City of Fitchburg

2012 Waste Sort Results Report

FITCHBURG
Public Works

Last Revised August 15, 2012

Acknowledgements

We'd like to acknowledge the following individuals who assisted with the collecting and sorting of the refuse and recycling items from the June 19-20th and June 26th Waste Sort:

Fitchburg Staff

Felipe Avila, GIS Engineering Specialist

Rick Eilertson, Environmental Engineer

Dan Fourness, Stormwater/Utilities Engineer

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Pellitteri Waste Systems

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David Pellitteri

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Introduction

This report outlines the results of a solid waste sort (refuse, recyclables, and organics) for a selected residential service area in the City of Fitchburg. Pellitteri Waste Systems collected refuse, recycling, and organics carts from 40 houses within the Organics Collection Pilot collection area on June 19th. Pellitteri collected refuse and organics carts from those same households on June 26th, 2012.

Study Objectives

1999 FITCHBURG WASTE AND RECYCLE CHARACTERIZATION STUDY OBJECTIVES

In 1999, Fitchburg hired Recycle Worlds Consulting to oversee a characterization study to answer two major objectives:

1. Assess how well Fitchburg was succeeding at diverting recyclables from the landfill.
2. Highlight areas where Fitchburg's refuse and recycling program might be expanded upon.

Conclusions from the 1999 study included:

1. Especially high diversion rates were noticed for newspaper and metal and glass containers, however, improvements were needed to in the categories of corrugated cardboard and plastic bottles.
2. The next frontier lies in the recycling or reuse of food waste, which constituted 24% of the waste stream to the landfill.

2009 STUDY OBJECTIVES

The 2009 study was conducted to expand on the 1999 results and see if any improvements or setbacks had occurred since then.

Conclusions from the 2009 study included:

1. Similar results from the 1999 and 2009 study were noticed with high diversion rates of newspapers, metal and glass; however improvements were needed in the white office paper and polystyrene.
2. Food waste management suggestions were also made because food waste continued to constitute 27% of the waste stream.

2012 STUDY OBJECTIVES

This study was conducted to expand and compare results from the Fitchburg 1999, 2009 waste sorts and Madison's "2012 Analysis of Composition of Residential Rubbish Stream" report. The results of the 1999 and 2009 waste sorts are compared to conclude any improvements or setbacks occurring in the collection program. The composting rates of Madison's "2012 Analysis of Composition of Residential Rubbish Stream" report

are compared to Fitchburg's composting rates to determine the success of the composting programs. The 2012 waste sort study was also conducted to create a baseline organic recycling rate since the implementation of the Organics Collection Pilot in April 2012.

2012 Study Design

Tim Bolhuis and Rick Eilertson jointly organized this year's sort to incorporate previous as well as new methods. By closely following the 1999 and 2009 studies for refuse and recycling waste, a comparison could be made to the 2012 data. Additionally, in the 2012 waste sort, organics carts were collected and sorted separately and divided into similar categories of waste. By using the 1999 and 2009 sorted waste categories a comparison could be reached on Fitchburg's diversion trends from

Recycling Pile surrounded by carts, June 19, 2012

SAMPLE SIZE

According to the Census Bureau, the City of Fitchburg has an estimated 25,260 citizens in 2010. Both 1999 and 2009 studies analyzed waste with a restricted sample size of forty households. In the previous 1999 and 2009 waste sorts, four subdivisions on Fitchburg's Wednesday route were chosen to most accurately model Fitchburg's refuse and recycling practices. As shown below in *Table 1: 2012 Fitchburg Housing Breakdown,* Fitchburg is primarily composed of single family residences. The previous subdivisions chosen for the 1999 and 2009 waste sorts were all composed of single family residences. The sample size of the 2012 waste sort remained at 40 households and occurred on Fitchburg's Tuesday collection route since this is the collection day for households in the Organics Collection Pilot.

Table 1: 2012 Fitchburg Housing Breakdown*

Type of dwelling	Number of dwelling units	Percent
Single family residency	4,510	77.1%
Condominiums	520	8.9%
Apartment Buildings	447	7.6%
Duplexes	254	4.3%
Trailers	47	.8%
Assisted Living Facilities	3	.1%
Correctional Facilities	65	1.1%
Total	5846	100%

***** *Obtained from Fitchburg's Planning and Zoning Department.*

The forty homes selected by Pellitteri Waste Systems all included a refuse, recycling and organics cart that were set out on the collection date of Tuesday June 19th. Pellitteri chose refuse and organics from these same homes on the June 26th waste sort to assist in providing an accurate recycling and composting rate. On the second waste collection on June 26th, 27 out of 40 had their organics carts out and 35 out of 40 had their refuse carts out. Note the recycling carts are collected by Pellitteri every other week while refuse and organics are collected weekly. The 2012 sort was set up to collect 2 consecutive weeks to determine whether residents changed what they put in the refuse and organics carts on non-recycling weeks.

