FINAL REPORT

STATE OF NEBRASKA
WASTE CHARACTERIZATION STUDY

Prepared for

State of Nebraska
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EXECUTIVE SUMMARY

The main objectives of this study were to determine the characteristics of Nebraska's solid waste stream and establish a baseline of waste characterization data for the state. In addition, the results of the study provide a differentiation of the characteristics of Nebraska's solid waste stream among: (1) facilities based upon their grouping as large urban, small urban, large rural, or small rural; (2) the four seasons; (3) the generating sectors – residential, commercial, and mixed; and (4) items sighted during the visual inspection process.

Four seasonal field sorting events were undertaken at eight selected facilities located throughout the state. The Fall 2007 field sorting event occurred during September and October 2007; the Winter 2008 field sorting event was undertaken during January and February 2008; the Spring 2008 field sorting event occurred during April and May 2008; and the Summer 2008 field sorting event occurred during July and August 2008. Both publicly- and privately-owned and operated landfills and transfer stations hosted the seasonal field sorting events.

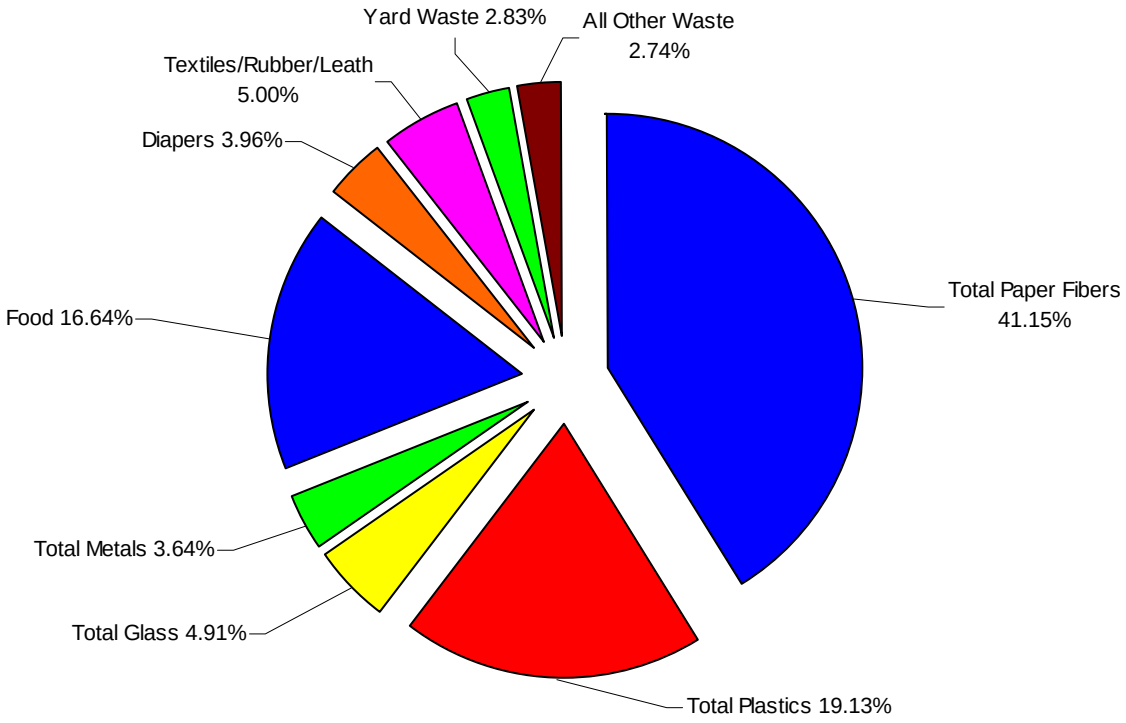
A total of 624 samples were collected during 80 days of sorting. Detailed data for every sample was compiled throughout the four seasonal field sorting events. For example, the weights of the materials found in each sample were recorded, items sighted during the visual inspection were quantified and noted, and sample specifics like the type of waste, county of origin, etc. were also noted. Each sample's weight data was then used to compute each material's corresponding volume. This weight and volume data along with each sample's specifics were then compiled into a two-page sample summary.

The term waste-material category and waste-material component are used throughout this report. A waste-material category is a defined single category for a portion of the waste stream. Cardboard, PET #1, clear glass containers, aluminum containers, food waste, diapers, and yard waste are all examples of a waste-material category. A waste-material component is a group of related waste-material categories. For example, paper fibers is a waste-material component comprised of the cardboard, office paper, newsprint, magazines, paperboard/liner board, and mixed paper waste-material categories.

The three largest portions of Nebraska's waste stream encompass the paper fibers component at 41.15%, the plastics component at 19.13%, and the food category at 16.64%. Combined, these two components and one category comprise almost 77% of Nebraska's total waste stream. It is interesting to note that the food category is larger than any one category in either the paper fibers component or the plastics component.

The four major components of the waste stream – paper fibers, plastics, glass, and metals – comprise more than 68% of the total waste stream in Nebraska. The largest component of these four is paper fibers and the smallest is metals. The largest material categories within each of these four major components include mixed paper, plastic film/wrap/bags, clear glass containers, and tin cans. Of these categories, tin cans are the easiest to recycle while clear glass containers are the most difficult. Plastic film/wrap/bags and mixed paper are both recyclable; however, because these materials are usually highly contaminated and there are limited uses for the materials, they are very price sensitive.

Of the four major components, the paper fibers component provides the greatest opportunity for recovery and recycling. There is recycling potential for all of the material categories in the paper fibers component. More than 75% of the metals component is readily marketable and recyclable; while at least 50% to 60% of the plastics component is recyclable and approximately 27% of the plastics component (PET #1 and HDPE #2 material categories) is readily recyclable. The glass component presents the greatest potential for reuse; however, given its weight and limited value, these reuse needs tend to be localized.



A statistical analysis of the data indicates the database is statistically sound and it meets the 90% confidence interval. The step-by-step process utilized, identified those waste categories with unique anomalies that were addressed through additional analysis and assessment. The key results of this analysis are that the data is normally distributed, represents a true representation of the waste stream, and is statistically valid. Further, this analysis proves that the data meets the confidence interval required.

As previously stated, 624 loads of solid waste were sampled during the four seasonal statewide field sorting events. Of these samples, 284 contained residential waste, 231 were comprised of commercial waste, and 109 contained mixed waste. When the data for all 624 samples was combined, the largest portion of the waste stream (by weight) was the paper fibers component at 41.15%. The paper fibers component found in the statewide residential loads (35.33%) was 5.82% less than all of the 624 samples combined. Conversely, the paper fibers component found in the statewide commercial loads (47.93%) was 6.78% higher than all of the 624 samples combined. The paper fibers component found in the statewide mixed samples was 41.58%, which is only 0.43% higher than the combined samples.

The second largest portion of the 624 combined samples (by weight) was the plastics component at 19.13%. When the plastics component of the commercial samples (19.49%) was compared to this component of the 624 combined samples, the commercial samples contained only 0.36% more plastics. Similarly, when the plastics component of the residential samples (19.27%) was compared to this component of the 624 combined samples, the residential samples contained only 0.14% more plastics. The plastics component of the mixed samples comprised 18.03% of the samples' weight, which is 1.10% lower than the plastics component of the combined statewide samples.

The third largest portion of the 624 combined samples (by weight) was food at 16.64%. Food comprised 15.86% of the weight of the statewide commercial samples, which is 0.78% lower when compared to all of the 624 combined samples. Food comprised 17.22% of the weight of the statewide residential samples, which is 0.58% more when compared to all of the 624 combined samples. Similarly, the statewide mixed waste samples were comprised of 16.80% food, which is 0.36% higher than the 624 combined samples.

A visual inspection of each of the loads selected for sampling was undertaken as a part of this study. The visual inspection process entailed noting items seen when the collection vehicle discharged its load and while walking around the entire perimeter of the load once it was discharged (a walk around). The walk around was first conducted in a clockwise direction. Once the entire perimeter was traversed, a second walk around was conducted in a counter-clockwise direction.

During the four seasonal field sorting events undertaken for this project, data was collected for 50 different items sighted in the 624 loads sampled for this study. An important result of analyzing this data was determining how frequently certain classifications of waste were sighted during the visual inspections of the 624 sampled loads. Specifically, we segregated and analyzed the following classifications:

E-Waste: Includes CPU's, Monitors, Keyboards, Printers, Computer Parts, Televisions, Stereos, DVDs and VCRs, and Stereos and Speakers.

Furniture: Includes Sofas, Stuffed Chairs, Mattresses, Patio Furniture, Wood Furniture, and Metal Furniture.

Limbs and Brush: Includes Limbs, Brush, and Yard Waste (for purposes of this specific analysis, only yard waste that was sighted in the sampled loads was included).

Construction and Demolition Debris: Includes Lumber, Dry Wall, Plumbing Fixtures, Electric Cable, Insulation, Plastic Bins, Siding, Shingles, PVC Pipe, Carpet, Doors, Windows, and Linoleum.

In the residential waste stream, e-waste was sighted in 31% of all the residential loads sampled for this project; furniture was sighted in 60% of all the residential loads; limbs and brush were sighted in 46% of all the residential loads; and, construction and demolition debris was sighted in 78% of all the residential loads sampled for this project.

In the commercial waste stream, e-waste was sighted in 30% of all the commercial loads sampled; furniture was sighted in 62% of all the commercial loads; limbs and brush were sighted in 32% of all the commercial loads; and construction and demolition debris was sighted in 71% of all the commercial loads sampled for this project.

In the mixed waste stream, e-waste was sighted in 35% of all the 109 mixed waste loads sampled; furniture was sighted in 63% of the mixed waste loads sampled; limbs and brush were sighted in 49% of the mixed waste loads; and construction and demolition debris was sighted in 86% of all the 109 mixed waste loads sampled for this project.

The following observations are based on a review of all the data generated for this study and the field activities undertaken as a part of this project. These observations are provided to further expand the information provided in this report.

- The yard waste ban appears to be very successful in reducing the amount of yard waste disposed in Nebraska's solid waste facilities.
- More than 50% of the paper fibers component of Nebraska's municipal waste stream is easily recyclable.
- The plastics component comprises 19.13% of Nebraska's municipal waste stream and approximately 27% of the component is easily recyclable.
- The metals component comprises 3.64% of Nebraska's municipal waste stream and more than 75% of this component is easily recycled.
- Food comprises 16.64% of Nebraska's municipal waste stream. This material can be recovered and utilized in composting; however, recovery can be expensive and require vehicles that are exclusively utilized for food waste collection.
- The diapers category comprises 3.96% of Nebraska's municipal waste stream. The majority of this category appears to be adult diapers.
- The textiles/rubber/leather category comprises 5.00% of Nebraska's municipal waste stream. The largest portions of this category appear to be clothing (textiles) and shoes.
- Electronic waste was sighted in more than 30% of the sampled loads.
- Furniture was sighted in more than 60% of the sampled loads.
- Construction and demolition debris was sighted in more than 75% of the sampled loads.

The success of any waste characterization study is in the use of the data and the information generated. The following recommendations provide ideas on how this data and information could be utilized to benefit the State of Nebraska.

1. A program should be developed that provides a relationship among the eight participating facilities – and the counties they serve – and all of the other counties in Nebraska.

2. An on-going training program that provides guidance and direction in the use of the data provided in this report should be established.

3. The implementation of waste audit programs and data from this study could be of exceptional benefit to solid waste planners throughout the state.

4. More focused waste sorts should be considered for particular areas in the state.

5. A follow-up waste characterization study of Nebraska's municipal waste stream should be conducted in 2013, or no later than 2016.

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1. INTRODUCTION

Engineering Solutions & Design, Inc. (ES&D) was contracted by the Nebraska Department of Environmental Quality (NDEQ) to perform a statewide waste characterization study. The study included sampling the waste stream at eight solid waste disposal facilities (landfills or transfer stations) located throughout Nebraska. Field sampling events were conducted at each of the eight selected facilities during each of the four seasons. The first field sorting event was undertaken in Fall 2007. Subsequent field sorting events were undertaken in Winter 2008, Spring 2008, and Summer 2008.

1.1 STUDY PURPOSE AND DEFINITIONS

The main objectives of this study were to determine the characteristics of Nebraska's solid waste stream and establish a baseline of waste characterization data for the state. In addition, the results of the study provide a differentiation of the characteristics of Nebraska's solid waste stream among: (1) facilities based upon their grouping as large urban, small urban, large rural, or small rural; (2) the four seasons; (3) the generating sectors – residential, commercial, and mixed; and (4) items sighted during the visual inspection process.

In order to better understand the purpose of this project, it is important to define waste characterization, also known as a waste sort or waste pick. In general, a waste characterization project encompasses sorting a portion of the solid waste stream. For this project, the waste sort encompassed sorting through a portion of the solid waste stream at predetermined selected facilities. Solid waste that was sorted during the four seasonal field sorting events at each facility was generated from a variety of users and included residential, commercial or mixed waste.

Throughout this report a variety of terms specific to the waste characterization process are used. Definitions for some of these terms are listed in Table 1.1. For purposes of this study, waste generated at apartment complexes was considered either residential or commercial waste depending upon how it was collected and delivered to the solid waste facility. Apartment waste placed in dumpsters and collected by front-loading vehicles together with waste collected from commercial generators such as restaurants, offices, retail stores, etc. was considered a part of the commercial waste stream. Conversely, apartment waste that was placed in cans, bags and/or toters and collected in rear- or side-loading vehicles along with waste collected from single family dwellings was considered a part of the residential waste stream.

TABLE 1.1
DEFINITIONS

Term	*Definition*
Field Sorting Event	Activities undertaken at a participating solid waste facility that encompassed all functions necessary to gather data to accurately determine the characteristics of the waste stream (also see Waste Pick or Waste Sort). For this study, field sorting events were undertaken at each participating facility during the fall, winter, spring and summer seasons.
Waste Pick or Waste Sort	The sorting of a sample of waste to determine its characteristics. This effort can be used to define the characteristics of the entire waste stream or to identify specific items in the waste stream.
Load	The contents of a solid waste collection vehicle.
Sample	The portion of the load selected for sorting. The optimum sample size varies from 200 to 300 pounds.
Waste-Material Category	A defined single category for a portion of the waste stream. For example, cardboard, PET #1, clear glass containers, aluminum containers, food waste, diapers, and yard waste are all waste-material categories.
Waste-Material Component	A group of related waste-material categories. For example, paper fibers is a waste-material component comprised of the cardboard, office paper, newsprint, magazines, paperboard/liner board, and mixed paper waste-material categories.
Visual Inspection	An inspection conducted by walking around the load once it is removed from the collection vehicle. This inspection is utilized to identify large items in a load as well as to ascertain a broad concept of the characteristics of the load.
Residential Waste	Waste generated by households at either single family residences or apartment residences.
Commercial Waste	Waste collected from restaurants, grocery stores, dry goods stores, apartment buildings, small businesses, office buildings, schools, medical centers, and/or similar facilities.
Mixed Waste	A combination of commercial and residential waste.

TABLE 1.1
DEFINITIONS (continued)

Term	*Definition*
Curbside or Street Collection	The process of placing bags, cans, carts and/or toters filled with solid waste at the curbside or edge of street for collection.
Front Loader	A solid waste collection vehicle that collects waste utilizing two forks to lift various size containers or dumpsters. Solid waste is loaded into the top of the truck and compacted within the box. This type of truck is typically utilized for the collection of solid waste generated by commercial users.
Rear Packer	A solid waste collection vehicle that collects waste by placing it in an opening at the rear of the truck. The waste can be placed manually or via automated means. The solid waste is mechanically pushed into the box of the truck and compacted. This type of truck is typically utilized to collect solid waste generated by residential users.
Side Loader	A solid waste collection vehicle that collects waste by placing it in an opening at the side of the truck. The waste can be placed manually or via automated means. The solid waste is mechanically pushed into the box of the truck and compacted. This type of truck is typically utilized to collect solid waste generated by residential users.
Roll-Off	A solid waste collection vehicle that collects waste deposited in a large metal container (dumpster) from one location, such as a construction site, large store, shopping mall, or industrial site. This vehicle then delivers the waste to a disposal facility, where the container is rolled off and unloaded. The empty container is then returned to the waste generator.
Bags	Non-rigid plastic containers that are filled with solid waste and placed at the curb or in alleys for collection. The opening of the container is usually secured by a metal or plastic tie.
Cans	Rigid metal or plastic containers that are filled with solid waste and placed at the curb or in alleys for collection. The opening in these containers is typically secured with a lid.

TABLE 1.1
DEFINITIONS (continued)

Term	*Definition*
Carts or Toters	Rigid plastic containers that are filled with solid waste and placed at the curb or in alleys for collection. These containers have wheels and are designed to be utilized by collection vehicles that have automated mechanisms for lifting the container and unloading it into the collection vehicle. The opening in these containers is typically at the top and secured with a lid that is attached to the container.
Dumpsters	Rigid metal or plastic containers that are filled with solid waste. These containers are typically rectangular in shape and are typically utilized to service large commercial waste generators. These containers are collected by front loading vehicles s that utilize forks to lift the dumpster onto the top of the truck where the container is tipped and the contents unloaded in the vehicle. The opening in these containers is typically at the top or side and is secured with a lid that is attached to the container.

