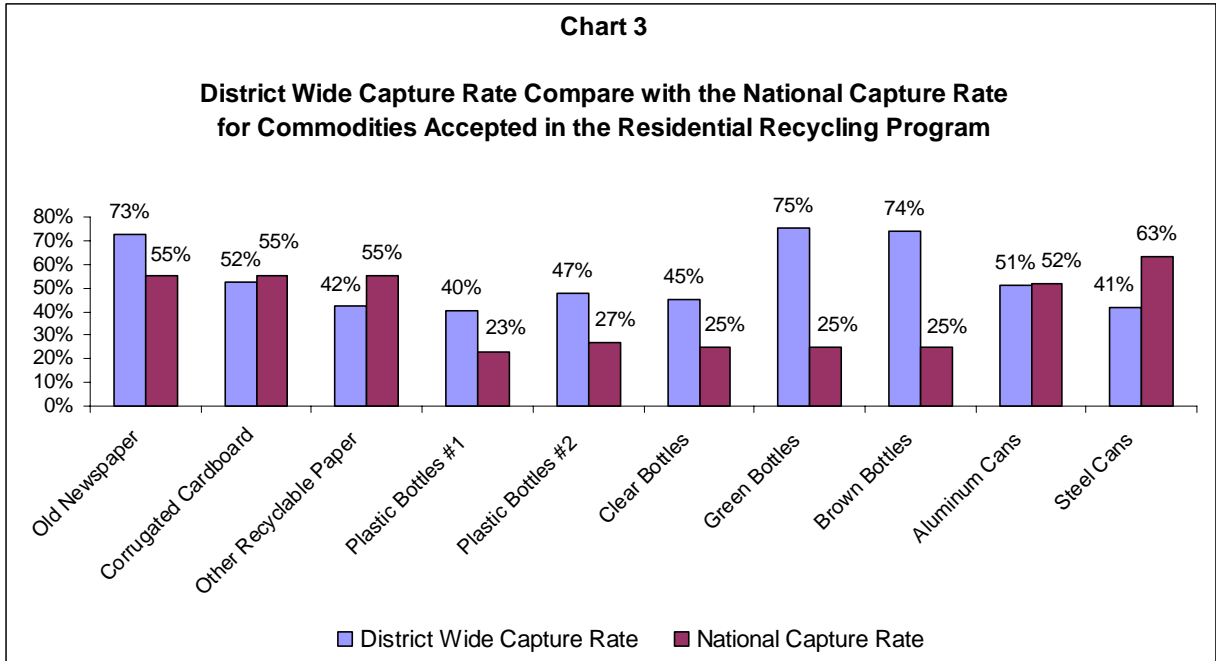


- Chart 2 illustrates that paper recycling offers the largest area of opportunity for increasing the residential diversion rate. This makes intuitive sense – paper is heavier than food and beverage containers and is easier to segregate.

What is in the Recyclable Stream?

- Looking at the composition of the trash tells only part of the story. District residents recycled more than 24,380 tons of materials in FY 2007. While this represents a 17.6% diversion rate, it does not indicate how well District residents are doing to recycle everything they can.
- To understand where the opportunities are to move more materials out of the trash stream into recycling, DPW needed to understand how much of a given material was actually being captured for recycling. In other words, if the entire waste stream contains 100 pounds of aluminum cans and 70 pounds are recycled, that means that the “capture rate” for aluminum cans is 70%.

- DPW sorted 33 samples of recycling from routes in areas where the trash was sampled to try to gauge the capture rate of the various commodities currently accepted as part of the District’s residential recyclables collection program. Chart 3 illustrates the citywide capture rates for these commodities. The District’s rates are compared to the national capture rates for each commodity as reported by the respective industry associations.