STUDY DIFFERENCES

A few differences in the study's composition included a greater range of sorting categories, fewer housing subdivisions involved in the study, and two collection dates instead of one. Twenty-seven categories were created for the refuse, recycling, and organics streams in the 2012 waste sort verses twenty-five in the 2009 waste sort and twenty-two in the 1999 waste sort. *Table 2 on page 9* displays how the stream categories were separated for the 2012 waste sort. The second difference in the study's composition is the selection of subdivisions. The previous 2009 study included the Lacy Heights, Seminole Ridge, Tower Hill and Wildwood subdivisions, whereas the 2012 waste sort included the Swan Creek of Nine Springs neighborhood. The June 2012 waste sort consisted of two collections to represent the data of a two week cycle of collection. The sorting process replicated the 2009 waste sort, by separating the refuse, recycling into their own pile. Additionally, the organic waste collected was separated into its own pile. Three separate piles of recycling refuse and organics were made on June 19th. A total of 876.5 pounds of material from 40 refuse carts, 1,142 pounds from 40 recycling carts and 399.5 pounds from 40 organics carts was collected on June 19th. On June 26th, the same 40 households were visited. The sort consisted of two separate piles of refuse and organics were made. A total of 742 pounds of material from 35 refuse carts and 221.8 pounds of material from 27 organics carts were collected on June 26th. The residents were informed a waste sort was to be conducted on the Organic Collection Pilot households but were not informed of the date of the waste sort prior to the collection, to insure that normal behavior was observed. Comparably, in 1999, the sort was conducted using random selections, stakes divided the "bread loaf" or refuse and recycling piles into approximately 8 cells, 3 feet by 3 feet by 3 feet for the waste stream, and slightly larger for the container stream and slightly smaller for the paper stream. This method was used to approximate a volume for the density of material with an intended weight of 200-300 pounds. The average weight of the waste samples was 204.2 pounds, paper at 141.5 pounds, and containers at 118.6 pounds.

Unloading recyclables collection on the June 19th waste sort

The Collection

Pellitteri used a fully automated solid waste collection truck to collect the refuse, recycling and organic material from residences on the June 19th and June 26th waste sorts. The selected homes in the Swan Creek of Nine Springs neighborhood were not informed of the date of the sort. Notice was not given because normal waste collection was desired to obtain results that would be representative of other weeks. The material was then delivered to Fitchburg's Public Works salt shed at 2373 S. Fish Hatchery Rd.

The Sort

The sorts took place on June 19, 2012 from approximately 1 to 5 PM, on June 20th from approximately 9 AM to 1 PM and on June 26th from approximately 8:30 AM to 12:00 PM. The mean temperature for the June 19th sort was 90°F, for the June 20th sort it was 88°F and for the June 26th sort it was 85°F. Eleven volunteers assisted with the sorts from Pellitteri Waste System, the Resource Conservation Commission and City staff. The sort was videotaped with a camera provided by FACTv. The camera was used to document the sorting procedure. The sort on June 19th separated the material into three separate piles of refuse, recycling and organics. The organics pile was surrounded by seven designated containers, in which the waste was to be separated into. The organic's pile containers were labeled contaminated mix paper, plastic film, food waste, yard waste, pet waste, diapers, and compostable plastic bags. The recycling and refuse piles were both surrounded by twenty-seven designated containers. The labels of each designated container can be found on the first column of *Table 2 on page 9.* Rick Eilertson and Tim Bolhuis gave a brief overview of the project and procedure to the volunteers. The volunteers sorted the material into the appropriate carts for measurement. The weight and volume was then recorded for statistical analysis as displayed in *Table 2 on page 9.*

Observations

Weight and Volume Measurements

The largest portions of the refuse waste stream were "food waste" (~21% by weight of the total refuse), "diapers" (~18% by weight of the total refuse) and "contaminated mixed paper" (~14% by weight of the total refuse). "Food waste" includes fruits, vegetables, grains, meats, fats, and bones. "Contaminated mixed paper" includes soiled napkins, boxes, and other paper items that has too much food waste, dirt, or debris on them to be recyclable back into paper products. Currently "food waste" and "contaminated mixed paper" are being collected in the organics pilot. Fitchburg and Pellitteri are researching ways to communicate more clearly the items that are allowed to go in the organics cart. The City and Pellitteri are also proceeding to allow diapers to be deposited in the organics cart. The amount of pet waste (~8% by weight of the total refuse) was also significant, by the fact that pet waste can also be collected in the organics cart.