1.2 PARTICIPATING FACILITIES

Field sorting events (waste sorts) were undertaken during each of the four seasons at eight selected facilities. Facilities were selected based on their location within the state, their size, and their willingness to work with NDEQ to allow access to their solid waste landfill or transfer facility. The highlighted counties on the Map 1.1 indicate the participating facilities' locations. The eight participating facilities included:

1. Pheasant Point Landfill located in Douglas County near Bennington, Nebraska. This facility primarily serves the Omaha metropolitan area.

2. City of Lincoln's Bluff Road Landfill located in Lancaster County just north of Lincoln, Nebraska.

3. Norfolk Area Solid Waste Transfer Station located in Madison County within the city limits of Norfolk, Nebraska.

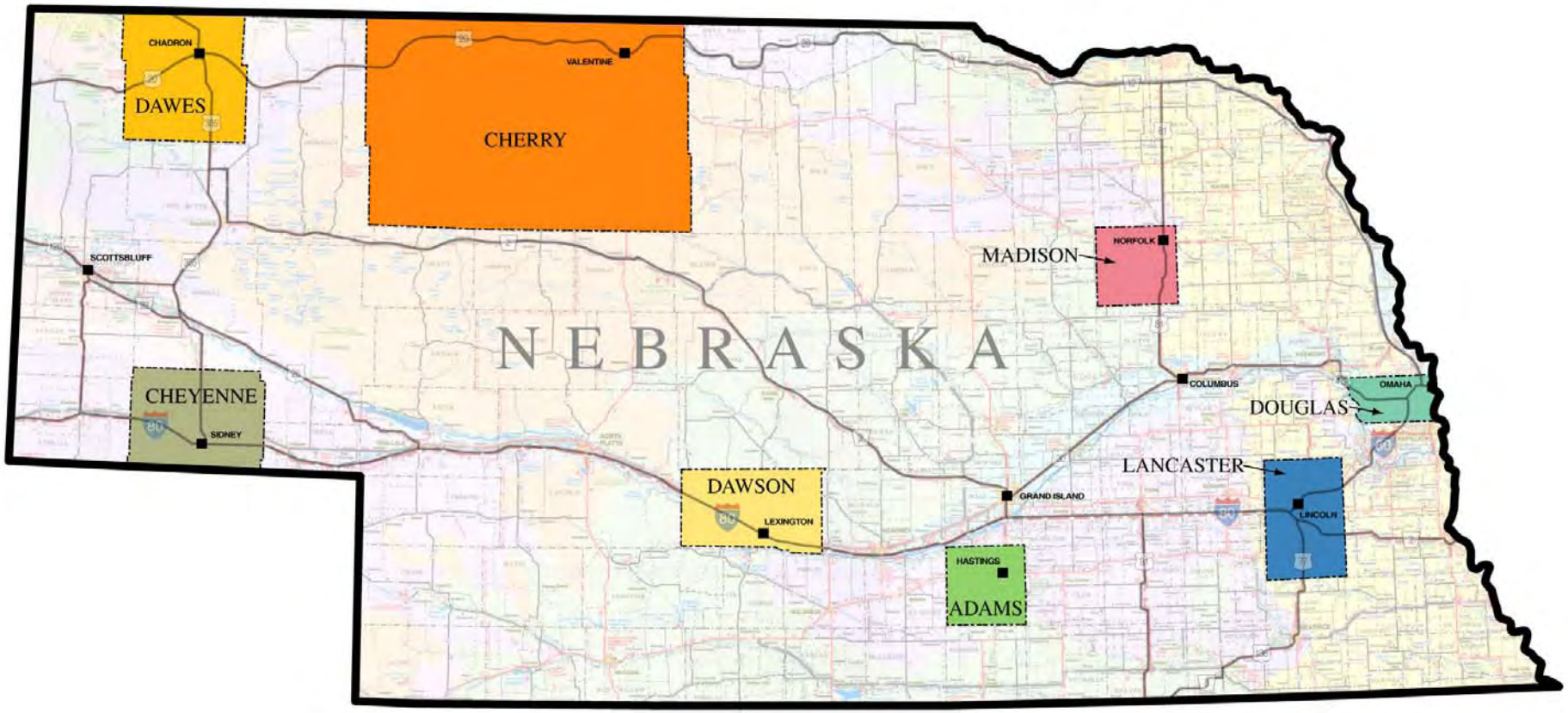
4. City of Hastings Landfill located in Adams County in the southwestern portion of Hastings, Nebraska.

5. Lexington Area Solid Waste Agency's landfill located in Dawson County north of Lexington, Nebraska.

6. The Chadron Transfer Station serving the Solid Waste Agency of Northwest Nebraska. The facility is located in the community of Chadron, which is in Dawes County, Nebraska.

7. The Sidney Landfill, which serves the Sidney Area Solid Waste Agency and is located in the community of Sidney in Cheyenne County, Nebraska.

8. The Valentine Landfill, which serves the Valentine Area Solid Waste Agency and is located in Cherry County east of the community of Valentine, Nebraska.



MAP 1.1
NEBRASKA MAP DEPICTING COUNTIES AND PARTICIPATING FACILITIES' LOCATIONS

1.3 PRE-SORT SITE ASSESSMENTS

During the week of July 9, 2007, ES&D conducted site visits at the eight selected participating facilities where field sorting events were scheduled to be undertaken. ES&D's project team met with the landfill or transfer station manager at each facility and explained the field activity procedures and the team's needs. Then, the project team toured the facility, reviewed the facility's operation procedures, and discussed the facility's service areas. During the facility tour, the project team ascertained the best and least intrusive area for the team to conduct its field sorting activities. Detailed discussions were undertaken between the project team and each facility manager to identify the flow of waste into each site, day-to-day variations in solid waste delivered to each site, and any specific peculiarities in the solid waste delivered to each site.

At the conclusion of these site visits, ES&D prepared a work plan that detailed the anticipated field activities, sorting area needs and configuration, and requested facility services for each participating facility. The project's health and safety plan was also prepared and presented in the work plan document. A copy of the work plan, entitled *State of Nebraska Waste Characterization Study Work Plan* and dated September 20, 2007, is included in Appendix I. Each facility's site-specific information and work plan are presented in the appendices of this report. Table 1.2 lists each facility and the corresponding appendix where its work plan can be found.

TABLE 1.2
FACILITIES AND CORRESPONDING WORK PLANS

Facility	Appendix
Pheasant Point Landfill – Omaha	A
Bluff Road Landfill – Lincoln	B
Norfolk Area Transfer Station	C
Lexington Landfill	D
Hastings Landfill	E
Sidney Landfill	F
Chadron Transfer Station	G
Valentine Landfill	H

2. METHODOLOGY

During field sorting events at each participating facility, the work day varied in length from 10 to 12 hours and was dependent upon the facility's operating hours, the amount of available daylight, and the anticipated number of needed samples. Set-up time consumed approximately one-half hour as did breakdown time at the end of each day. A minimum of 9 hours each day was spent sorting and categorizing waste. Each selected load took between 45 minutes and one-and-one-half hours to sort. As field sorting activities progressed, the time needed to sort and categorize each sample decreased.

At each facility the waste sort team size varied based on the size of the facility and the anticipated number of samples. The sort team was typically comprised of the project manager, the project coordinator, an individual to collect and record data (data analyst), and two to six additional individuals to assist in the sorting process. All field sorting team members were outfitted with Tyvek protective suits, Kevlar lined gloves, safety goggles, hard hats, and high-visibility safety vests.

At the start of the day, the project manager and/or project coordinator arrived at the site prior to the remainder of the team. These team members ensured that the site was secure, identified any changes in the site operation, and communicated with the on-duty site operations staff. Additionally, these team members began the set-up process and tested the scales to ensure proper operation and accuracy.

The first step in the sort process is setting up the site. At each landfill, unless other arrangements were made, the sort area was located as close to the working face as possible, but in a location that did not adversely impact the operation of the facility. The sorting area was set up within 100 feet of the edge of the working face in order to reduce the distance team members needed to traverse when carrying samples to the sort area.

PHOTOGRAPH 1.1
THREE-TENT COMPLEX CONFIGURATION AT A LANDFILL

A three-tent complex comprised the sort area at those landfill facilities where the sorting activities were conducted outside. Two of the tents

were configured as work stations with sort tables where portions of the sample were placed for categorizing. Two material sorters sorted and categorized waste in each tent. The third tent was configured with tables, scales, and supplies for material weighing and data gathering. Two scales were utilized for weighing captured samples and sorted waste. A floor scale (with the capacity to accurately weigh up to 220.0 pounds) was positioned adjacent to the tracking table and a smaller scale (with the capacity to accurately weight up to 50.00 pounds) was placed on the tracking table. This configuration allowed for an ease of use and reduced the need for excessive bending and lifting. All necessary forms and recording devices were also housed in the third tent.

An identical configuration was used at the transfer station facilities and those landfills where a baling building or material recovery building was available for use. However, instead of erecting a three-tent complex, the stations and tables were set-up inside the building. At all of these facilities, the sort area was located in a segregated portion of the building so the sort team's interference with the facility's operation was minimized.

PHOTOGRAPH 2.2
SORTING AREA CONFIGURATION
AT A TRANSFER STATION

At the end of each day, the sort area was dismantled. All equipment was placed in the proper carrying cases and loaded into the team's vehicles. At those sites where field activities were undertaken outdoors, all of the equipment and materials brought to the site were removed each day. At those sites where working indoors was an option, equipment was left set up, ready for use the next day, and was only removed at the end of the last day of field activities at that site. All setup and breakdown procedures were reviewed with, and approved by, the facility operators to reduce misunderstandings and allow for adjustments as necessary.

2.1 LOAD SELECTION PROCESS

Once the tents and work stations were setup, the next step was selecting loads for sampling. When a vehicle arrived at the site, an initial interview was conducted with each driver to determine the load content and collection location. If this interview revealed the load did not meet the study requirements, the driver was directed to the working face or transfer station bay and the load was not sampled. If the load did meet the study requirements, the driver was directed to unload the vehicle at a segregated location near the landfill's working face or adjacent to the sorting area in the transfer station, baling building, or material recovery building.

Vehicles were unloaded in thirds. This was accomplished by unloading the first third of the load and then moving the vehicle forward approximately 10 feet. The next third was then unloaded and the vehicle moved again. The final third of the load was then unloaded. Depending on how tightly the waste was compacted within the vehicle, the load flowered which allowed for an easier selection of the sort sample.

After the vehicle was unloaded, the driver was interviewed in more detail. A standard interview form was utilized for consistency. Some of the information gathered during this interview included: (1) vehicle owner; (2) type of collection vehicle; (3) type of waste – residential, commercial, or mixed; (3) county of origin and specific service area, if available; (4) net weight of load, if available; and (5) any driver observations or noted anomalies within the load.

PHOTOGRAH 2.3
INTERVIEWING A DRIVER

In addition to completing an interview with the vehicle driver, a detailed visual inspection of each selected load was undertaken. An example of the interview and visual inspection form utilized throughout this study is presented in Table 2.1. The visual inspection entailed observing the load being discharged from the collection vehicle and walking around the entire perimeter of the load once it was discharged (a walk around). The walk around was first conducted in a clockwise direction. Once the entire perimeter was traversed, a second walk around was conducted in a counter-clockwise direction. This method allowed for a complete observation of the load while also taking into account variations in lighting, the likely skewed position of the load, and viewing the load from a variety of angles.

During the unloading and walk around inspections, all anomalies and large seams of a particular waste category were noted. Three photographs of each load were taken to note the overall characteristics of the load along with one photograph of the delivering vehicle. All large or bulky items were noted, and where possible, the predominant materials of the load were determined.

TABLE 2.1
EXAMPLE INTERVIEW AND VISUAL INSPECTION FORM

CONTROL #		SAMPLE BIN NUMBERS	
FACILITY		DATE	
TRUCK OWNER		TRUCK #	
TIME IN		NET WGT	
TYPE OF TRUCK	☐ REAR ☐ FRONT ☐ SIDE ☐ ROLL-OFF		
SERVICE AREA TYPE OF WASTE DRIVER OBSERVATIONS	County: _____Community: _____ ☐ RES ☐ COM ☐ MIX ☐ Single Family ☐ Apartments ☐ Retail ☐ Offices ☐ Restaurants ☐ Nur Home ☐ Hospital ☐ Dr Offices ☐ Schools		

CPUs		Televisions		Sofas	
Keyboards		VCR or DVD		Stuffed Chairs	
Monitors		Tires		Mattresses	
Printers		Wood Pallets		Fluorescent Bulb	
Stereos		Small Apps		Oil Filters	
Speakers		Large Apps		Dead Animals	

Lumber ☐ Plumbing Fix ☐ Elec Wire/Cable ☐ Insulation ☐ Siding ☐
Shingles ☐ PVC Pipe ☐ Plastic Strap ☐ Carpet ☐ Metal ☐
Doors ☐ Windows ☐ Drywall ☐ Linoleum ☐ Styrofoam ☐ Plastic Bins ☐
Patio Furn ☐ Wood Furn ☐ Metal Furn ☐ Office Furn ☐
Yard Equip ☐ Garden Hose ☐ Bicycles ☐ Car Seats ☐ Strollers ☐
Plastic Toys ☐ Stuffed Toys ☐ Books ☐
Car Parts - Body ☐ Car Parts - Engine ☐ Limbs & Brush ☐ Yard Waste ☐

2.2 SELECTING THE SAMPLE

After the selected load was discharged from the collection vehicle and the detailed visual inspection was completed, a decision was made to determine what portion of the load was to be sampled. The portion to be sampled was randomly selected keeping in mind that a broad spectrum of data was desired. The goal was to gather a sample weighing between 200 and 300 pounds. It was important to maintain a consistent sample size in order to ensure accuracy, allow for continuity between sort locations, and allow for ease in controlling the sort activities. This results in greater confidence in the data.

The samples were selected by the same person who conducted the visual inspection. Using information and observations garnered from the visual inspection, locations within the load were selected and the sample materials were collected from these locations.

PHOTOGRAPH 2.4
SELECTING A SAMPLE

2.3 SORTING AND CATEGORIZATION PROCESS

After a load was selected and the portion to be sampled was determined, the physical waste sort could commence. Waste was gathered from the designated load portion and placed into sampling bins. The sample bins were then carried to the sort area, weighed and then taken to one of the sort stations. Each sort station was comprised of two tables with a series of various sized bins. Each bin was labeled with a specific material category. Solid waste was removed from the sample bins and placed on the tables where it was sorted into the different waste-material categories by placing the material in the bin that best corresponded to the material. As each bin became full, it was weighed on a digital bench scale and its weight recorded. Table 2.2 presents an example of the form used to record the waste-material category weights for each sample. Table 2.3 provides brief definitions of each of the waste-material categories used throughout this study.

PHOTOGRAH 2.5
SORTING A SAMPLE

After the team sorted, categorized and weighed the designated sample materials, the waste was discarded. Depending on the facility and site constraints, the waste was discarded onto the tipping floor at transfer stations, onto the conveyor in baling buildings, into the bucket of a front-end loader, or onto a portion of the working face at landfills.