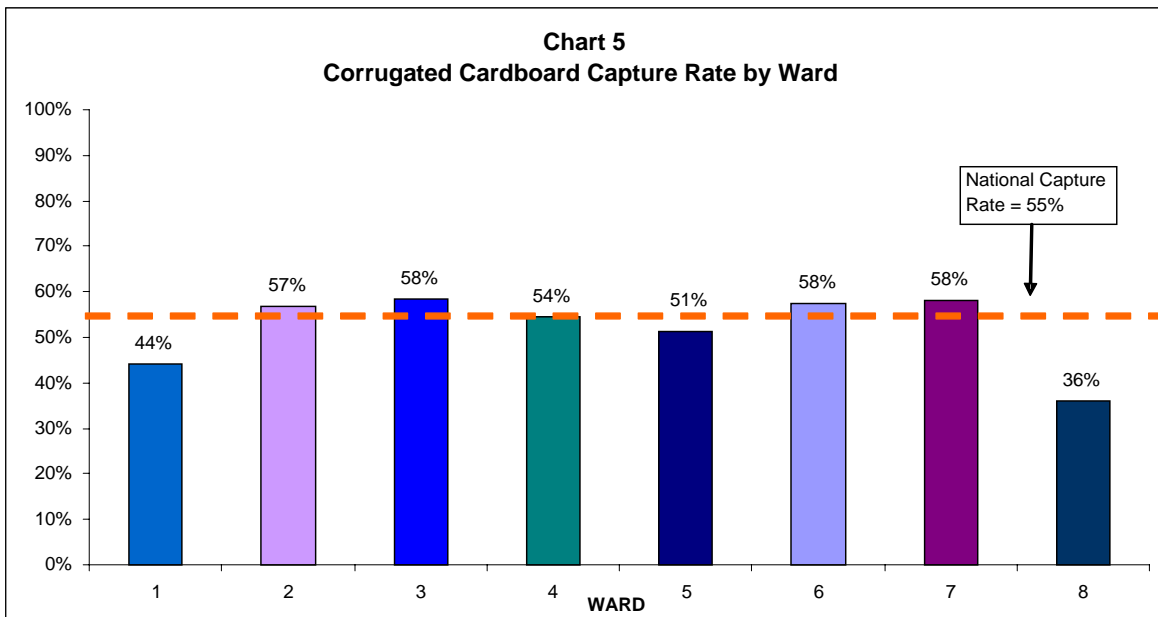
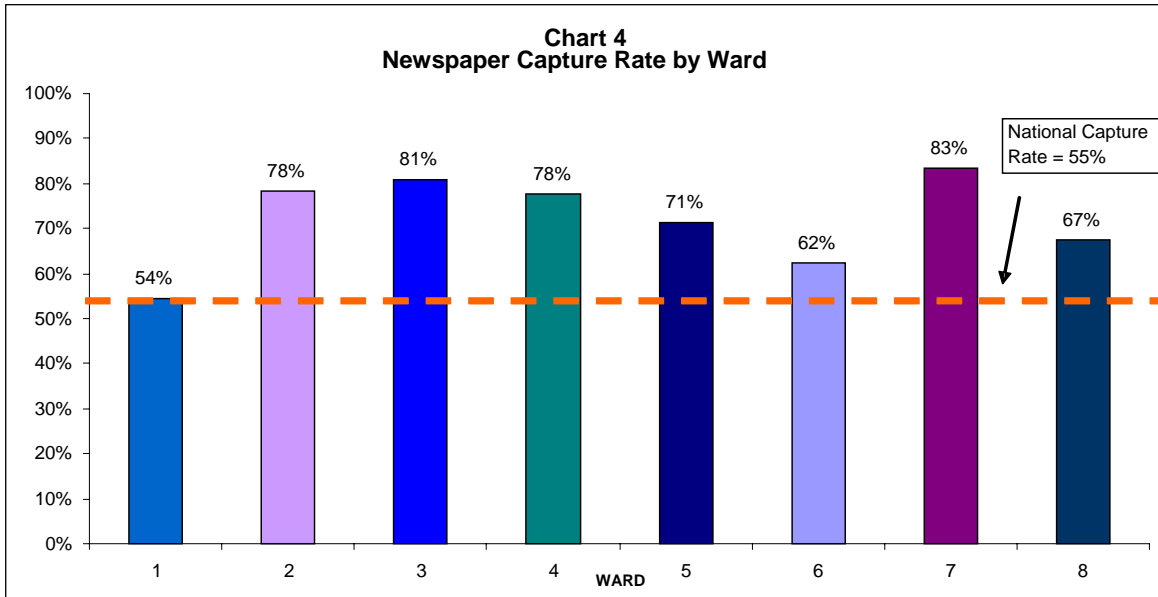