The recycling rate is the first calculation made to judge the current status of the recycling program. The recycling rate is the total percentage by weight collected in the recycling carts during the June 19th collection divided by the total weight of refuse and recycling carts from the two collections. The recycling rate (~41% by weight) was derived from the forty homes collected in this study. Another calculation present in the data is the capture rate per item. The capture rate is the weight of the recyclable items captured from the refuse carts divided by the total amount of recyclable in the recycling and refuse waste stream. The higher the capture rate the better residents are at recycling an item. The highest capture rate was observed on glass (91% by weight), uncontaminated mixed paper (90% by weight), and corrugated cardboard (86% by weight). The lowest capture rates were observed on plastic #6 polystyrene (6% by weight), plastic film (7% by weight), and scrap metal (10% by weight).

The compostable rate is the first calculation made to judge the current status of the Organics Collection Pilot. The composting rate is the total percentage by weight collected in the organics carts from the June 19th and 26th collections divided by the total weight of the refuse and organic waste from the two collections. The composting rate (~28% by weight) was derived from the 67 homes on the two waste sorts in this study. Another calculation present in the data is the capture rate per item. The capture rate is the percentage by weight of the compostable item captured from the waste stream divided by the total amount of compostables in the waste stream. The higher the capture rate the better residents are at placing an item in the correct carts. The capture rates of organic items were as follows: food waste (51% by weight), pet waste (41% by weight) and contaminated mixed paper (14% by weight).

This study shows that if residents actually recycled and composted all of the potentially recyclable items, they could achieve up to a **52%** (by weight) recycling rate and **72%** (by weight) composting rate. Additionally, if residents were able to implement reuse/recycling and composting through all the available options (e.g.: per recommendation of the Fitchburg Recycling Guide at: www.city.fitchburg.wi.us/departments/cityHall/publicWorks/solidWaste/documents/FitchburgRecyclingGuide.pdf the potential diversion rate from the landfill could be raised up to ~**96%!**

Statistical Comparison between the Fitchburg 1999, 2009 and 2012 Waste Sorts and Madison's 2012 Analysis of Composition of Residential Rubbish Stream

The term "diversion rate" and "recycling rate" is referenced throughout the 1999 and 2009 sorts. One may also note that the 2012 waste sort includes a diversion and recycling rate. The methods in the 1999 sort to calculate the diversion rate is equivalent to the 2009 recycling rate. In 1999 and 2009, the recycling rate was 37% and 32%, respectively. The recycling rate recorded for the June 2012 waste sort was 41% the highest the recycling rate in any waste sort. Another record tracked by Fitchburg Public Works department is the recycling rate via month reports from the City hauler, Pellitteri Waste Systems. The 1999 and 2009 recycling rate was averaged at 35.9% and 32.8% respectively. Madison's 2012 Analysis of Composition of Residential Rubbish Stream measures organic separation in units of pounds of organics collected each week per household. The report concluded approximately 11 pounds of organic material was separated for composting by households participating in the Madison Organics