TABLE 2.2
EXAMPLE DATA RECORDING SHEET

CONTROL NUMBER		**SAMPLE BIN NO.**	
FACILITY		**DAY/DATE**	
SAMPLE BIN WGT		**SAMPLE BIN WGT**	
SAMPLE BIN WGT		**SAMPLE BIN WGT**	
SAMPLE BIN WGT		**SAMPLE BIN WGT**	
GROSS SAMPLE WEIGHT		**NET SAMPLE WEIGHT**	

MATERIAL CATEGORY	WEIGHT	WEIGHT	WEIGHT	WEIGHT	WEIGHT	WEIGHT
CARDBOARD						
OFFICE PAPER						
NEWSPRINT						
MAGAZINES						
PAPERBOARD/LINER BOARD						
MIXED PAPER/OTHER PAPER						
PET #1						
HDPE #2						
OTHER NUMBERED CON						
PLASTIC FILM/WRAP/BAGS						
OTHER PLASTICS						
CLEAR GLASS CONTAINERS						
BROWN GLASS CONTAINER						
GREEN GLASS CONTAINERS						
BLUE GLASS CONTAINERS						
OTHER GLASS						

TABLE 2.2
EXAMPLE DATA RECORDING SHEET (continued)

MATERIAL CATEGORY	WEIGHT	WEIGHT	WEIGHT	WEIGHT	WEIGHT	WEIGHT
ALUMINUM CONTAINERS						
STEEL/TIN CONTAINERS						
OTHER FERROUS SCRAP						
OTHER NON-FERROUS						
FOOD WASTE						
DIAPERS						
TEXTILE/RUBBER/LEATHER						
YARD WASTE						
HHW						
E-WASTE						
NON-DISTINCT						
OIL FILTERS						
WASTE OIL						
LINOLEUM						
THERMOMETERS						
THERMOSTATS						
RAW MERCURY						
LIGHT-UP STUFF						
FLUORESCENT BULBS						
DRY-CELL BATTERIES						
MISC. C/D WASTE						
WOOD						
EMPTY AEROSOL CANS						

TABLE 2.3
WASTE-MATERIAL CATEGORY DEFINITIONS

PAPER FIBERS COMPONENT	
Cardboard	Cartons and boxes made of corrugated paper
Office Paper	High-grade paper, printing and writing papers including ground-wood and thermo-chemical pulps
Newsprint	Printed ground-wood newsprint and other minimally bleached ground wood
Magazines	Glossy papers and inserts including catalogs, magazines, and mailings
Paperboard/Liner Board	Heavyweight liner board, cereal boxes, and forms
Mixed Paper/Other Paper	Paper not included above or that is not easily recycled including carbon paper, tissues, napkins, paper towels, foil-lined paper, and waxed-coated papers (i.e. milk and juice cartons)
PLASTICS COMPONENT	
PET #1	Soft drink, water or mouthwash bottles and similar containers with PET or #1 inscribed on the container
HDPE #2	Milk, water or juice bottles and similar containers with HDPE or #2 inscribed on the container
Other Numbered Containers	Clear food packaging, wire and cable insulation, squeezable bottles, ketchup bottles, yogurt containers, margarine tubs, compact disc jackets, egg cartons, meat trays, and similar materials with #3, #4, #5, #6 or #7 inscribed on the container
Film and Bags	Plastic bags and film including dry cleaning bags, bread bags, retail bags, trash bags, plastic wrap, and bubble wrap
Other Plastics	All other plastics including compact discs, hard plastic toys and similar materials that do not have a number inscribed on them
GLASS COMPONENT	
Clear Glass Containers	Clear glass bottles and jars
Brown Glass Containers	Brown glass bottles and jars
Green Glass Containers	Green glass bottles and jars
Blue Glass Container	Blue glass bottles and jars
Other Glass	Window glass, mirrors, light bulbs, ceramics

TABLE 2.3
WASTE-MATERIAL CATEGORY DEFINITIONS (continued)

METALS COMPONET	
Aluminum Containers	Beverage cans made of non-ferrous metal
Steel/Tin Containers	Empty ferrous metal containers including tin cans, steel cans and metal containers to which a magnet adheres
Other Ferrous Scrap	Ferrous metal pieces that are not containers and to which a magnet adheres
Other Non-Ferrous Scrap	Non-ferrous metals that are not containers including cookware, take-out containers, and metals to which a magnet does not adhere
Other Metals	Items that contain both ferrous and non-ferrous materials
OTHER WASTE CATEGORIES	
Food	Vegetative matter and animal byproducts
Diapers	Plastic disposable diapers
Textiles/Rubber/Leather	Clothing, shoes, cushions, curtains, rubber mats, rugs, and similar products
Yard Waste	Leaves, grass clippings, garden waste, and brush
Household Hazardous Waste	Paints, pesticides, cleaners, solvents, antifreeze, etc. and containers with any unused portion of these products
Electronic Waste	Computer parts and peripherals, small appliances, cameras, cellular phones and other wireless devices, televisions, audio and stereo equipment, videocassette recorders and digital video disc players, video cameras, telephones, fax machines, copy machines, video game consoles, and similar products
Non-Distinct Waste	Miscellaneous materials, kitty litter, wax, soap, etc. and those items made of mixed materials

TABLE 2.3
WASTE-MATERIAL CATEGORY DEFINITIONS (continued)

MISCELLANEOUS WASTE CATEGORIES	
Oil Filters	Filters that treat oil in automobiles, trucks, and other machinery
Waste Oil	Oil used in automobiles, trucks, and other equipment
Linoleum	Floor covering with a canvas back and a surface of hardened linseed oil and a filler
Thermometers	Instruments used for measuring temperature including digital read-out devices and those that measure by the rise or fall of mercury in a thin glass tube
Thermostats	Devices that automatically control temperature
Raw Mercury	Heavy silver –white metallic chemical element Used in scientific instruments
Light-Up Shoes/Buttons	Shoes or buttons that produce a small intense light when a specific area is depressed
Fluorescent Bulbs	Lights that utilize a ballast and are designed to function with a filament
Dry-Cell Batteries	Cell phone batteries and other alkaline and non-alkaline batteries
Misc. C/D Waste	Pieces of asphalt shingles, drywall, plumbing fixtures, HVAC and similar pieces of materials used in construction
Wood	Dimension lumber used in construction and plywood pieces
Empty Aerosol Cans	Pressurized containers that dispense a substance as an aerosol

2.4 WEIGHT AND VOLUME DETERMINATION

To facilitate weighing each sampling bin, a portable electronic scale (Ohaus ES Bench Scale, Model #ES100L) was utilized. The scale's weighing capacity is accurate to 0.1 pound up to a capacity of 220.0 pounds. At the sorting stations, as each categorized bin became full it was carried to a separate scale and weighed. This scale's (Champ SQ with an Ohaus Model CD-11 indicator) weighing capacity is 50.00 pounds and is accurate to 0.01 pounds. The gross weight of the bin and waste was recorded and the bin was transported to a separate area and emptied. For some categories, each bin was filled and weighed several times. For other categories, each bin was either fully- or partially-filled and weighed at the end of the categorization process for that specific sample. When the categorization process for each selected sample was complete, the gross weight (bin + waste), bin weight, and net weight (gross weight - bin weight) for each waste-material category was totaled.

PHOTOGRAPH 2.6
WEIGHING AND RECORDING MATERIALS

The volume of material was determined based on the type of bin utilized in the categorization process. Two different sized bins were utilized throughout the field sorting events. The size of bin was directly related to the anticipated amount of material for each category. Bin selection was also based on the potential dimensions of the material. For example, cardboard varies greatly in size and shape while aluminum cans are very similar in size and shape. Another variance that was considered was the ability of the material to consolidate. For example, newsprint and magazines easily consolidate because of their initial shape. In turn, some plastics have odd shapes or are so light that consolidation is more difficult. Based on all of these considerations, a specific bin size was assigned to each waste-material category.

Utilizing results from the Fall 2007 field sorting event, a relationship between volume and weight was established. A total of 158 samples were sorted and categorized during the Fall 2007 field sorting event. For each of the 21 major material categories, there was at least one full bin in each category; for 17 of the major material categories, there were at least 15 full bins for each material. Utilizing the weight of each full bin of material, an

average weight and standard deviation was calculated. Any weight that was greater or lesser than one standard deviation from the calculated average was removed from the data base. After these outliers were removed, the average was recalculated. Utilizing these recalculated average weights, a weight-to-volume relationship was determined for the waste-material categories. This relationship was established by dividing the average weight (in pounds) by the volume (in cubic feet) of the bin utilized for each specific waste-material category.

2.5 DATA RECORDING AND QUALITY CONTROL

The data for each sample was recorded on forms prepared specifically for this project (see Table 2.1 and Table 2.2). The data forms were prepared so that the data could be easily entered into a computer data base. Data for each sample was recorded on separate forms. Each sample was assigned a unique control number. Each sample's control number was recorded on all forms and data related to that specific sample. This numbering system ensured that data from one sample was not contaminated with information from another sample.

The sampling program was checked twice daily for consistency and completeness. The checking process included reviewing photographs, checking sort results to identify anomalies, and timing the sampling process to identify if shortcuts were occurring. The second check of the day occurred approximately two hours after the lunch break. All sort procedures were monitored regularly by both the project manager and project coordinator. Each sort result was reviewed for anomalies and no sample was discarded until the data was initially reviewed.

Please note that values on the weight and volume tables presented throughout this report and the appendices may not add to exactly 100% due to rounding calculations.

3. STATISTICAL ANALYSIS

An important element of assessing the data collected during this statewide waste characterization project was determining the statistical validity of the data. Because of the size of the database – 624 samples – we developed a very methodical step-by-step process to ascertain the validity of the data. The following sections present this process and subsequent results.

To begin the analysis process, we grouped all the data into the following databases: (1) consolidated data, (2) residential waste data, (3) commercial waste data and (4) mixed waste data. We then calculated the total weight, average weight, median, and standard deviation for each database. Table 3.1 through Table 3.4 present the results of these calculations for the waste-material categories in each of the four databases. For this analysis, the definition for:

- Total weight is the sum of all the weights recorded for a specific material category;
- Average weight is the calculated total weight divided by the number of samples;
- Median is the middle number of the data when the data is arranged in ascending order;
- Standard deviation is a calculation which expresses the dispersion of the data. For example, the larger the standard deviation, more data points fall farther from the average. A smaller standard deviation indicates that most of the data points lie near the average.

Upon evaluating these calculations, we found there were at least five categories with each of the four databases (consolidated, residential, commercial and mixed) where the standard deviation was greater than the average. When the standard deviation is larger than the average, the implication is that the data set varies greatly. In those categories where the standard deviation result was greater than the average, our next step was to evaluate why this may be the case.

TABLE 3.1
WEIGHT DATA SUMMARY BY CATEGORY
FOR THE CONSOLIDATED DATABASE

Category	Weight (Pounds)	Average (Pounds)	Median (Pounds)	Standard Deviation	No. of Samples
Cardboard	11,864.20	19.01	9.01	22.25	624
Office Paper	6,448.82	10.33	6.90	10.90	624
Newsprint	7,321.39	11.73	10.08	8.28	624
Magazines	5,688.35	9.12	7.91	6.71	624
Paperboard	7,828.24	12.55	12.14	4.89	624
Mixed Paper	21,579.17	34.58	32.50	12.83	624
PET #1	5,076.81	8.14	7.53	4.53	624
HDPE #2	2,395.69	3.84	3.43	2.32	624
#3 - #4 - #5 - #6 - #7	3,951.40	6.33	5.38	4.28	624
Film & Bags	10,260.10	16.44	15.52	6.23	624
Other Plastics	6,547.00	10.49	8.32	8.23	624
Clear Glass	3,841.91	6.16	5.43	4.27	624
Brown Glass	2,436.19	3.90	2.49	4.71	624
Green Glass	691.98	1.11	0.00	1.84	624
Blue Glass	37.65	0.06	0.00	0.33	624
Other Glass	244.62	0.39	0.00	0.91	624
Aluminum Cans	1,772.37	2.84	2.46	2.26	624
Tin Cans	2,426.10	3.89	3.38	2.89	624
Other Aluminum	463.10	0.74	0.53	0.76	624
Other Tin	265.68	0.43	0.16	1.73	624
Food Waste	24,552.67	39.35	37.52	19.61	624
Diapers	5,850.28	9.38	7.26	9.23	624
Textiles	7,385.91	11.84	8.09	12.09	624
Yard Waste	4,182.93	6.70	1.23	12.26	624

TABLE 3.2
WEIGHT DATA SUMMARY BY CATEGORY
FOR THE RESIDENTIAL DATABASE

Category	Weight (Pounds)	Average (Pounds)	Median (Pounds)	Standard Deviation	No. of Samples
Cardboard	1,320.97	4.65	2.74	5.99	284
Office Paper	2,082.03	7.33	5.46	7.74	284
Newsprint	4,029.80	14.19	12.33	8.50	284
Magazines	2,955.07	10.41	9.56	6.40	284
Paperboard	3,947.13	13.90	13.75	3.95	284
Mixed Paper	23,314.90	31.62	30.52	9.54	284
PET #1	2,091.22	7.36	6.90	3.45	284
HDPE #2	1,230.26	4.33	4.05	2.01	284
#3 - #4 - #5 - #6 - #7	1,612.93	5.68	4.97	3.41	284
Film & Bags	4,566.95	16.08	15.44	5.46	284
Other Plastics	3,215.29	11.32	8.60	9.12	284
Clear Glass	2,218.75	7.81	7.31	3.93	284
Brown Glass	1,266.37	4.46	3.52	4.14	284
Green Glass	441.92	1.56	0.85	2.17	284
Blue Glass	23.63	0.08	0.00	0.44	284
Other Glass	143.47	0.51	0.05	0.96	284
Aluminum Cans	876.80	3.09	2.80	2.22	284
Tin Cans	1,246.97	4.39	4.09	2.09	284
Other Aluminum	237.32	0.84	0.63	0.74	284
Other Tin	106.85	0.38	0.23	0.55	284
Food Waste	11,361.31	40.00	38.31	14.64	284
Diapers	3,388.06	11.93	10.27	8.46	284
Textiles	4,148.18	14.61	11.05	12.95	284
Yard Waste	2,369.48	8.34	2.56	13.47	284

TABLE 3.3
WEIGHT DATA SUMMARY BY CATEGORY
FOR THE COMMERCIAL DATABASE

Category	Weight (Pounds)	Average (Pounds)	Median (Pounds)	Standard Deviation	No. of Samples
Cardboard	7,932.37	34.34	31.12	24.68	231
Office Paper	3,274.08	14.17	10.04	13.52	231
Newsprint	2,085.60	9.03	6.64	7.32	231
Magazines	1,629.18	7.05	5.42	6.79	231
Paperboard	2,370.91	10.26	9.56	5.09	231
Mixed Paper	9,067.77	39.25	37.50	15.32	231
PET #1	1,884.52	8.16	7.23	4.54	231
HDPE #2	722.35	3.13	2.54	2.63	231
#3 - #4 - #5 - #6 - #7	1,625.68	7.04	6.13	4.68	231
Film & Bags	4,100.06	17.75	16.89	7.12	231
Other Plastics	2,387.50	10.34	8.33	8.15	231
Clear Glass	911.00	3.94	3.14	3.37	231
Brown Glass	660.80	2.86	1.12	4.51	231
Green Glass	150.20	0.65	0.00	1.26	231
Blue Glass	10.59	0.05	0.00	0.20	231
Other Glass	59.90	0.26	0.00	0.75	231
Aluminum Cans	545.50	2.36	1.96	2.11	231
Tin Cans	656.57	2.84	1.86	3.47	231
Other Aluminum	156.18	0.68	0.34	0.86	231
Other Tin	126.23	0.55	0.05	2.77	231
Food Waste	8,724.49	37.77	32.74	25.20	231
Diapers	1,202.70	5.21	2.17	8.43	231
Textiles	1,943.26	8.41	4.36	10.47	231
Yard Waste	1,031.03	4.46	0.18	9.67	231

TABLE 3.4
WEIGHT DATA SUMMARY BY CATEGORY
FOR THE MIXED WASTE DATABASE

Category	Weight (Pounds)	Mean (Pounds)	Median (Pounds)	Standard Deviation	No. of Samples
Cardboard	2,610.86	23.95	23.46	19.88	109
Office Paper	1,092.71	10.02	6.74	9.17	109
Newsprint	1,205.99	11.06	9.40	7.74	109
Magazines	1,104.10	10.13	9.01	6.29	109
Paperboard	1,510.20	13.86	13.22	4.90	109
Mixed Paper	3,531.50	32.40	29.57	11.68	109
PET #1	1,101.07	10.10	8.69	6.16	109
HDPE #2	443.08	4.06	3.56	2.00	109
#3 - #4 - #5 - #6 - #7	712.79	6.54	4.95	5.14	109
Film & Bags	1,593.09	14.62	13.17	5.53	109
Other Plastics	944.21	8.66	7.65	5.13	109
Clear Glass	712.16	6.53	5.82	4.74	109
Brown Glass	509.02	4.67	2.65	5.97	109
Green Glass	99.86	0.92	0.00	1.69	109
Blue Glass	3.43	0.03	0.00	0.16	109
Other Glass	41.25	0.38	0.04	1.03	109
Aluminum Cans	350.07	3.21	2.83	2.49	109
Tin Cans	522.56	4.79	4.35	2.68	109
Other Aluminum	69.60	0.64	0.47	0.52	109
Other Tin	32.60	0.30	0.20	0.32	109
Food Waste	4,466.87	40.98	41.48	17.17	109
Diapers	1,259.52	11.56	9.47	9.64	109
Textiles	1,294.47	11.88	7.67	11.22	109
Yard Waste	782.42	7.18	1.79	13.18	109

3.1 INITIAL DATA ASSESSMENT

To determine the reason for this standard deviation anomaly, we reviewed each data set and discovered a sizeable number of samples where certain categories' weights were zero. That is, we examined all the data for each category, and we noted if the material was not present in a load, and as such the measured weight was zero. Once we identified those samples in each category where the measured weight was zero, we removed those sample weights from the databases and recalculated total weight, average weight, median, and standard deviation.

The results of the recalculation provided direction for our next step. When the zero weights were removed from the databases, the number of categories where the standard deviation was greater than the average decreased in all of the four databases. Table 3.5 presents the number categories in each of the four databases where the standard deviation was greater than the average when all samples were considered and when those samples with zero weights were removed. Table 3.6 through Table 3.9 present the recalculated total weight, average weight, median, and standard deviation for the waste-material categories in each of the four databases.