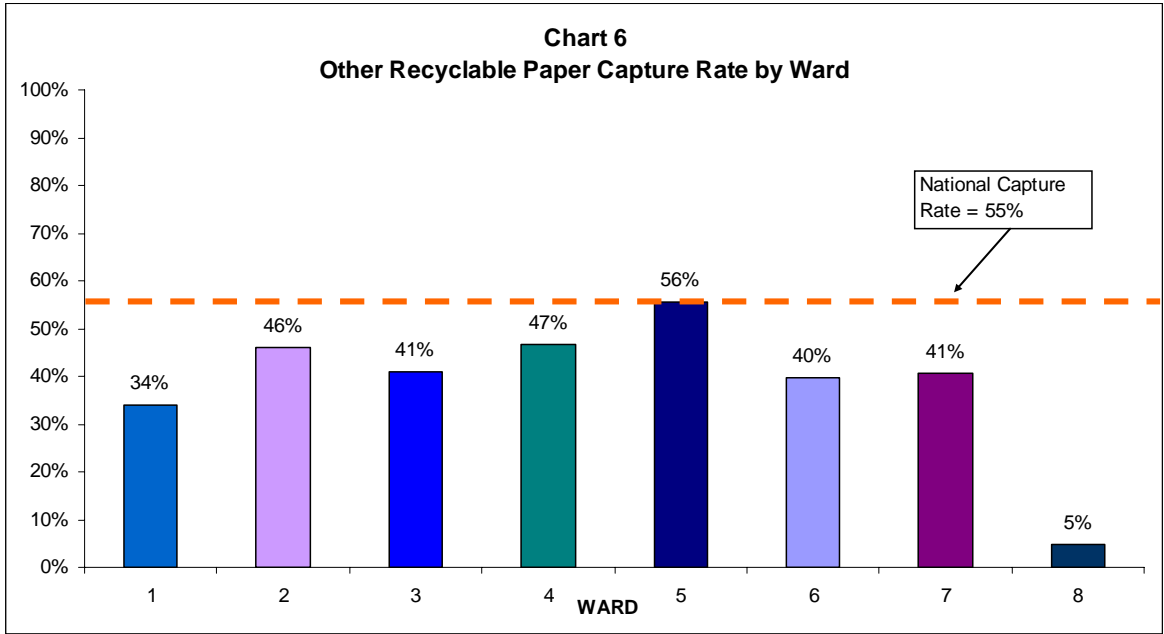
- Chart 3 indicates that the District does an impressive job of recycling newspaper and green and brown glass compared with the national averages for these commodities.
- The chart indicates there are opportunities for improving the District’s capture rates for corrugated cardboard (OCC), other recyclable paper (office paper, shredded paper, junk mail, and paperboard), clear glass bottles and steel cans. The District’s capture rate for each of these commodities falls below the national capture rate for the materials.
- DPW theorizes that clear glass bottles and steel cans are not recycled at the rate they should be because these containers are mostly for food rather than beverages. Food containers must be rinsed thoroughly to prevent odor and that may be the impediment towards increasing the recycling of these commodities.
- DPW also theorizes that residents need additional education to increase the amount of OCC and Other Paper that is recycled. Storage of the materials may be an issue.