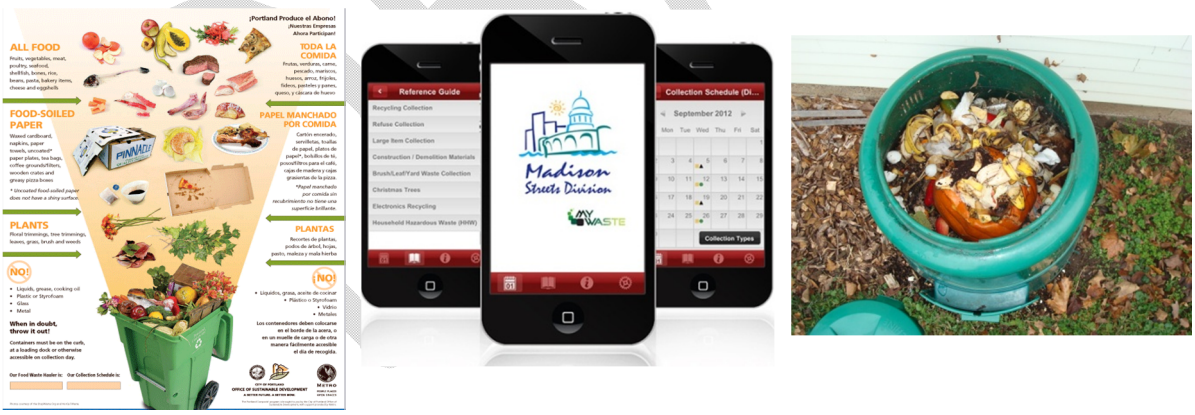
Collection Pilot. Fitchburg's 2012 Waste Sort Results concluded approximately 9.1 pounds of organic material was separated for composting by households participating in the Fitchburg Organics Collection Pilot.

Recommended Actions

Organic Waste: The 1999, 2009 and 2012 waste sorts indicated a large percent by weight of "food waste", and "contaminated mixed paper" in the refuse collection carts. Additionally, in the 2012 waste sort "diapers" and "pet waste" were also a large percent by weight in the refuse collection carts.

Recommendation #1: Add diapers to the list of allowable items in the organics cart. The amount of diapers in the refuse totaled 286 pounds (18% by weight of the total refuse stream). Diverting such an item could have a large impact on the landfill diversion rate. .

Recommendation #2: Continue education on what is acceptable in the organics carts and what can be home composted. **Option 2a:** Inform residents on the amount of food waste, contaminated mix paper and pet waste not being collected in the organics carts to increase the amount of materials collected in the organics carts. Education and outreach could be accomplished by the addition of an informative sticker placed on the organics collection carts stating the acceptable and unacceptable items to be placed in organics cart. **Option 2b:** Another form of outreach and education could be completed by the creation of a mobile app, supplying organized information about composting and recycling. **Option 2c:** Continue collecting information for recommendations by surveying organics collection pilot residents and also residents not involved in the organics collection pilot. **Option 2d:** Continue to encourage all residents to install home composting bins for food waste.