TABLE 3.5
NUMBER OF CATEGORIES WHERE THE
STANDARD DEVIATION IS GREATER THAN THE AVERAGE

Database	Number When All Samples Included	Number When Zero-Weight Samples Removed
Consolidated Data	10	5
Residential Waste Data	7	5
Commercial Waste Data	10	8
Mixed Waste Data	6	4
TOTAL NUMBER	33	22

As Table 3.5 indicates, when the zero-weight samples were removed, the number of categories where the standard deviation is greater than the average decreased by 11. Although this is a 33% reduction in the number of categories with standard deviations greater than the average, it is not a sufficient reduction and this circumstance indicates that the data requires further refinement.

TABLE 3.6
WEIGHT DATA SUMMARY FOR NON-ZERO SAMPLES
FOR THE CONSOLIDATED DATABASE

Category	Weight (Pounds)	Average (Pounds)	Median (Pounds)	Standard Deviation	Zero Weight Samples	Non-Zero Samples
Cardboard	11,864.20	19.39	9.59	22.31	12	612
Office Paper	6,448.82	10.78	7.24	10.92	26	598
Newsprint	7,321.39	11.83	10.16	8.24	5	619
Magazines	5,688.35	9.48	8.23	6.58	24	600
Paperboard	7,828.24	12.55	12.14	4.89	0	624
Mixed Paper	21,579.17	34.64	32.51	12.77	1	623
PET #1	5,076.81	8.15	7.53	4.52	1	623
HDPE #2	2,395.69	3.90	3.46	2.29	9	615
#3 - #4 - #5 - #6 - #7	3,951.40	6.38	5.40	4.26	5	619
Film & Bags	10,260.10	16.44	15.52	6.23	0	624
Other Plastics	6,547.00	10.49	8.32	8.23	0	624
Clear Glass	3,841.91	6.44	5.76	4.15	27	597
Brown Glass	2,436.19	4.82	3.52	4.79	119	505
Green Glass	691.98	2.29	1.62	2.08	322	302
Blue Glass	37.65	0.99	0.85	0.95	586	38
Other Glass	244.62	0.89	0.50	1.20	349	275
Aluminum Cans	1,772.37	2.84	2.46	2.26	0	624
Tin Cans	2,426.10	3.94	3.43	2.87	8	616
Other Aluminum	463.10	0.80	0.57	0.76	45	579
Other Tin	265.68	0.64	0.31	2.08	207	417
Food Waste	24,552.67	39.54	37.55	19.46	3	621
Diapers	5,850.28	10.75	8.50	9.10	80	544
Textiles	7,385.91	12.25	8.20	12.10	21	603
Yard Waste	4,182.93	10.56	5.28	14.00	228	396

TABLE 3.7
WEIGHT DATA SUMMARY FOR NON-ZERO SAMPLES
FOR THE RESIDENTIAL DATABASE

Category	Weight (Pounds)	Average (Pounds)	Median (Pounds)	Standard Deviation	Zero Weight Samples	Non-Zero Samples
Cardboard	1,320.97	4.84	2.94	6.04	11	273
Office Paper	2,082.03	7.65	5.62	7.75	12	272
Newsprint	4,029.80	14.24	12.43	8.47	1	283
Magazines	2,955.07	10.59	9.67	6.30	5	279
Paperboard	3,947.13	13.90	13.75	3.95	0	284
Mixed Paper	23,314.90	31.62	30.52	9.54	0	284
PET #1	2,091.22	7.39	6.91	3.43	1	283
HDPE #2	1,230.26	4.33	4.05	2.01	0	284
#3 - #4 - #5 - #6 - #7	1,612.93	5.72	4.99	3.39	2	282
Film & Bags	4,566.95	16.08	15.44	5.46	0	284
Other Plastics	3,215.29	11.32	8.60	9.12	0	284
Clear Glass	2,218.75	7.84	7.32	3.91	1	283
Brown Glass	1,266.37	4.83	3.84	4.10	22	262
Green Glass	441.92	2.65	1.86	2.26	117	167
Blue Glass	23.63	1.31	0.85	1.26	266	18
Other Glass	143.47	0.99	0.66	1.16	139	145
Aluminum Cans	876.80	3.09	2.80	2.22	0	284
Tin Cans	1,246.97	4.39	4.09	2.09	0	284
Other Aluminum	237.32	0.87	0.67	0.74	10	274
Other Tin	106.85	0.52	0.36	0.58	79	205
Food Waste	11,361.31	40.00	38.31	14.64	0	284
Diapers	3,388.06	12.28	10.57	8.33	8	276
Textiles	4,148.18	14.71	11.14	12.93	2	282
Yard Waste	2,369.48	11.85	6.44	14.71	84	200

TABLE 3.8
WEIGHT DATA SUMMARY FOR NON-ZERO SAMPLES
FOR THE COMMERCIAL DATABASE

Category	Weight (Pounds)	Average (Pounds)	Median (Pounds)	Standard Deviation	Zero Weight Samples	Non-Zero Samples
Cardboard	7,932.37	34.34	31.12	24.68	0	231
Office Paper	3,274.08	14.75	10.81	13.48	9	222
Newsprint	2,085.60	9.19	6.69	7.28	4	227
Magazines	1,629.18	7.65	6.15	6.74	18	213
Paperboard	2,370.91	10.26	9.56	5.09	0	231
Mixed Paper	9,067.77	39.43	37.51	15.14	1	230
PET #1	1,884.52	8.16	7.23	4.54	0	231
HDPE #2	722.35	3.25	2.66	2.60	9	222
#3 - #4 - #5 - #6 - #7	1,625.68	7.10	6.14	4.65	2	229
Film & Bags	4,100.06	17.75	16.89	7.12	0	231
Other Plastics	2,387.50	10.34	8.33	8.15	0	231
Clear Glass	911.00	4.32	3.33	3.29	20	211
Brown Glass	660.80	4.41	2.78	4.96	81	150
Green Glass	150.20	1.85	1.50	1.52	150	81
Blue Glass	10.59	0.81	0.96	0.36	218	13
Other Glass	59.90	0.80	0.49	1.14	156	75
Aluminum Cans	545.50	2.36	1.96	2.11	0	231
Tin Cans	656.57	2.94	1.87	3.49	8	223
Other Aluminum	156.18	0.78	0.43	0.88	32	199
Other Tin	126.23	1.03	0.26	3.75	109	122
Food Waste	8,724.49	38.27	33.78	24.99	3	228
Diapers	1,202.70	7.38	4.19	9.21	68	163
Textiles	1,943.26	9.08	5.05	10.59	17	214
Yard Waste	1,031.03	8.45	4.48	11.98	109	122

TABLE 3.9
WEIGHT DATA SUMMARY FOR NON-ZERO SAMPLES
FOR THE MIXED WASTE DATABASE

Category	Weight (Pounds)	Average (Pounds)	Median (Pounds)	Standard Deviation	Zero Weight Samples	Non-Zero Samples
Cardboard	2,610.86	24.17	23.49	19.84	1	108
Office Paper	1,092.71	10.51	7.04	9.11	5	104
Newsprint	1,205.99	11.06	9.40	7.74	0	109
Magazines	1,104.10	10.22	9.12	6.24	1	108
Paperboard	1,510.20	13.86	13.22	4.90	0	109
Mixed Paper	3,531.50	32.40	29.57	11.68	0	109
PET #1	1,101.07	10.10	8.69	6.16	0	109
HDPE #2	443.08	4.06	3.56	2.00	0	109
#3 - #4 - #5 - #6 - #7	712.79	6.60	4.97	5.12	1	108
Film & Bags	1,593.09	14.62	13.17	5.53	0	109
Other Plastics	944.21	8.66	7.65	5.13	0	109
Clear Glass	712.16	6.91	6.17	4.59	6	103
Brown Glass	509.02	5.47	3.54	6.11	16	93
Green Glass	99.86	1.85	1.33	2.02	55	54
Blue Glass	3.43	0.49	0.38	0.42	102	7
Other Glass	41.25	0.75	0.21	1.36	54	55
Aluminum Cans	350.07	3.21	2.83	2.49	0	109
Tin Cans	522.56	4.79	4.35	2.68	0	109
Other Aluminum	69.60	0.66	0.51	0.51	3	106
Other Tin	32.60	0.36	0.26	0.31	19	90
Food Waste	4,466.87	40.98	41.48	17.17	0	109
Diapers	1,259.52	12.00	9.72	9.55	4	105
Textiles	1,294.47	12.10	8.04	11.21	2	107
Yard Waste	782.42	10.57	4.68	14.85	35	74

3.2 OUTLIER ASSESSMENT

Because there were still a number of categories where the standard deviation was greater than the average, the next step in the process was to identify and remove the outliers. In order to identify any data points that could be classified as outliers, we applied the *Grubbs' Test for Outliers*. This test calculates the probability that a particular data point would have occurred in the sample, assuming that the data set was derived from a normal distribution. Utilizing the *Central Limit Theorem*, it is reasonable to assume the data resembles a normal distribution. This theorem states that with a random database (which has a finite average and standard deviation), the larger the database size becomes, the closer the database resembles a normal distribution. Since our database size is very large (624 samples), and the total size for each category is large (over 100 samples – excluding blue glass), after the zero-weight samples are removed, based on the central limit theorem, our data is normally distributed.

Having established normality for the databases, we can now apply the *Grubbs' Outlier Test*. First, for each data point in each category, the Z value is calculated, utilizing the following formula:

$$Z = |a - d| \div s$$

where:

Z = the Z value

a = sample category average (pounds)

d = sample weight for a specific sample (pounds)

s = sample category standard deviation (pounds)

This calculated Z value is then compared to a tabulated critical Z value, based on sample size. If the calculated Z value is larger than the tabulated critical Z value, then the data point associated with the calculated Z value has less than a 5% chance of occurring in the data. Any data point with less than a 5% chance of occurring in the data was removed from the data set, and the total weight, average weight, median, and standard deviation were recalculated for each category. Table 3.10 through Table 3.13 present the result of these recalculated total weights, average weights, medians, and standard deviations for the waste-material categories in each of the four databases.

Upon reviewing the results, we find that there are fewer categories where the standard deviation is greater than the average; and, additionally, for those categories where the standard deviation is greater than the average, the difference between the standard deviation and the average is further reduced.

TABLE 3.10
WEIGHT DATA SUMMARY FOR NON-ZERO SAMPLES
WITH NO OUTLIERS FOR THE CONSOLIDATED DATABASE

Category	Weight (Pounds)	Average (Pounds)	Median (Pounds)	Standard Deviation	Zero Weight Samples	Outliers	New Sample Size
Cardboard	11,197.16	18.45	9.32	19.75	12	5	607
Office Paper	5,979.07	10.12	7.18	9.01	26	7	591
Newsprint	7,077.52	11.53	10.08	7.57	5	5	614
Magazines	5,560.13	9.31	8.21	6.15	24	3	597
Paperboard	7,710.01	12.42	12.10	4.51	0	3	621
Mixed Paper	21,374.86	34.42	32.48	12.18	1	2	621
PET #1	4,911.36	7.95	7.51	3.82	1	5	618
HDPE #2	2,357.72	3.85	3.45	2.12	9	2	613
#3 - #4 - #5 - #6 - #7	3,822.62	6.22	5.38	3.70	5	4	615
Film & Bags	10,203.35	16.38	15.51	6.02	0	1	623
Other Plastics	6,067.56	9.87	8.21	6.37	0	9	615
Clear Glass	3,739.78	6.31	5.73	3.85	27	4	593
Brown Glass	2,293.82	4.59	3.47	4.16	119	5	500
Green Glass	645.02	2.16	1.57	1.77	322	4	298
Blue Glass	33.17	0.90	0.79	0.76	586	1	37
Other Glass	221.64	0.81	0.50	0.97	349	3	272
Aluminum Cans	1,683.83	2.72	2.46	1.56	0	4	620
Tin Cans	2,308.72	3.78	3.39	2.39	8	6	610
Other Aluminum	428.38	0.75	0.57	0.64	45	8	571
Other Tin	208.01	0.50	0.31	0.59	207	2	415
Food Waste	24,171.77	39.11	37.52	18.53	3	3	618
Diapers	5,630.15	10.43	8.30	8.29	80	4	540
Textiles	6,953.24	11.65	8.16	10.54	21	6	597
Yard Waste	3,704.54	9.50	5.05	11.08	228	6	390

TABLE 3.11
WEIGHT DATA SUMMARY FOR NON-ZERO SAMPLES
WITH NO OUTLIERS FOR THE RESIDENTIAL DATABASE

Category	Weight (Pounds)	Average (Pounds)	Median (Pounds)	Standard Deviation	Zero Weight Samples	Outliers	New Sample Size
Cardboard	1,137.00	4.24	2.83	4.14	11	5	268
Office Paper	1,954.13	7.24	5.62	5.99	12	2	270
Newsprint	3,881.32	13.86	12.21	7.68	1	3	280
Magazines	2,912.46	10.48	9.65	6.01	5	1	278
Paperboard	3,882.25	13.77	13.68	3.64	0	2	282
Mixed Paper	8,979.90	31.62	30.52	9.54	0	0	284
PET #1	2,033.31	7.24	6.88	2.92	1	2	281
HDPE #2	1,205.14	4.27	4.03	1.89	0	2	282
#3 - #4 - #5 - #6 - #7	1,579.67	5.62	4.97	2.97	2	1	281
Film & Bags	4,566.95	16.08	15.44	5.46	0	0	284
Other Plastics	2,941.85	10.54	8.58	7.02	0	5	279
Clear Glass	2,166.65	7.71	7.29	3.61	1	2	281
Brown Glass	1,216.03	4.68	3.80	3.70	22	2	260
Green Glass	429.51	2.59	1.84	2.14	117	1	166
Blue Glass	23.63	1.31	0.85	1.26	266	0	18
Other Glass	125.75	0.89	0.58	0.91	139	3	142
Aluminum Cans	847.23	2.99	2.78	1.57	0	1	283
Tin Cans	1,216.27	4.31	4.07	1.87	0	2	282
Other Aluminum	215.64	0.80	0.66	0.57	10	5	269
Other Tin	95.37	0.47	0.35	0.41	79	3	202
Food Waste	11,255.62	39.77	38.25	14.14	0	1	283
Diapers	3,293.95	12.02	10.50	7.81	8	2	274
Textiles	3,786.37	13.67	10.83	10.42	2	5	277
Yard Waste	2,120.93	10.77	6.12	11.83	84	3	197

TABLE 3.12
WEIGHT DATA SUMMARY FOR NON-ZERO SAMPLES
WITH NO OUTLIERS FOR THE COMMERCIAL DATABASE

Category	Weight (Pounds)	Average (Pounds)	Median (Pounds)	Standard Deviation	Zero Weight Samples	Outliers	New Sample Size
Cardboard	7,617.18	33.26	30.98	21.90	0	2	229
Office Paper	3,048.05	13.92	10.40	11.51	9	3	222
Newsprint	2,013.94	8.95	6.65	6.87	4	2	227
Magazines	1,543.57	7.32	6.12	5.81	18	2	213
Paperboard	2,325.64	10.11	9.51	4.54	0	1	231
Mixed Paper	8,955.63	39.11	37.50	14.38	1	1	230
PET #1	1,831.68	8.00	7.23	4.22	0	2	231
HDPE #2	684.38	3.11	2.63	2.12	9	2	222
#3 - #4 - #5 - #6 - #7	1,593.13	6.99	6.14	4.35	2	1	229
Film & Bags	4,043.31	17.58	16.88	6.65	0	1	231
Other Plastics	2,181.50	9.61	8.24	5.97	0	4	231
Clear Glass	892.81	4.25	3.32	3.16	20	1	211
Brown Glass	567.86	3.89	2.69	3.89	81	3	150
Green Glass	150.20	1.85	1.50	1.52	150	0	81
Blue Glass	10.59	0.81	0.96	0.36	218	0	13
Other Glass	47.40	0.65	0.48	0.65	156	2	75
Aluminum Cans	518.48	2.25	1.95	1.34	0	1	231
Tin Cans	572.16	2.61	1.87	2.42	8	4	223
Other Aluminum	147.06	0.75	0.42	0.80	32	2	199
Other Tin	68.56	0.57	0.25	0.73	109	2	122
Food Waste	8,591.29	37.85	33.09	24.23	3	1	228
Diapers	1,048.99	6.56	4.14	6.99	68	3	163
Textiles	1,872.40	8.79	4.91	9.73	17	1	214
Yard Waste	894.08	7.45	4.39	9.06	109	2	122

TABLE 3.13
WEIGHT DATA SUMMARY FOR NON-ZERO SAMPLES
WITH NO OUTLIERS FOR THE MIXED WASTE DATABASE

Category	Weight (Pounds)	Average (Pounds)	Median (Pounds)	Standard Deviation	Zero Weight Samples	Outliers	New Sample Size
Cardboard	2,510.90	23.47	23.46	18.51	1	1	107
Office Paper	1,036.95	10.07	7.02	7.97	5	1	103
Newsprint	1,156.07	10.70	9.20	6.79	0	1	108
Magazines	1,070.33	10.00	9.01	5.83	1	1	107
Paperboard	1,471.96	13.63	13.14	4.32	0	1	108
Mixed Paper	3,531.50	32.40	29.57	11.68	0	0	109
PET #1	1,046.37	9.69	8.69	4.42	0	1	108
HDPE #2	420.78	3.93	3.56	1.77	0	2	107
#3 - #4 - #5 - #6 - #7	672.97	6.29	4.95	3.99	1	1	107
Film & Bags	1,555.71	14.40	13.12	5.10	0	1	108
Other Plastics	907.52	8.40	7.55	4.38	0	1	108
Clear Glass	662.13	6.56	5.99	3.84	6	2	101
Brown Glass	442.49	4.86	3.52	4.54	16	2	91
Green Glass	86.28	1.63	1.32	1.20	55	1	53
Blue Glass	3.43	0.49	0.38	0.42	102	0	7
Other Glass	33.46	0.62	0.21	0.96	54	1	54
Aluminum Cans	318.12	2.97	2.72	1.74	0	2	107
Tin Cans	506.26	4.69	4.25	2.45	0	1	108
Other Aluminum	67.31	0.64	0.50	0.49	3	0	106
Other Tin	31.17	0.35	0.26	0.29	19	1	89
Food Waste	4,466.87	40.98	41.48	17.17	0	0	109
Diapers	1,198.77	11.53	9.66	8.30	4	1	104
Textiles	1,242.93	11.73	7.86	10.57	2	1	106
Yard Waste	632.98	8.79	4.44	10.27	35	2	72

3.3 CONFIDENCE INTERVAL

The final step in this analysis process was to calculate the 90% confidence interval for each material category. The equation we utilized for this was the *Standard 90% Confidence Interval Calculation*:

$$a \pm [(1.645)(s \div \sqrt{n})]$$

where:

a = category average (pounds)

s = category standard deviation (pounds)

n = number of data points in the category

The 90% confidence interval is defined as the range in which we expect the calculated sample average, of a sample size n, to fall within, 90% of the time while 10% of the time it will not.