Goal 3: Recycling Behaviors by Ward

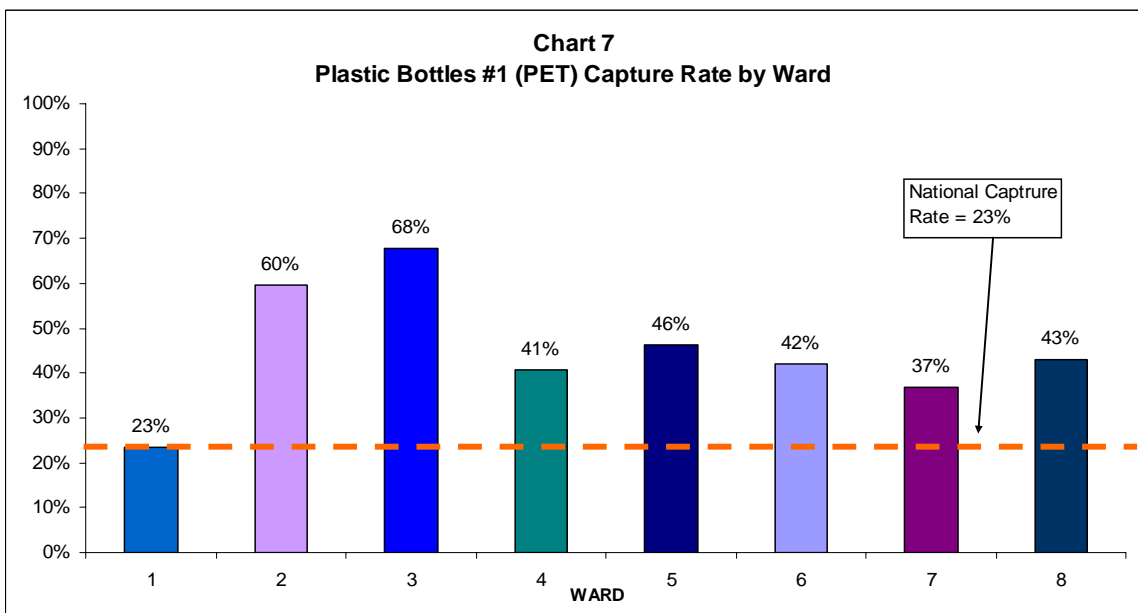
- Diversion rate is not the only metric that matters when it comes to recycling. Capture rate of a recyclable commodity indicates how much of that particular item – be it newspaper or a soda bottle – is being diverted for recycling.

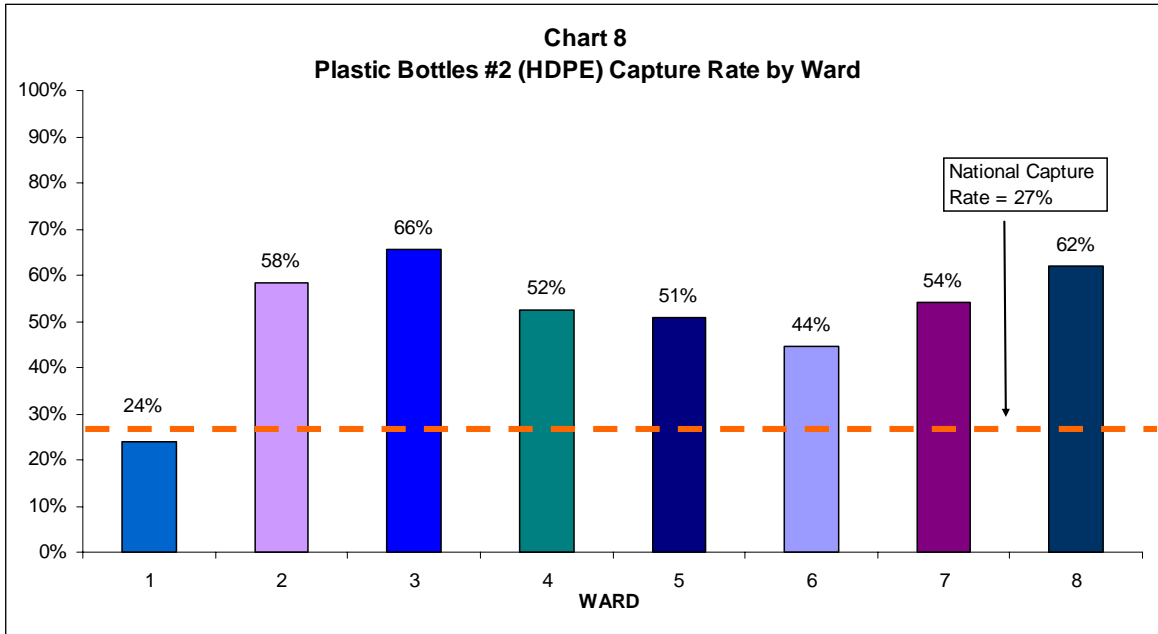
- Capture rate is important. It tells DPW where there are opportunities to increase recycling. Looking at that information by ward provides a way to tailor the messaging that best suits the community in question.
- Charts 4 through 13 look at the capture rate of currently recycled commodities by ward to identify areas where DPW can best focus its scarce public information dollars. These charts also place in context how the District is doing in comparison to the national capture rate for each commodity.