Compost Signage, Mobile Apps, Home Composting Bin

City of Fitchburg

June 19 and 26, 2012 Waste Sort - Refuse, Recycling, and Organics Data

	Recycling Stream					Refuse Stream					Organics Stream					Capture Rate	Capture Rate
	Weight (lbs)	Volume (gallons)	Weight/Vol (lb/gal)	%by Weight	% by Volume	Weight (lbs)	Volume (gallons)	Weight/Vol (lb/gal)	%by Weight	% by Volume	Weight (lbs)	Volume (gallons)	Weight/Vol (lb/gal)	%by Weight	% by Volume	%by Weight	
OCC (Old Corr. Cardboard)	93.0	295	0.32	8.15%	15.03%	15.0	18	0.83	0.93%	1.05%	0.0	0.0		0.00%	0.00%	86%	
Newspapers	99.0	80	1.24	8.67%	4.08%	24.5	18	1.36	1.51%	1.05%	0.0	0.0		0.00%	0.00%	80%	
Magazines & Catalogs	81.5	35	2.33	7.14%	1.78%	36.0	23	1.57	2.22%	1.34%	0.0	0.0		0.00%	0.00%	69%	
White Office Paper	20.5	25	0.82	1.80%	1.27%	17.5	19	0.92	1.08%	1.11%	0.0	0.0		0.00%	0.00%	54%	
Cont. Mixed Paper	42.0	120	0.35	3.68%	6.12%	224.0	305	0.73	13.83%	17.81%	43.5	100.0	0.44	7.06%	28.33%		14%
Uncont. Mixed Paper	350.0	570	0.61	30.66%	29.05%	40.0	115	0.35	2.47%	6.71%	0.0	0.0		0.00%	0.00%	90%	
Plastic # 1 PETE	51.0	285	0.18	4.47%	14.52%	17.0	35	0.49	1.05%	2.04%	0.2	0.3	0.80	0.03%	0.07%	75%	
Plastic # 2 HDPE	25.0	50	0.50	2.19%	2.55%	21.0	27	0.78	1.30%	1.58%	0.0	0.0		0.00%	0.00%	54%	
Plastic # 3 PVC, #4 LDPE, &#7 Other Resin	9.5	45	0.21	0.83%	2.29%	20.5	19	1.08	1.27%	1.11%	0.0	0.0		0.00%	0.00%	32%	
Plastic # 5 Polypropylene	14.5	80	0.18	1.27%	4.08%	20.0	45	0.44	1.23%	2.63%	0.0	0.0		0.00%	0.00%	42%	
Plastic # 6 PS	4.5	50	0.09	0.39%	2.55%	16.5	55	0.30	1.02%	3.21%	2.0	1.5	1.33	0.32%	0.42%	20%	
Plastic # 6 Block PS (Exp. Foam)	1.5	1	3.00	0.13%	0.03%	22.0	120	0.18	1.36%	7.01%	0.1	0.2	0.50	0.02%	0.06%	6%	
Plastic film (bags)	8.0	40	0.20	0.70%	2.04%	106.5	325	0.33	6.58%	18.97%	0.5	1.0	0.50	0.08%	0.28%	7%	
Bulk Plastic (Toys, furniture, etc.)	12.5	40	0.31	1.10%	2.04%	24.0	13		1.48%	0.76%	5.0	8.0	0.63	0.81%	2.27%	30%	
Tin	19.5	35	0.56	1.71%	1.78%	18.0	10	1.80	1.11%	0.58%	0.0	0.0		0.00%	0.00%	52%	
Aluminium	15.0	80	0.19	1.31%	4.08%	19.0	20	0.95	1.17%	1.17%	0.0	0.0		0.00%	0.00%	44%	
Glass	247.0	115	2.15	21.64%	5.86%	24.0	6	4.00	1.48%	0.35%	0.0	0.0		0.00%	0.00%	91%	
Scrap Metal	2.5	1	5.00	0.22%	0.03%	21.5	4	5.38	1.33%	0.23%	0.0	0.0		0.00%	0.00%	10%	
Textiles, Clothing, Shoes	0.0	0		0.00%	0.00%	24.0	45	0.53	1.48%	2.63%	0.0	0.0		0.00%	0.00%		
Food Waste	8.5	1	17.00	0.74%	0.03%	345.0	125	2.76	21.30%	7.30%	374.0	105.0	3.56	60.68%	29.75%		51%
Brush	0.0	0		0.00%	0.00%	0.0	0		0.00%	0.00%	0.0	0.0		0.00%	0.00%		
Yardwaste	1.0	0	4.00	0.09%	0.01%	25.0	25	1.00	1.54%	1.46%	91.5	95.0	0.96	14.85%	26.92%		78%
Construction & Demolition Mat'l	9.5	1	19.00	0.83%	0.03%	31.5	31	1.02	1.95%	1.81%	0.0	0.0		0.00%	0.00%		
Pet Waste	0.0	0		0.00%	0.00%	124.5	65	1.92	7.69%	3.79%	85.5	28.0	3.05	13.87%	7.93%		41%
Diapers	0.0	0		0.00%	0.00%	286.0	140	2.04	17.66%	8.17%	4.0	2.0	2.00	0.65%	0.57%		1%
Compostable Plastic Bags	0.0	0		0.00%	0.00%	0.0	0		0.00%	0.00%	10.0	12.0	0.83	1.62%	3.40%		100%
Non-Recyclables	26.0	15	1.73	2.28%	0.76%	96.5	105	0.92	5.96%	6.13%	0.0	0.0		0.00%	0.00%		
Totals	1,142	1,962	0.58	100.00%	100.00%	1,619.5	1713	0.95	100.00%	100.00%	616.3	353.0	1.75	100.00%	100.00%	34%	

Recycling Rate = Total Recyclables/(Total Recyclables + Total Refuse)	41.34%	(Calculations include data from both June 19 and 26, 2012	Composting Rate	27.57%
Potential Recycling Rate	52.61%		Potential Composting Rate	72.49%
Potential Diversion Rate	95.56%			

Notes: OCC included cardboard only. Paperboard and brown paper bags were included in the uncontaminated mixed paper. Contaminated Mixed Paper included soiled napkins, pizza boxes, and other paper items that had too much food waste, dirt, or debris on them to be recyclable back into paper products.

8.5 lbs/20 gallons of recyclables and 11.5 lbs/8 gallons of refuse was excluded from the Organics data on June 19 since it was attributed to a move-out on Buttonbush Drive.

Table 2: Waste Sort Data