Once we determined the 90% confidence interval for all categories, the weighted averages for each material category in each database was calculated. To accomplish this, we calculated the total weight of the loads selected for sampling for the four databases: consolidated waste, residential waste, commercial waste, and mixed waste. From this information, we then calculated what percent of the total weight of the loads that comprised the consolidated database were residential, commercial, and mixed; resulting in the variables W^1, W^2, W^3 (see equation below). Using these numbers, we then calculated the weighted average for each material category. This was accomplished with the following equation:

$$[(W^1)(R)] + [(W^2)(C)] + [(W^3)(M)]$$

where:

W^1 = percentage of the total weight of the loads that contained residential waste

W^2 = percentage of the total weight of the loads that contained commercial waste

W^3 = percentage of the total weight of the loads that contained mixed waste

R = category average weight for residential loads (pounds)

C = category average weight for commercial loads (pounds)

M = category average weight for mixed loads (pounds)

This calculation provides us with a more accurate expected weight for each category in the consolidated database.

Finally, we converted the calculated average weights into percentages. This was accomplished by dividing the average weight for each material category by the average database size. The confidence interval ranges were also converted into percentage points, to provide us a percentage range for each material category. Table 3.14 presents this confidence interval and weighted average information.

The results presented in Table 3.14 indicate several things. For each material category, we now know a range in which, 90% of the time, we can expect the average to lie. For example, with the office paper category, we know that 90% of the time the average weight will lie in the range of 9.61 pounds to 11.05 pounds. This is calculated by taking the average (10.33 pounds) and subtracting the confidence interval range (0.72 pounds) to find the lower number, and adding the confidence interval range (0.72 pounds) to the average (10.33 pounds) to obtain the higher number. This confidence interval indicates that the office paper category is in the range of 4.18% to 4.80% of the entire waste stream, by weight. The lower percentage was obtained by subtracting the confidence interval in terms of percentage points (0.31%) from the average percentage of the entire waste stream, by weight, for office paper (4.49%). The higher percentage was calculated by taking the average percentage and adding the confidence interval (0.31%).

The confidence interval ranges for the consolidated data, as presented in Table 3.14, are also very small; the variance in every category is less than 1%. This supports the validity of the data. This same observation holds true for residential waste database, commercial waste database, and mixed waste database, with the exception of cardboard category, total paper fibers component, and food category in the commercial waste database and the mixed waste database.

Another interesting aspect of these results is the weighted average calculation. This number describes how much of a particular category would be expected in any random sample, regardless of type of load, for the overall waste stream. It is interesting to note that these weighted averages are close to the non-weighted averages we calculated. This demonstrates that the samples were representative of the total waste stream, and not skewed towards any of residential, commercial, or mixed loads.

The data presented in this analysis is for the statewide waste stream. Each facility has its own waste stream with its own unique characteristics. More than 30 loads were sampled at the Omaha, Lincoln, Norfolk, Lexington, Sidney, Chadron, and Hastings facilities. This is a sufficient number of samples to justify the 90% confidence intervals at each of these sites. The only site that may require more data to properly identify the characteristics of its waste stream is Valentine. However, whereas at the other seven sites only a small percentage of the loads delivered to the facility during the field sorting activities were selected for sampling, the majority of the loads (all except one load) of waste delivered to the Valentine facility during the field sorting activities was selected for sampling. So, while the number of loads sampled at the Valentine Landfill is small (nine total), the percentage of the total waste stream that was selected for sampling is very high (90%). As a consequence, the data obtained at this facility is still valid.

TABLE 3.14
CONFIDENCE INTERVAL AND WEIGHTED AVERAGE DATA
FOR THE CONSOLIDATED DATABASE

Category/Component	Average (Pounds)	90% Confidence Interval	% of Waste Stream	+/-	Weighted Average in Total Waste Stream	Weighted % of Total Waste Stream
Cardboard	19.01	1.47	8.26%	0.64%	18.12	8.00%
Office Paper	10.33	0.72	4.49%	0.31%	10.19	4.50%
Newsprint	11.73	0.55	5.10%	0.24%	11.88	5.24%
Magazines	9.12	0.44	3.96%	0.19%	9.15	4.04%
Paperboard	12.55	0.32	5.45%	0.14%	12.56	5.54%
Mixed Paper	34.58	0.84	15.03%	0.37%	34.49	15.22%
TOTAL PAPER FIBERS	97.32	1.91	42.30%	0.83%	96.39	42.53%
PET #1	8.14	0.30	3.54%	0.13%	8.04	3.55%
HDPE #2	3.84	0.15	1.67%	0.07%	3.86	1.70%
#3 - #4 - #5 - #6 - #7	6.33	0.28	2.75%	0.12%	6.29	2.78%
Film & Bags	16.44	0.41	7.15%	0.18%	14.31	6.31%
Other Plastics	10.49	0.54	4.56%	0.24%	10.59	4.67%
TOTAL PLASTICS	45.24	0.80	19.67%	0.35%	43.09	19.01%
Clear Glass	6.16	0.28	2.68%	0.12%	6.23	2.75%
Brown Glass	3.90	0.31	1.70%	0.13%	3.91	1.73%
Green Glass	1.11	0.12	0.48%	0.05%	1.14	0.50%
Blue Glass	0.06	0.02	0.03%	0.01%	0.06	0.03%
Other Glass	0.39	0.06	0.17%	0.03%	0.4	0.18%
TOTAL GLASS	11.62	0.53	5.05%	0.23%	11.74	5.18%
Aluminum Cans	2.84	0.15	1.23%	0.06%	2.84	1.25%
Tin Cans	3.89	0.19	1.69%	0.08%	3.88	1.71%
Other Aluminum	0.74	0.05	0.32%	0.02%	0.75	0.33%
Other Tin	0.43	0.11	0.19%	0.05%	0.43	0.19%
TOTAL METALS	8.60	0.33	3.74%	0.14%	7.9	3.49%
Food Waste	39.35	1.29	17.10%	0.56%	39.33	17.35%
Diapers	9.38	0.61	4.08%	0.26%	9.44	4.17%
Textiles	11.84	0.80	5.15%	0.35%	11.98	5.29%
Yard Waste	6.70	0.81	2.91%	0.35%	6.77	2.99%

TABLE 3.15
CONFIDENCE INTERVAL FOR THE RESIDENTIAL DATABASE

Category	Average (Pounds)	90% Confidence Interval	% of Residential Waste Stream	+/-
Cardboard	4.65	0.58	2.06%	0.21%
Office Paper	7.33	0.76	3.25%	0.27%
Newsprint	14.19	0.83	6.29%	0.29%
Magazines	10.41	0.62	4.61%	0.22%
Paperboard	13.90	0.39	6.16%	0.14%
Mixed Paper	31.62	0.93	14.02%	0.33%
TOTAL PAPER FIBERS	82.09	1.77	36.40%	0.62%
PET #1	7.36	0.34	3.27%	0.12%
HDPE #2	4.33	0.20	1.92%	0.07%
#3 - #4 - #5 - #6 - #7	5.68	0.33	2.52%	0.12%
Film & Bags	16.08	0.53	7.13%	0.19%
Other Plastics	11.32	0.89	5.02%	0.31%
TOTAL PLASTICS	44.78	1.07	19.86%	0.38%
Clear Glass	7.81	0.38	3.46%	0.14%
Brown Glass	4.46	0.40	1.98%	0.14%
Green Glass	1.56	0.21	0.69%	0.07%
Blue Glass	0.08	0.04	0.04%	0.02%
Other Glass	0.51	0.09	0.22%	0.03%
TOTAL GLASS	14.42	0.66	6.39%	0.23%
Aluminum Cans	3.09	0.22	1.37%	0.08%
Tin Cans	4.39	0.20	1.95%	0.07%
Other Aluminum	0.84	0.07	0.37%	0.03%
Other Tin	0.38	0.05	0.17%	0.02%
TOTAL METALS	9.35	0.34	4.14%	0.12%
Food Waste	40.00	1.43	17.74%	0.50%
Diapers	11.93	0.83	5.29%	0.29%
Textiles	14.61	1.26	6.48%	0.45%
Yard Waste	8.34	1.32	3.70%	0.46%

TABLE 3.16
CONFIDENCE INTERVAL FOR THE COMMERCIAL DATABASE

Category	Average (Pounds)	90% Confidence Interval	% of Commercial Waste Stream	+/-
Cardboard	34.34	2.67	14.84%	1.15%
Office Paper	14.17	1.46	6.12%	0.63%
Newsprint	9.03	0.79	3.90%	0.34%
Magazines	7.05	0.73	3.05%	0.32%
Paperboard	10.26	0.55	4.43%	0.24%
Mixed Paper	39.25	1.66	16.96%	0.72%
TOTAL PAPER FIBERS	114.11	3.32	49.31%	1.44%
PET #1	8.16	0.49	3.53%	0.21%
HDPE #2	3.13	0.28	1.35%	0.12%
#3 - #4 - #5 - #6 - #7	7.04	0.51	3.04%	0.22%
Film & Bags	17.75	0.77	7.67%	0.33%
Other Plastics	10.34	0.88	4.47%	0.38%
TOTAL PLASTICS	46.41	1.39	20.05%	0.60%
Clear Glass	3.94	0.37	1.70%	0.16%
Brown Glass	2.86	0.49	1.24%	0.21%
Green Glass	0.65	0.14	0.28%	0.06%
Blue Glass	0.05	0.02	0.02%	0.01%
Other Glass	0.26	0.08	0.11%	0.03%
TOTAL GLASS	7.76	0.79	3.35%	0.34%
Aluminum Cans	2.36	0.23	1.02%	0.10%
Tin Cans	2.84	0.38	1.23%	0.16%
Other Aluminum	0.68	0.09	0.29%	0.04%
Other Tin	0.55	0.30	0.24%	0.13%
TOTAL METALS	7.30	0.70	3.15%	0.30%
Food Waste	37.77	2.73	16.32%	1.18%
Diapers	5.21	0.91	2.25%	0.39%
Textiles	8.41	1.13	3.63%	0.49%
Yard Waste	4.46	1.05	1.93%	0.45%

TABLE 3.17
CONFIDENCE INTERVAL FOR THE MIXED WASTE DATABASE

Category	Average (Pounds)	90% Confidence Interval	% of Mixed Waste Stream	+/-
Cardboard	23.95	3.13	10.02%	1.31%
Office Paper	10.02	1.44	4.20%	0.60%
Newsprint	11.06	1.22	4.63%	0.51%
Magazines	10.13	0.99	4.24%	0.41%
Paperboard	13.86	0.77	5.80%	0.32%
Mixed Paper	32.40	1.84	13.56%	0.77%
TOTAL PAPER FIBERS	101.43	4.38	42.45%	1.83%
PET #1	10.10	0.97	4.23%	0.41%
HDPE #2	4.06	0.32	1.70%	0.13%
#3 - #4 - #5 - #6 - #7	6.54	0.81	2.74%	0.34%
Film & Bags	14.62	0.87	6.12%	0.36%
Other Plastics	8.66	0.81	3.63%	0.34%
TOTAL PLASTICS	43.98	2.07	18.41%	0.87%
Clear Glass	6.53	0.75	2.73%	0.31%
Brown Glass	4.67	0.94	1.95%	0.39%
Green Glass	0.92	0.27	0.38%	0.11%
Blue Glass	0.03	0.02	0.01%	0.01%
Other Glass	0.38	0.16	0.16%	0.07%
TOTAL GLASS	12.53	1.45	5.24%	0.61%
Aluminum Cans	3.21	0.39	1.34%	0.16%
Tin Cans	4.79	0.42	2.01%	0.18%
Other Aluminum	0.64	0.08	0.27%	0.03%
Other Tin	0.30	0.05	0.13%	0.02%
TOTAL METALS	9.43	0.59	3.95%	0.25%
Food Waste	40.98	2.70	17.15%	1.13%
Diapers	11.56	1.52	4.84%	0.64%
Textiles	11.88	1.77	4.97%	0.74%
Yard Waste	7.18	2.08	3.00%	0.87%

3.4 SUMMARY

The statistical analysis provided in the previous sections indicates the database is statistically sound and it meets the 90% confidence interval. The step-by-step process utilized, identified those waste categories with unique anomalies that were addressed through additional analysis and assessment. The key results of this analysis are that the data is normally distributed, represents a true representation of the waste stream, and is statistically valid. Further, this analysis proves that the data meets the confidence interval required.

4. STATEWIDE WASTE STREAM

The State of Nebraska is located in the midwestern portion of the contiguous United States. Wyoming lies directly west of Nebraska, while Iowa and Missouri lie directly east. Colorado sits south of the panhandle of Nebraska, and west of the southern part of the state. South Dakota is to the north and Kansas lies to the south.

The major interstate freeway in Nebraska is I-80, traversing the state from east to west, connecting with Wyoming and Iowa. The Missouri River delineates the eastern border with Iowa and Missouri, and a small portion of the northern border with South Dakota.

The largest metropolitan area in Nebraska is Omaha, which is located near the Iowa border in the southeastern portion of the state. The Omaha metropolitan area lies within Douglas County, Sarpy County, Cass County, Saunders County, and Washington County. The state capitol is Lincoln, which is located in Lancaster County and southwest of Omaha along I-80.

According to 2006 U.S. Census Bureau information, Nebraska's estimated population totals 1,768,331 and the state encompasses a total land area of 76,872.41 square miles. The most populous county in Nebraska is Douglas County, with an estimated population of 492,003. Lancaster County is the second most populous county, while Cherry County in the far north-central portion of the state encompasses the most land area.

Four seasonal field sorting events were undertaken at eight selected facilities located throughout the state. The Fall 2007 field sorting event occurred during September and October 2007; the Winter 2008 field sorting event was undertaken during January and February 2008; the Spring 2008 field sorting event occurred during April and May 2008; and the Summer 2008 field sorting event occurred during July and August 2008. Both publicly- and privately-owned and operated landfills and transfer stations hosted the seasonal field sorting events.

A total of 624 samples were collected during 80 days of sorting. Detailed data for every sample was compiled throughout the four seasonal field sorting events. For example, the weights of the materials found in each sample were recorded, items sighted during the visual inspection (see Section 7) were quantified and noted, and sample specifics like the type of waste, county of origin, etc. were also noted. Each sample's weight data was then used to compute each material's corresponding volume (see Section 2.4). This weight and volume data along with each sample's specifics were then compiled into a two-page sample summary.

The sample summaries for every sample captured and sorted along with the visual inspection summaries are presented in the appendices of this report. Appendices A through H contain this data – segregated by season – for each of the eight participating facilities (refer to Table 1.2 or the *Table of Contents* for a listing of each facility and its corresponding appendix).

4.1 FIELD SORTING EVENT CONDITIONS

The following narrative provides a brief synopsis of the varying weather conditions encountered while undertaking the field sorting activities for this study. As may be expected, winter weather conditions were the most challenging.