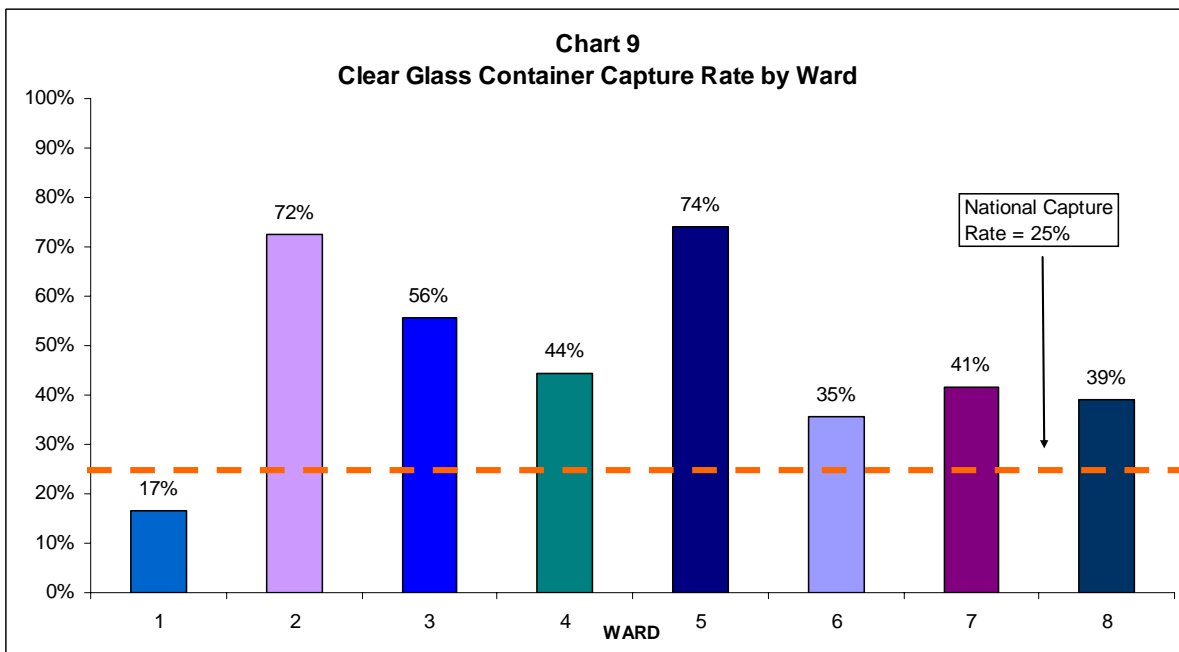


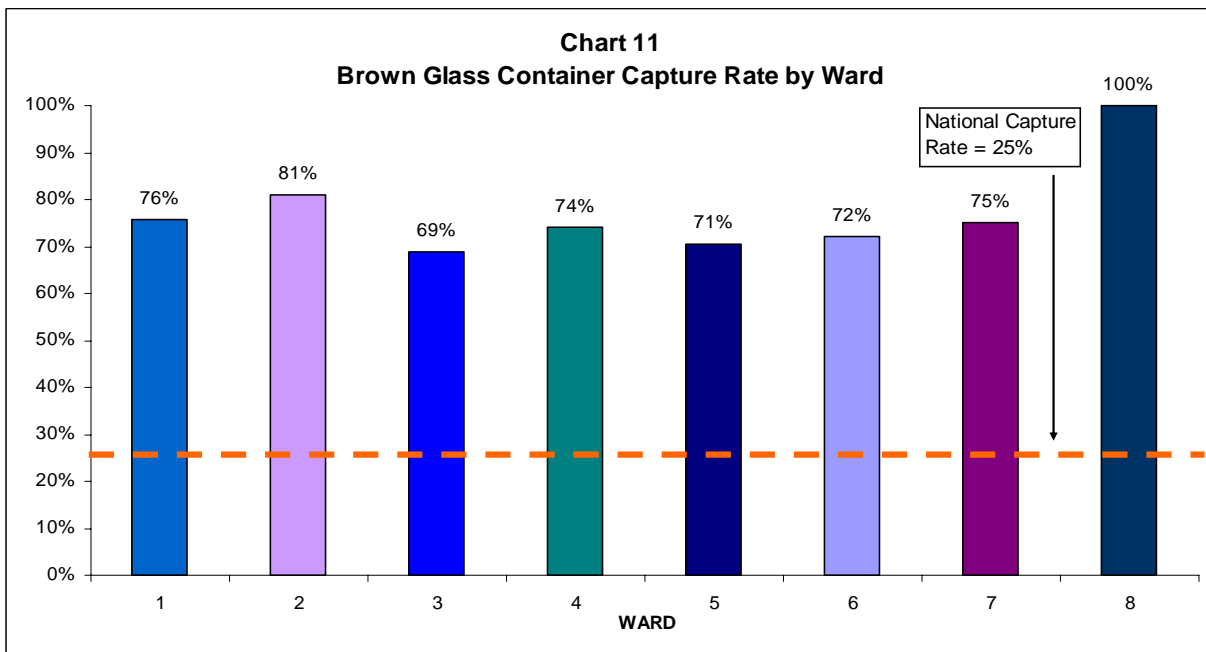
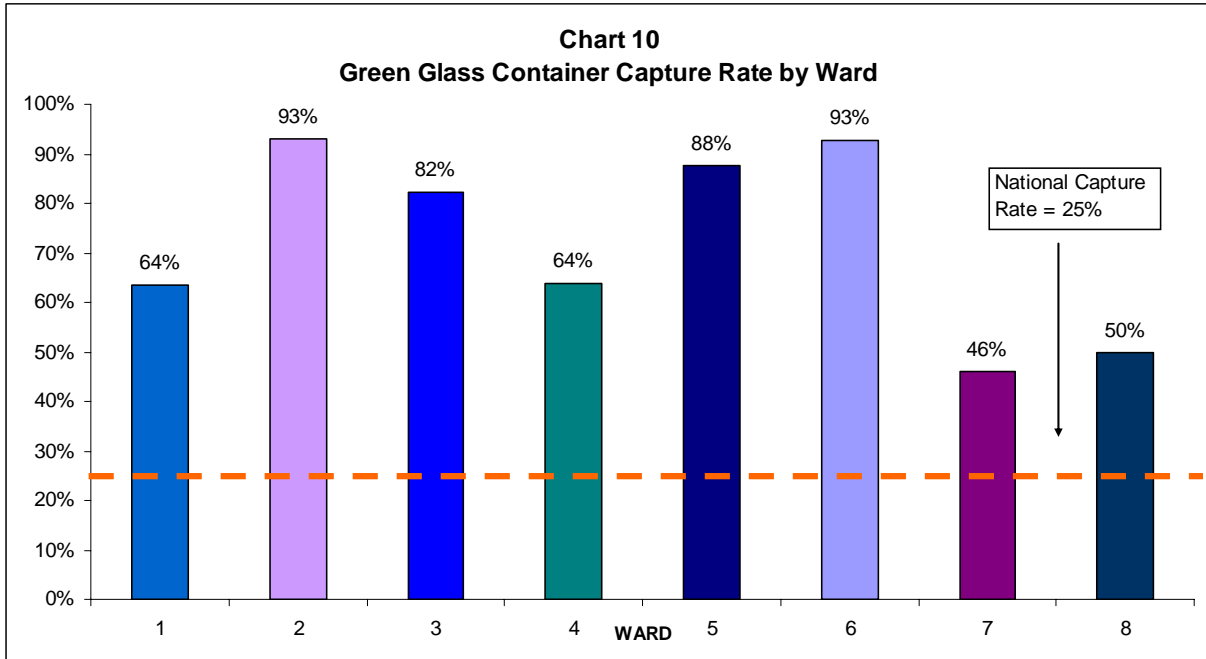
- Charts 4 through 6 represent the various paper commodities that can be recycled in the District’s recycling program. The results demonstrate that the residents understand that old newspaper, magazines and catalogs should be recycled.
- Messaging is needed to teach residents that corrugated cardboard and other recyclable paper – shoe and cereal boxes, tissue boxes, office paper, shredded paper, junk mail – also can be recycled. All information should be readily available in English and Spanish. Recycling additional amounts of these materials will help the District’s overall recycling rate because the material is heavy, especially if it has absorbed any moisture.





- Charts 7 and 8 represent the narrow-necked plastic bottles that can be recycled. Plastic Bottles #1 (PET) is primarily beverage bottles (i.e., soda and water bottles) and Plastic Bottles #2 (HDPE) is other narrow-necked plastic containers such as milk and detergent containers.
- Across the wards, District residents clearly know that these items are recyclable. Some messaging is needed in Spanish to reach the large Hispanic population in Ward 1.

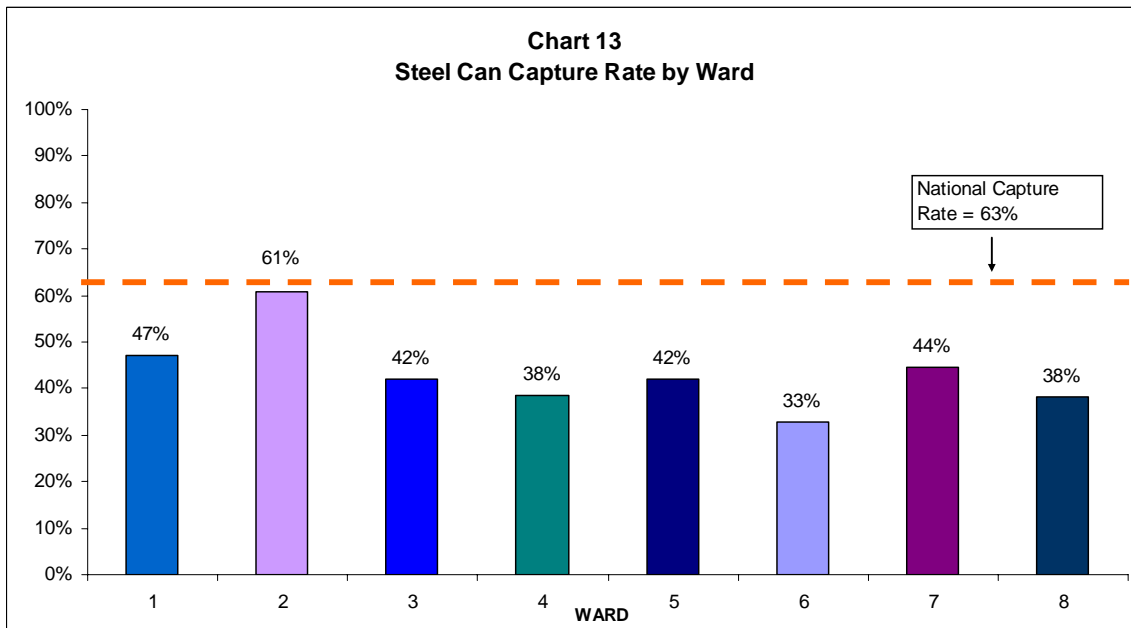
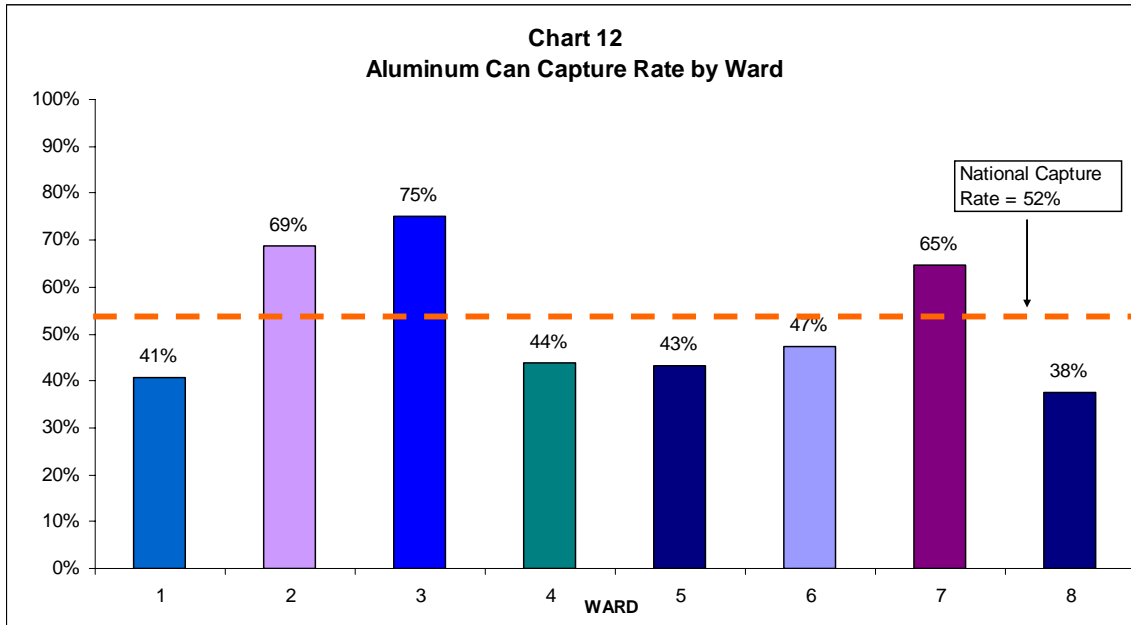