Fall 2007 **-** Weather conditions encountered during the Fall 2007 did not significantly impact field activities. However, weather conditions did cause some delays, at the landfill site near Omaha (Pheasant Point Landfill) and the landfill site near Lincoln (Bluff Road Landfill). Set up was delayed one day in Omaha because the site was very muddy from heavy overnight rains. Field activities were suspended one day while at the landfill site near Lincoln because of heavy rain and windy conditions. Other than these two delays, weather conditions encountered throughout this field sorting event did not cause any adverse impacts.

Winter 2008 **–** The weather conditions encountered during the Winter 2008 field sorting event presented many challenges. Throughout January and February 2008, Nebraska experienced bitterly cold temperatures and major snow events. In fact, it was one of the coldest and wettest winters the state has experienced in many decades. The cold temperatures caused the most challenges and often adversely impacted the team's ability to capture samples and conduct sorting activities. There were occasions when dangerously cold temperatures and wind chills forced the team to abandon field sorting activities until weather conditions improved. Adverse impacts – ranging from not having a load to sample because the delivery vehicles were slow to start or would not start in the extremely cold temperatures to having to wait to sort a captured sample because it was too cold and the sort team's scales would not properly operate – were even encountered at those sites where sorting activities were conducted inside a building and out of the elements.

The Winter 2008 field sorting event was scheduled to begin on Tuesday, January 8, 2008 and conclude on Friday, February 8, 2008. Although field sorting activities did commence on Tuesday, January 8, 2008, the final day of sorting activities was not undertaken until Friday, February 29, 2008.

Field sorting activities originally scheduled for Monday, January 14 through Friday, January 18, 2008, at the Pheasant Point Landfill near Omaha were abandoned after Tuesday, January 15 as a major winter storm with bitterly cold temperatures moved into the region. In an effort to maintain the remaining schedule of activities, it was decided that the team would complete the rest of the field sorting activities at the remaining seven facilities and would then return to the Pheasant Point Landfill. Upon returning to the Pheasant Point Landfill, the region was again experiencing bitterly cold temperatures with dangerous wind chills. Consequently, activities at the site were again abandoned and re-scheduled.

Spring 2008 – The weather conditions encountered during the Spring 2008 field sorting event did not present as many challenges as the sort team encountered during the Winter 2008 field sorting event. However, weather conditions did cause some delays, particularly at the landfill site near Omaha. On two different days, field sorting activities at this site were suspended in the early afternoon hours because of severe thunderstorms and/or gusting winds. One day of sorting at this site was completely cancelled because of wet conditions.

Summer 2008 – The weather conditions encountered during the Summer 2008 field sorting event varied from warm and dry to hot and humid. Although crew members were uncomfortable at times, there were no delays to the project.

4.2 RELATIONSHIP AMONG STUDY SITES

When the results of the waste characterization study data were analyzed, differences among the eight participating facilities became apparent. The tables and charts provided on the following pages present the statewide distribution of eight major waste-material components by facility. When the data is further analyzed, there is a clear distinction among facilities based on their size. Consequently, for purposes of this study, the eight participating facilities were grouped into one of four designations – large urban, small urban, large rural, or small rural.

Table 4.1 lists the eight participating facilities and their designation. The large urban facilities include the: (1) Pheasant Point Landfill near Omaha and (2) Bluff Road Landfill in Lincoln. The facilities designated as small urban include the: (1) Norfolk Area Transfer Station, (2) Lexington Landfill, and (3) Hastings Landfill. The large rural designation includes the: (1) Sidney Landfill and (2) Chadron Transfer Station. Finally, only one of the selected facilities is designated as small rural – the Valentine Landfill. Table 4.2 through Table 4.9 presents each facility's contribution to the four waste-material components (paper fibers, plastics, glass, and metals) and the four major other waste categories (food, diapers, textiles/leather/rubber, and yard waste).

There are a number of reasons this delineation and grouping of facilities is important. It allows a better correlation among the facilities and it also allows an easier focus on facilities based on size, types of waste, and generating sector. Further, potential approaches to waste reduction can be more easily applied to comparably-sized facilities. This size delineation also affords a better focus on issues that may be particular to a facility's size, which can result in implementing a more effective approach to solid waste management.

TABLE 4.1
SOLID WASTE FACILITIES GROUPED BY DESIGNATION

LARGE URBAN FACILITIES	
	Pheasant Point Landfill – Omaha
	Bluff Road Landfill – Lincoln
SMALL URBAN FACILITIES	
	Norfolk Area Transfer Station
	Lexington Landfill
	Hastings Landfill
LARGE RURAL FACILITIES	
	Sidney Landfill
	Chadron Transfer Station
SMALL RURAL FACILITIES	
	Valentine Landfill

TABLE 4.2
STATEWIDE SUMMARY OF THE
PAPER FIBERS COMPONENT BY WEIGHT

Facility	Paper Fibers Component (in pounds)	Percentage of Waste Stream at that Facility	Contribution to the Statewide Waste Stream
Pheasant Point Landfill – Omaha	19,552.79	40.21%	32.20%
Bluff Road Landfill – Lincoln	17,240.06	44.11%	28.39%
Norfolk Area Transfer Station	6,465.51	44.12%	10.65%
Lexington Landfill	4,990.50	37.57%	8.22%
Hastings Landfill	4,967.05	39.49%	8.18%
Sidney Landfill	3,668.90	40.35%	6.04%
Chadron Transfer Station	3,187.16	39.24%	5.25%
Valentine Landfill	658.20	30.88%	1.08%
PAPER FIBERS COMPONENT STATEWIDE TOTAL	**60,730.17**	**41.15%**	**100.00%**

By facility, the paper fibers component was most abundant at the Norfolk Area Transfer Station, where it comprised 44.12% of the waste stream, by weight, and at the Bluff Road Landfill in Lincoln, where it comprised at 44.11% of waste stream, by weight. The paper fibers component was least abundant at the Valentine Landfill, where it comprised 30.88% of the waste stream, by weight. The paper fibers component comprised between 40% and 44% of the waste stream (by weight) at the large urban facilities. The small urban facilities experienced the greatest variance in their paper fibers component percentages; varying from 44.12% to 39.49%, by weight. The paper fibers component at the large rural facilities was near, or just above, 40%, by weight. Among all facilities, the paper fibers component, by weight, varied by a maximum of 13.24%. Chart 4.1 presents a graphic representation of each facility's contribution to the paper fibers component. Chart 4.2 presents a graphic representation of the paper fibers component at each facility and statewide.

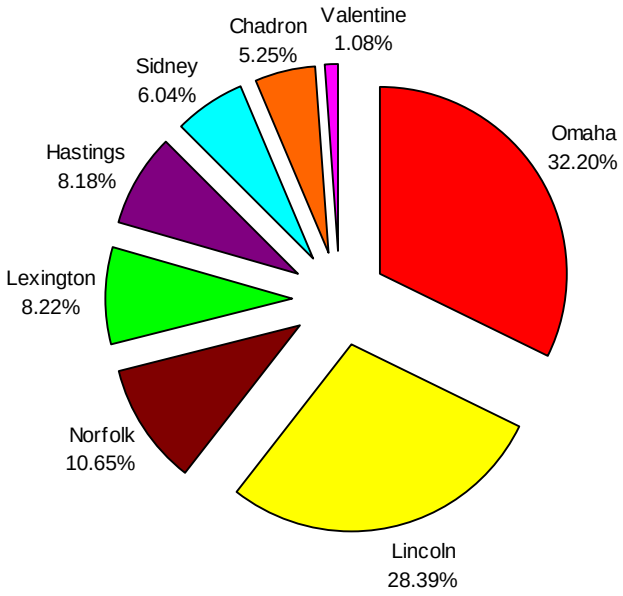


CHART 4.1
CONTRIBUTION OF EACH FACILITY TO THE PAPER FIBERS COMPONENT

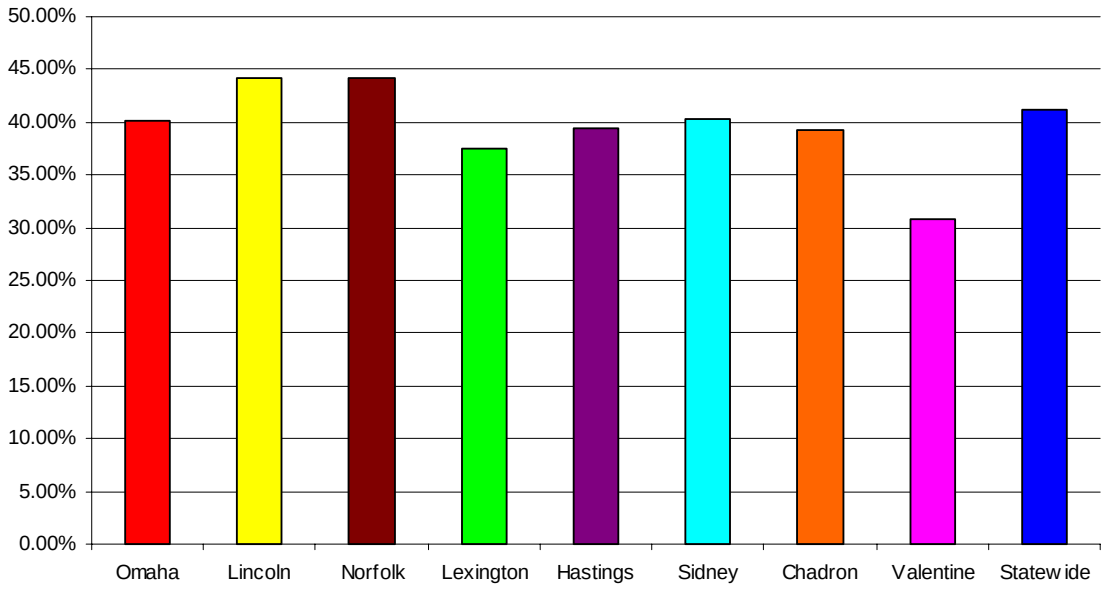


CHART 4.2
PERCENTAGE OF THE WASTE STREAM COMPRISED OF THE PAPER FIBERS COMPONENT AT EACH FACILITY AND STATEWIDE

TABLE 4.3
STATEWIDE SUMMARY OF THE
PLASTICS COMPONENT BY WEIGHT

Facility	Plastics Component (in pounds)	Percentage of Waste Stream at that Facility	Contribution to the Statewide Waste Stream
Pheasant Point Landfill – Omaha	9,707.87	19.96%	34.39%
Bluff Road Landfill – Lincoln	7,611.20	19.47%	26.96%
Norfolk Area Transfer Station	2,989.07	20.40%	10.59%
Lexington Landfill	2,477.08	18.65%	8.77%
Hastings Landfill	2,136.46	16.99%	7.57%
Sidney Landfill	1,615.59	17.77%	5.72%
Chadron Transfer Station	1,255.35	15.45%	4.45%
Valentine Landfill	438.38	20.56%	1.55%
PLASTICS COMPONENT STATEWIDE TOTAL	**28,231.00**	**19.13%**	**100.00%**

By facility, the plastics component was most abundant at the Valentine Landfill, where it comprised 20.56% of the waste stream, by weight, and at the Norfolk Area Transfer Station, where it comprised at 20.40% of waste stream, by weight. The plastics component was least abundant at the Chadron Transfer Station, where it comprised 15.45% of the waste stream, by weight. The plastics component comprised slightly less than 20% of the waste stream (by weight) at the large urban facilities, and the two facilities' plastics components were within 0.50% of each other. The small urban facilities experienced the greatest variance in their plastics component percentages; varying from 20.40% to 16.99%, by weight. The plastics components at the two large rural facilities were within 2.5% of each other. Among all facilities, the plastics component, by weight, varied by a maximum of 5.11%. Chart 4.3 presents a graphic representation of each facility's contribution to the plastics component. Chart 4.4 presents a graphic representation of the plastics component at each facility and statewide.

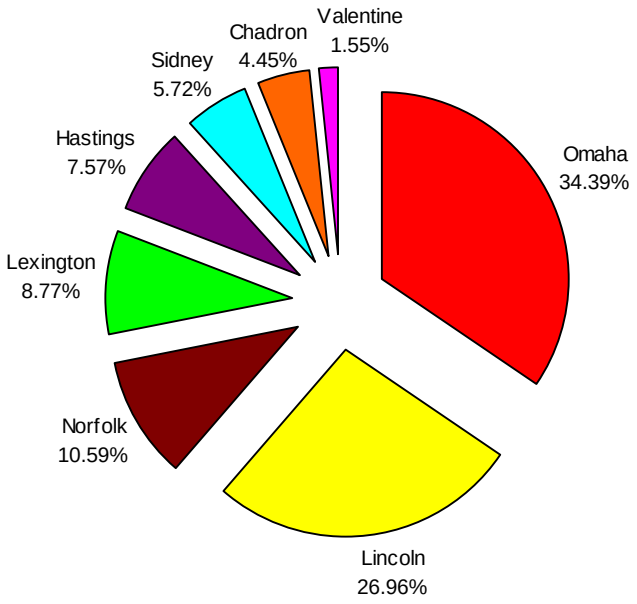


CHART 4.3
CONTRIBUTION OF EACH FACILITY TO THE PLASTICS COMPONENT

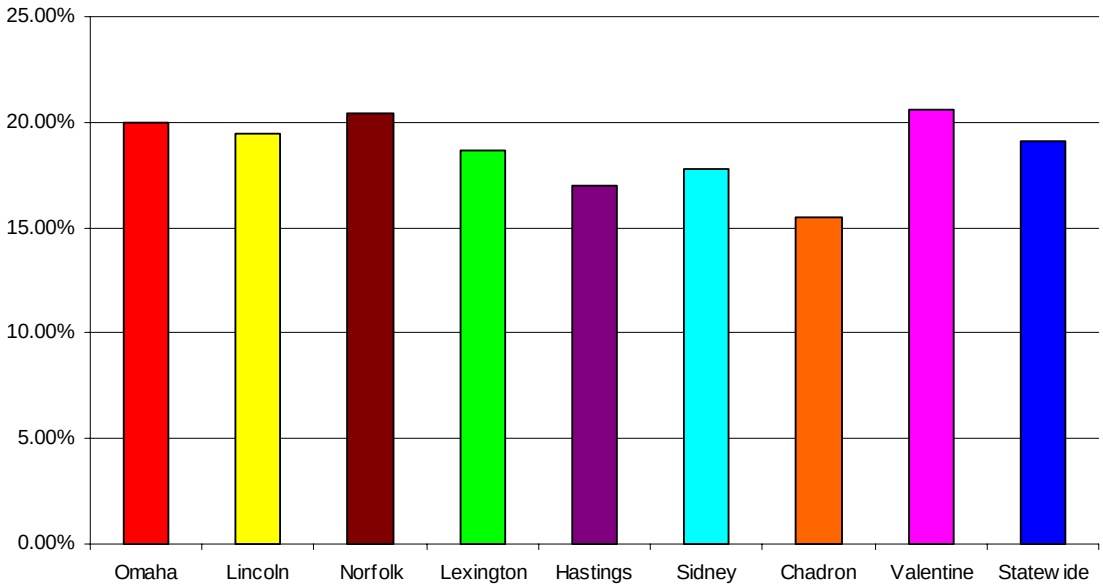


CHART 4.4
PERCENTAGE OF THE WASTE STREAM COMPRISED OF THE PLASTICS COMPONENT AT EACH FACILITY AND STATEWIDE

TABLE 4.4
STATEWIDE SUMMARY OF THE
GLASS COMPONENT BY WEIGHT

Facility	Glass Component (in pounds)	Percentage of Waste Stream at that Facility	Contribution to the Statewide Waste Stream
Pheasant Point Landfill – Omaha	2,409.66	4.96%	33.22%
Bluff Road Landfill – Lincoln	1,633.69	4.18%	22.53%
Norfolk Area Transfer Station	582.87	3.98%	8.04%
Lexington Landfill	752.77	5.66%	10.38%
Hastings Landfill	631.49	5.02%	8.71%
Sidney Landfill	550.62	6.06%	7.59%
Chadron Transfer Station	508.09	6.26%	7.01%
Valentine Landfill	183.38	8.60%	2.53%
GLASS COMPONENT STATEWIDE TOTAL	**7,252.57**	**4.91%**	**100.00%**

By facility, the glass component was most abundant at the Valentine Landfill, where it comprised 8.60% of the waste stream, by weight. The glass component was second most abundant at the Chadron Transfer Station, where it comprised at 6.26% of waste stream, by weight. The glass component was least abundant at the Norfolk Area Transfer Station, where it comprised 3.98% of the waste stream, by weight. The glass component comprised slightly less than 5% of the waste stream (by weight) at the large urban facilities, and the two facilities' glass components were within 0.80% of each other. The small urban facilities experienced the greatest variance in their glass component percentages; varying from 5.66% to 3.98%, by weight. The glass components at the two large rural facilities were within 0.20% of each other. Among all facilities, the glass component, by weight, varied by a maximum of 4.62%. Chart 4.5 presents a graphic representation of each facility's contribution to the glass component. Chart 4.6 presents a graphic representation of the glass component at each facility and statewide.

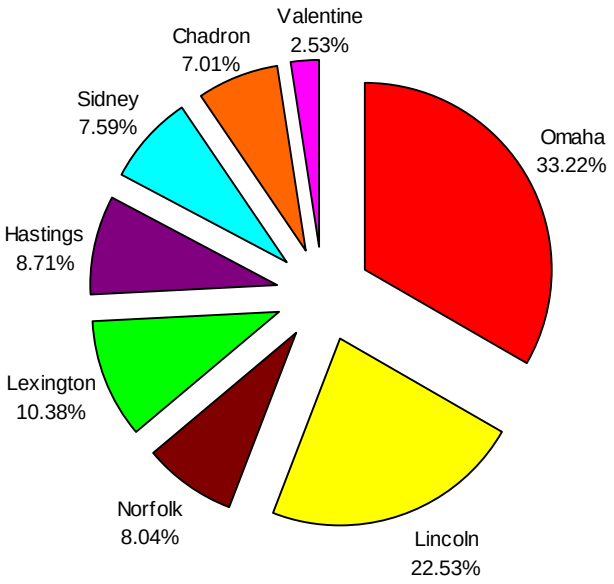


CHART 4.5
CONTRIBUTION OF EACH FACILITY
TO THE GLASS COMPONENT

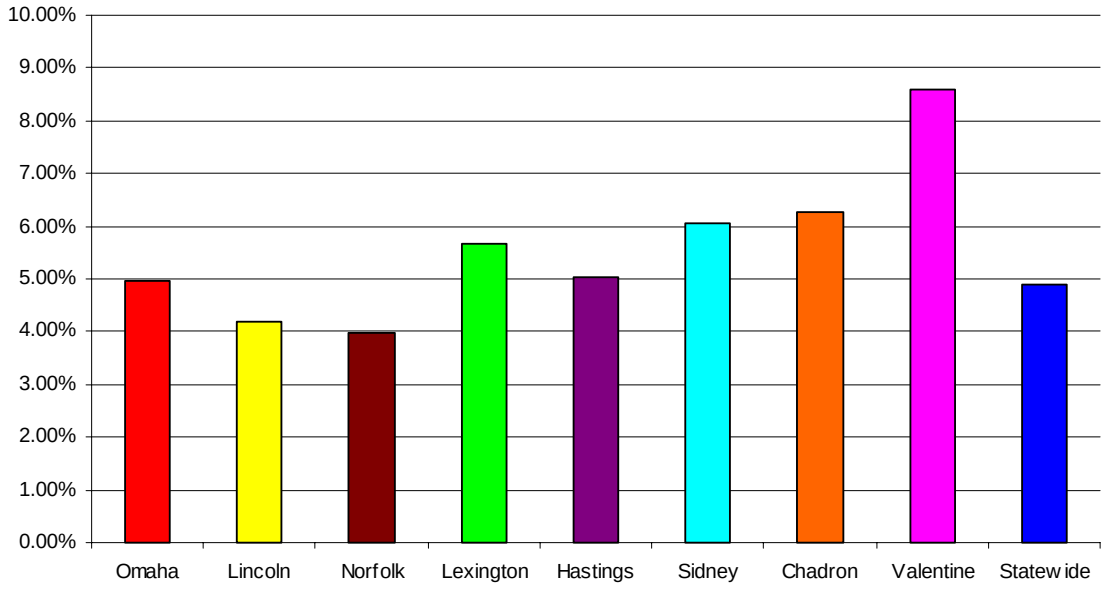


CHART 4.6
PERCENTAGE OF THE WASTE STREAM COMPRISED OF THE
GLASS COMPONENT AT EACH FACILITY AND STATEWIDE

TABLE 4.5
STATEWIDE SUMMARY OF THE
METALS COMPONENT BY WEIGHT

Facility	Metals Component (in pounds)	Percentage of Waste Stream at that Facility	Contribution to the Statewide Waste Stream
Pheasant Point Landfill – Omaha	1,737.68	3.57%	32.37%
Bluff Road Landfill – Lincoln	1,251.76	3.20%	23.32%
Norfolk Area Transfer Station	569.64	3.89%	10.61%
Lexington Landfill	549.70	4.14%	10.24%
Hastings Landfill	439.97	3.50%	8.20%
Sidney Landfill	318.30	3.50%	5.93%
Chadron Transfer Station	371.77	4.58%	6.93%
Valentine Landfill	129.31	6.07%	2.41%
METALS COMPONENT STATEWIDE TOTAL	**5,368.13**	**3.64%**	**100.00%**

By facility, the metals component was most abundant at the Valentine Landfill, where it comprised 6.07% of the waste stream, by weight. The metals component was second most abundant at the Chadron Transfer Station, where it comprised at 4.58% of waste stream, by weight. The metals component was least abundant at the Bluff Road Landfill in Lincoln, where it comprised 3.20% of the waste stream, by weight. The metals component comprised less than 4% of the waste stream (by weight) at the large urban facilities, and the two facilities' metals components were within 0.37% of each other. The small urban facilities' metals components varied from 4.14% to 3.50%, by weight. The large rural facilities experienced the greatest variance in their metals component percentages; varying from 4.58% to 3.50%, by weight. Among all facilities, the metals component, by weight, varied by a maximum of 2.87%. Chart 4.7 presents a graphic representation of each facility's contribution to the metals component. Chart 4.8 presents a graphic representation of the metals component at each facility and statewide.

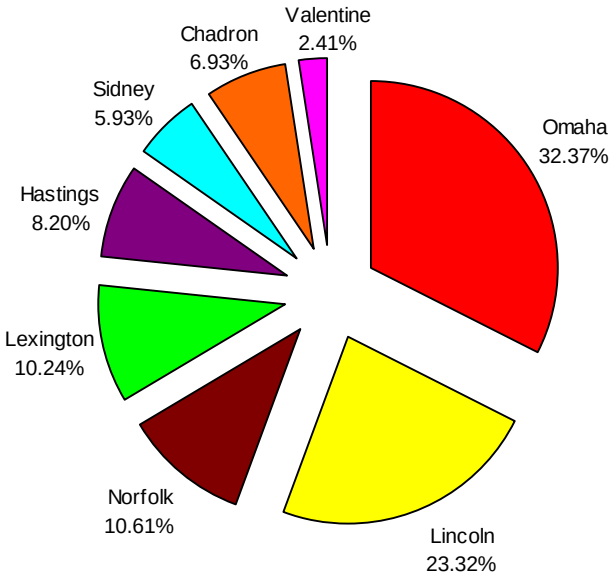


CHART 4.7
CONTRIBUTION OF EACH FACILITY TO THE METALS COMPONENT

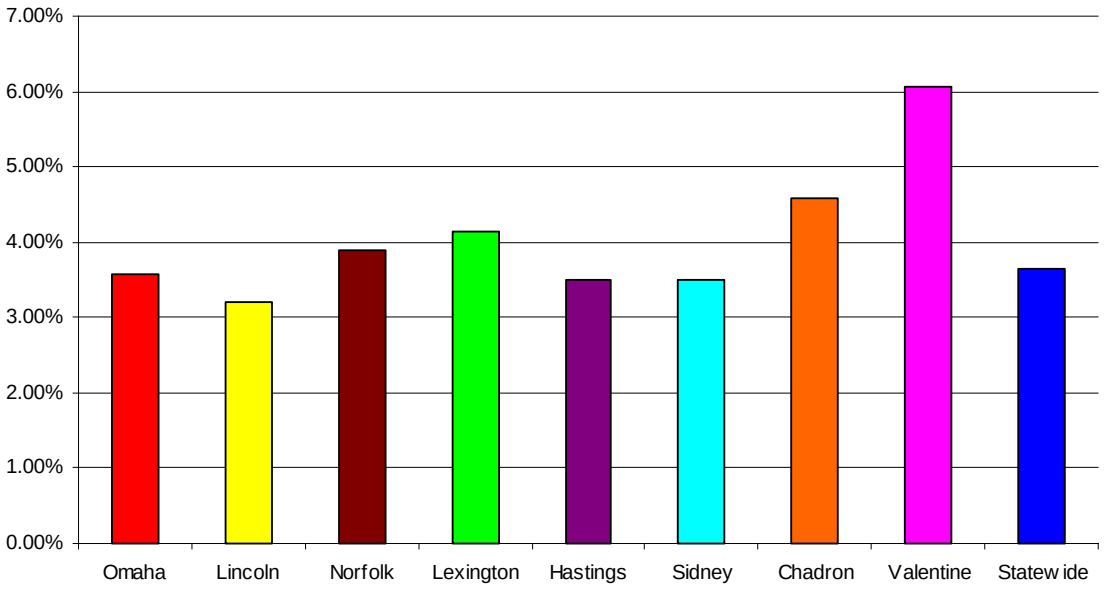


CHART 4.8
PERCENTAGE OF THE WASTE STREAM COMPRISED OF THE METALS COMPONENT AT EACH FACILITY AND STATEWIDE

TABLE 4.6
STATEWIDE SUMMARY OF THE
FOOD CATEGORY BY WEIGHT

Facility	Food Category (in pounds)	Percentage of Waste Stream at that Facility	Contribution to the Statewide Waste Stream
Pheasant Point Landfill – Omaha	7,507.47	15.44%	30.61%
Bluff Road Landfill – Lincoln	6,260.52	16.02%	25.50%
Norfolk Area Transfer Station	2,116.29	14.44%	8.62%
Lexington Landfill	2,559.29	19.26%	10.42%
Hastings Landfill	2,536.37	20.16%	10.33%
Sidney Landfill	1,536.83	16.90%	6.26%
Chadron Transfer Station	1,508.07	18.57%	6.14%
Valentine Landfill	527.83	24.76%	2.15%
FOOD CATEGORY STATEWIDE TOTAL	**24,552.67**	**16.64%**	**100.00%**

By facility, food was most abundant at the Valentine Landfill, where it comprised 24.76% of the waste stream, by weight. Food was second most abundant at the Hastings Landfill, where it comprised at 20.16% of waste stream, by weight. Food was least abundant at the Norfolk Area Transfer Station, where it comprised 14.44% of the waste stream, by weight. Food comprised between 15% and 16% of the waste stream (by weight) at the large urban facilities. The small urban facilities experienced the greatest variance in their food category percentages; varying from 20.16% to 14.44%, by weight. The large rural facilities experienced the greatest variance in their food category percentages; varying from 4.58% to 3.50%, by weight. Food at the two large rural facilities varied from 18.57% to 16.90%. Among all facilities, food (by weight) varied by a maximum of 10.32%. Chart 4.9 presents a graphic representation of each facility's contribution to the food category. Chart 4.10 presents a graphic representation of the food category at each facility and statewide.

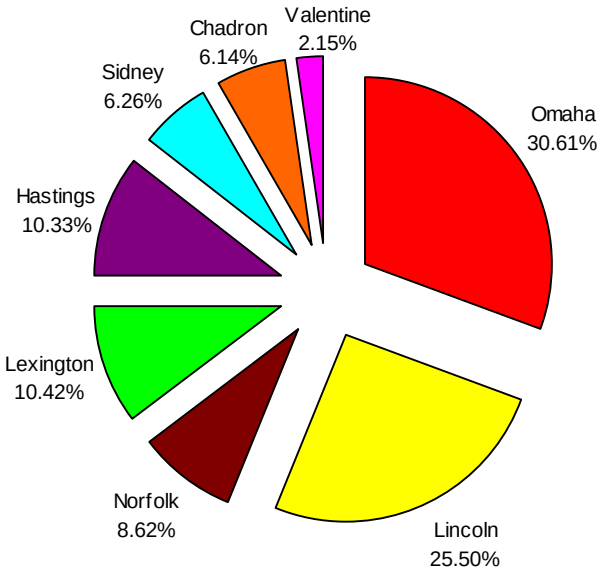


CHART 4.9
CONTRIBUTION OF EACH FACILITY TO THE FOOD CATEGORY

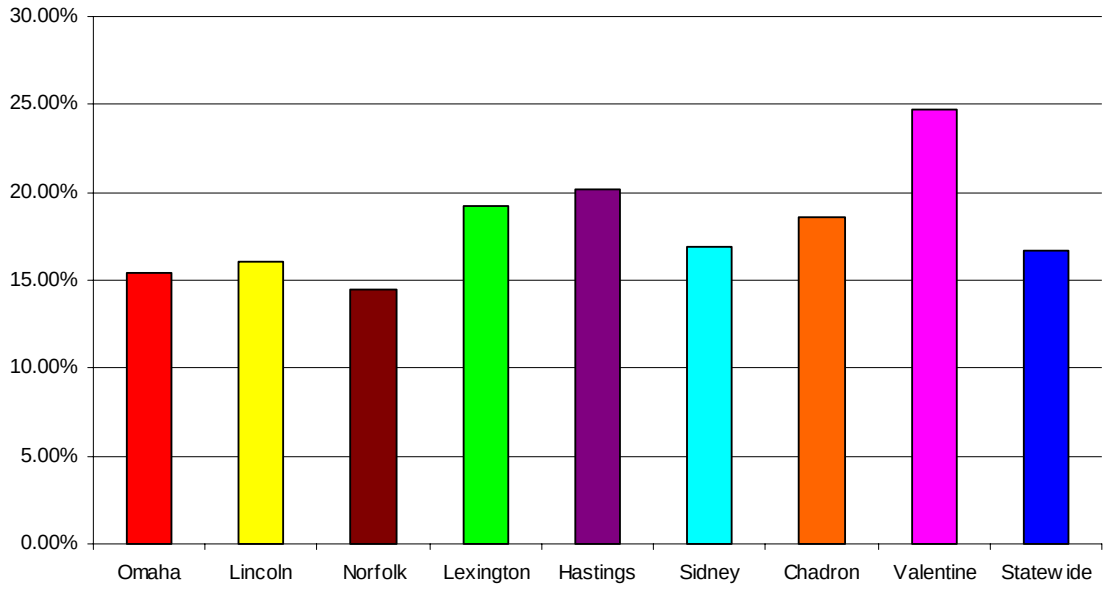


CHART 4.10
PERCENTAGE OF THE WASTE STREAM COMPRISED OF THE FOOD CATEGORY AT EACH FACILITY AND STATEWIDE

TABLE 4.7
STATEWIDE SUMMARY OF THE
DIAPERS CATEGORY BY WEIGHT

Facility	Diapers Category (pounds)	Percentage of Waste Stream at that Facility	Contribution to the Statewide Waste Stream
Pheasant Point Landfill – Omaha	1,937.30	3.98%	33.11%
Bluff Road Landfill – Lincoln	1,200.03	3.07%	20.51%
Norfolk Area Transfer Station	637.27	4.35%	10.89%
Lexington Landfill	612.59	4.61%	10.47%
Hastings Landfill	528.41	4.20%	9.03%
Sidney Landfill	431.84	4.75%	7.38%
Chadron Transfer Station	433.51	5.34%	7.41%
Valentine Landfill	69.33	3.25%	1.19%
DIAPERS CATEGORY STATEWIDE TOTAL	**5,850.28**	**3.96%**	**100.00%**

By facility, the diapers category was most abundant at the Chadron Transfer Station, where it comprised 5.34% of the waste stream, by weight. The diapers category was second most abundant at the Sidney Landfill, where it comprised 4.75% of waste stream, by weight. The diapers category was least abundant at the Bluff Road Landfill in Lincoln, where it comprised 3.07% of the waste stream, by weight. The large urban facilities experienced the greatest variance in their diapers category percentages, varying from 3.98% to 3.07%, by weight, which is a difference of 0.91%. The small urban facilities' diapers category percentages varied from 4.20% to 4.61%, by weight; a difference of only 0.41%. The diapers category at the two large rural facilities varied from 5.34% to 4.75%, by weight. Among all facilities, the diapers category (by weight) varied by a maximum of 2.27%. Chart 4.11 presents a graphic representation of each facility's contribution to the diapers category. Chart 4.12 presents a graphic representation of the diapers category at each facility and statewide.