- The capture rates for glass jars and containers are confusing – overall capture rates for green and brown glass are significantly higher than for clear glass. Beverages usually come in green or brown glass bottles. Food generally comes in clear glass jars (e.g. spaghetti sauce, applesauce, pickles).
- DPW theorizes that residents are less likely to recycle food containers because preparing them for recycling by rinsing them out is more difficult than rinsing beverage

containers. Food containers that are rinsed but not entirely clean may create odors that residents believe will attract vectors. Residents who store recyclables in their houses prior to collection day may be unwilling to keep these jars and bottles separated from the trash.

- Although glass adds weight to the recycling stream, it is of little value in the market place. Specific messaging focused on increasing glass recycling is not recommended at this time.



- Charts 12 and 13 look at capture rates of metal food and beverage containers. Aluminum cans are primarily used as packaging for beverages. Steel cans are more often used as food containers. DPW's theory that residents are more willing to recycle beverage containers than food containers seems to apply here as well.
- Both aluminum and steel are valuable recyclable commodities that also add weight to the total. It is beneficial for DPW to identify messaging that encourages residents across the District to recycle these items in greater numbers.

Summary:

- It is not enough to look at diversion rate when determining the success of a recycling program. Capture rate is an equally important element evaluating the effectiveness of a recycling program and for deciding how to spend scarce public education dollars to encourage residents to recycle more.
- DPW needs to create messaging that focuses on increasing the amounts of cardboard, other paper and metal food and beverage containers that can be recycled. The messaging may need to be tailored to different constituencies across the District, but the basic themes should be the same.
- DPW should investigate the economic viability of creating reuse and recycling collection options for textiles and yard waste (other than through the seasonal leaf program).
- Recycling alone will not mitigate the District's environmental issues with regard to solid waste. People need to generate less waste overall. Over consumption is a much at issue as what does and does not get recycled. DPW's messaging should also focus on reducing waste and reuse as a viable solid waste management option.

Acknowledgements:

The District of Columbia's Residential Waste Sort Study was a collaborative effort of many members of the Department of Public Works staff. Hallie Clemm was Project Leader and author of the report. Ms. Clemm is pictured with the crew from the Solid Waste Management Administration who did the dirty job of sorting through more than 16 tons of waste from October 23rd to November 8th, 2007, (from left to right they are Mr. Paul Dandy, Kevin Williams, Terrence Terrell, and Rodney Bean).. Assistance in obtaining samples was received from many at the District's two transfer stations who facilitated the sorting operation as well as from drivers and supervisors with solid waste collections operation. Special thanks to David Koehler in preparing data used to select the sample loads, Beverly Day who compiled the data, Yvette Judge who created the charts and graphs for this report, and Tom Henderson for assistance in designing and executing the study and editing the report.