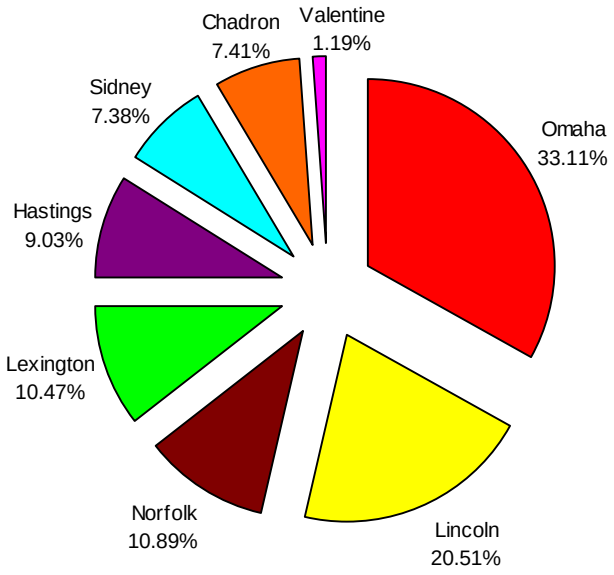


CHART 4.11
CONTRIBUTION OF EACH FACILITY TO THE DIAPERS CATEGORY

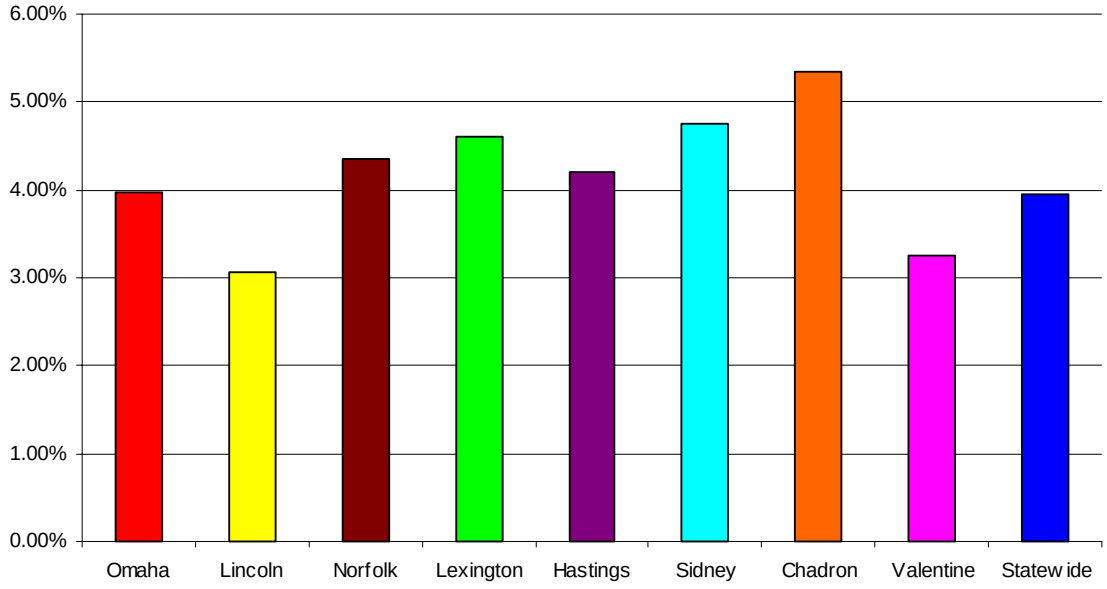


CHART 4.12
PERCENTAGE OF THE WASTE STREAM COMPRISED OF THE DIAPERS CATEGORY AT EACH FACILITY AND STATEWIDE

TABLE 4.8
STATEWIDE SUMMARY OF THE
TEXTILES/RUBBER/LEATHER CATEGORY BY WEIGHT

Facility	Textiles/ Rubber/Leather Category (in pounds)	Percentage of Waste Stream at that Facility	Contribution to the Statewide Waste Stream
Pheasant Point Landfill – Omaha	2,967.31	6.10%	40.18%
Bluff Road Landfill – Lincoln	1,666.91	4.26%	22.57%
Norfolk Area Transfer Station	446.84	3.05%	6.05%
Lexington Landfill	704.50	5.30%	9.54%
Hastings Landfill	648.83	5.16%	8.78%
Sidney Landfill	422.71	4.65%	5.72%
Chadron Transfer Station	448.51	5.52%	6.07%
Valentine Landfill	80.30	3.77%	1.09%
TEXTILES/RUBBER/LEATHER CATEGORY STATEWIDE TOTAL	**7,385.91**	**5.00%**	**100.00%**

By facility, the textiles/rubber/leather category was most abundant at the Pheasant Point Landfill in Omaha, where it comprised 6.10% of the waste stream, by weight. The textiles/rubber/leather category was second most abundant at the Chadron Transfer Station, where it comprised at 5.52% of waste stream, by weight. The textiles/rubber/leather category was least abundant at the Norfolk Area Transfer Station, where it comprised 3.05% of the waste stream, by weight. The large urban facilities' textiles/rubber/leather category percentages varied from 6.10% to 4.26%, by weight; a difference of 1.84%. The small urban facilities experienced the greatest variance in their textiles/rubber/leather category percentages, varying from 5.30% to 3.05%, by weight, which is a difference of 2.25%. The textiles/rubber/leather category at the two large rural facilities varied from 5.52% to 4.65%, by weight. Among all facilities, the textiles/rubber/leather category (by weight) varied by a maximum of 3.05%. Chart 4.13 presents a graphic representation of each facility's contribution to the textiles/rubber/leather category. Chart 4.14 presents a graphic representation of the textiles/rubber/leather category at each facility and statewide.

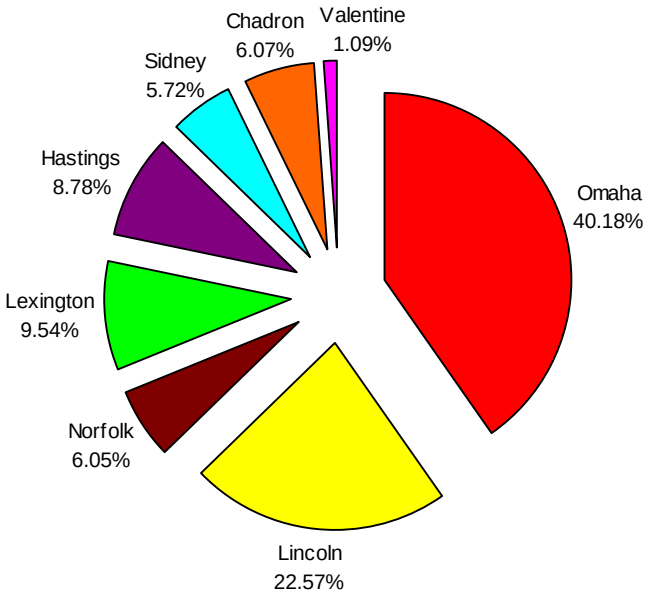


CHART 4.13
CONTRIBUTION OF EACH FACILITY TO
THE TEXTILES / RUBBER / LEATHER CATEGORY

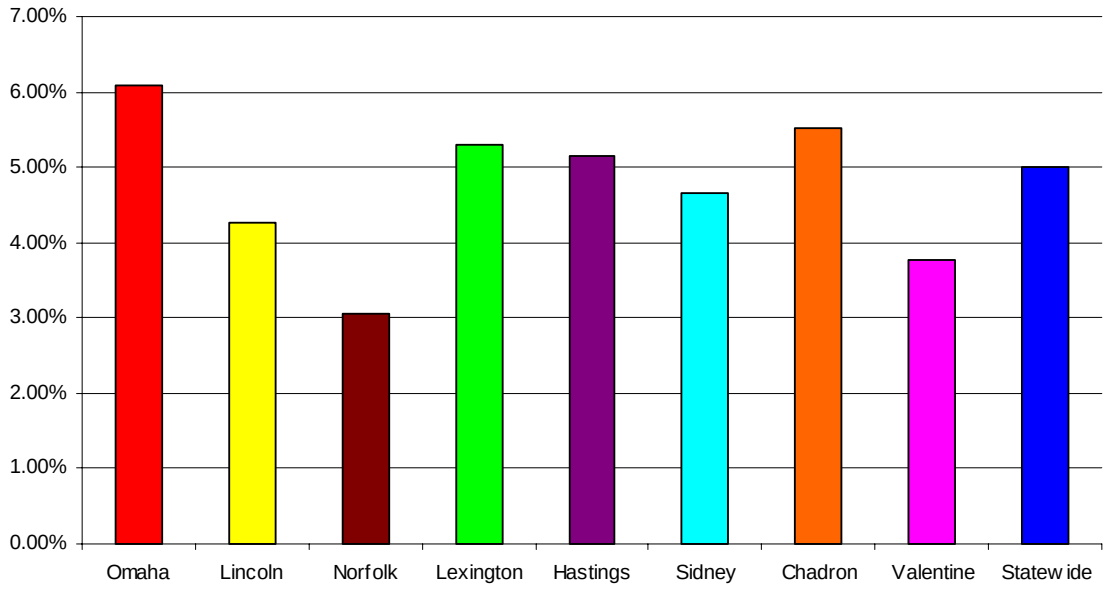


CHART 4.14
PERCENTAGE OF THE WASTE STREAM COMPRISED OF THE
TEXTILES / RUBBER / LEATHER CATEGORY AT EACH FACILITY AND STATEWIDE

TABLE 4.9
STATEWIDE SUMMARY OF THE
YARD WASTE CATEGORY BY WEIGHT

Facility	Yard Waste Category (in pounds)	Percentage of Waste Stream at that Facility	Contribution to the Statewide Waste Stream
Pheasant Point Landfill – Omaha	1,402.96	2.89%	33.54%
Bluff Road Landfill – Lincoln	1,125.24	2.88%	26.90%
Norfolk Area Transfer Station	542.75	3.70%	12.98%
Lexington Landfill	259.93	1.96%	6.21%
Hastings Landfill	307.01	2.44%	7.34%
Sidney Landfill	297.65	3.27%	7.12%
Chadron Transfer Station	233.30	2.87%	5.58%
Valentine Landfill	14.09	0.66%	0.34%
YARD WASTE CATEGORY STATEWIDE TOTAL	**4,182.92**	**2.83%**	**100.00%**

By facility, yard waste was most abundant at the Norfolk Area Transfer Station, where it comprised 3.70% of the waste stream, by weight. The yard waste category was second most abundant at the Sidney Landfill, where it comprised at 3.27% of waste stream, by weight. Yard waste was least abundant at the Valentine Landfill, where it comprised only 0.66% of the waste stream, by weight. Yard waste comprised less than 3% of the waste stream (by weight) at the large urban facilities, and the two facilities' yard waste categories were within 0.01% of each other. The small urban facilities experienced the greatest variance in their yard waste category percentages, varying from 3.70% to 1.96%, by weight, which is a difference of 1.74%. The yard waste category at the two large rural facilities varied from 3.27% to 2.87%, by weight, which is a difference of only 0.40%. Among all facilities, yard waste (by weight) varied by a maximum of 3.04%. Chart 4.15 presents a graphic representation of each facility's contribution to the yard waste category. Chart 4.16 presents a graphic representation of the yard waste category at each facility and statewide.

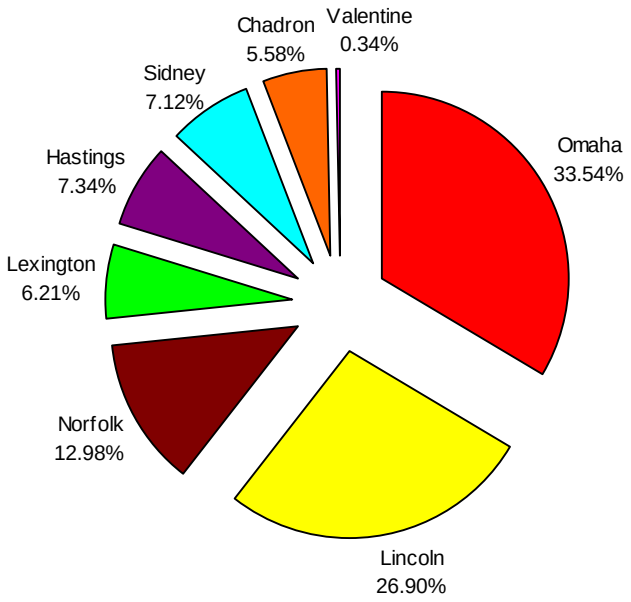


CHART 4.15
CONTRIBUTION OF EACH FACILITY TO THE YARD WASTE CATEGORY

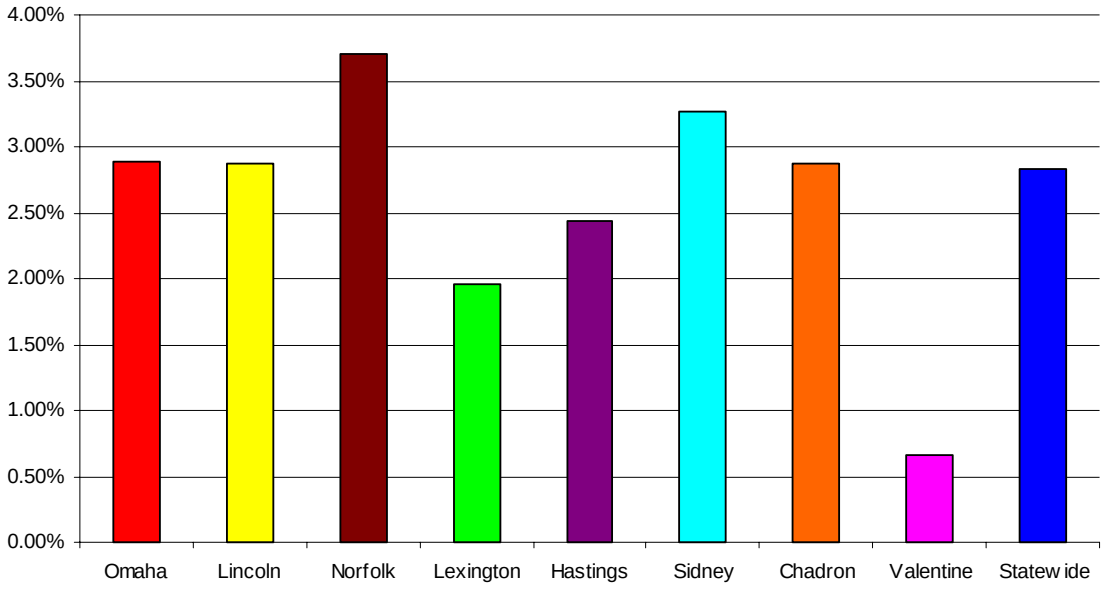


CHART 4.16
PERCENTAGE OF THE WASTE STREAM COMPRISED OF THE YARD WASTE CATEGORY AT EACH FACILITY AND STATEWIDE

The eight locations where data was collected represent a unique cross-section of Nebraska communities. As noted earlier in this section, the eight participating facilities were divided into four distinct designations: (1) large urban; (2) small urban; (3) large rural; and (4) small rural. In assessing the differences and commonalities among these four designations, three distinct differences were discovered. In all of the four waste-material components (paper fibers, plastics, glass, and metals) and four major other waste categories (food, diapers, textiles/rubber/leather, and yard waste), those facilities in the large urban designation contributed a minimum of 53.62% and a maximum of 62.75% of the waste for the consolidated statewide waste stream. This is not surprising given that 60.0% of the 624 samples collected were from facilities in the large urban designation. Comparatively, 27.1% of the loads sampled were captured at facilities designated as small urban; 11.5% of the captured samples were from facilities in the large rural designation; and 1.4% of the captured samples were collected at the facility designated as small rural. Table 4.10 provides a more detailed breakdown of the percentage each of the four waste-material components and four major other waste categories contributed to the four designations.

TABLE 4.10
EACH DESIGNATION'S CONTRIBUTION TO THE FOUR WASTE-MATERIAL COMPONENTS AND THE FOUR MAJOR OTHER WASTE CATEGORIES

Waste-Material Component/Category	Large Urban	Small Urban	Large Rural	Small Rural
Paper Fibers Component	60.59%	33.09%	11.29%	1.08%
Plastics Component	61.35%	26.93%	10.17%	1.55%
Glass Component	55.75%	27.13%	14.60%	2.53%
Metals Component	55.69%	24.74%	12.86%	2.41%
Food	56.11%	29.37%	12.4%	2.15%
Diapers	53.62%	30.39%	14.79%	1.19%
Textiles/Rubber/Leather	62.75%	24.37%	11.79%	1.09%
Yard Waste	60.44%	26.53%	12.70%	0.34%
Percent of Total Samples	60.00%	27.10%	11.50%	1.40%

When comparing the four waste-material components and the four major other waste categories, the large urban designation exceeded its percentage of samples (60.0%) in only half the components or categories. Because urban areas typically have a greater number of offices and other non-manufacturing businesses, it is anticipated that the amount of paper fibers and plastics would be higher in these areas. Likewise, the percentage of textiles/rubber/leather is also anticipated to be higher in urban areas because these areas tend to have a higher density of multi-family dwellings and a more transient population. Finally, the higher percentage of yard waste in the large urban designation is likely the result of a larger number of single family homes and subsequent landscaping.

The small urban designation also exceeded its percentage of samples (27.1%) in only half of the components or categories. As with the large urban designation, it is anticipated that small urban areas would also have a larger population of non-manufacturing businesses which would result in a higher amount of paper fibers. The glass component in the small urban designation only slightly exceeded the percentage of samples (27.13% vs. 27.10%).

Because the small urban designation includes rural areas too, it is likely that fewer households in these areas use garbage disposals. This may explain the higher percentage of the food category. The higher percentage for the diaper category may be explained by

demographic differences. For example, if the population of the area is older, there may be more nursing homes in the area and consequently more adult diapers in the waste stream. Or, if the population of the area is younger, the birth rate in the area may be higher which would also result in more diapers in the waste stream.

The large rural designation exceeded its percentage of samples in six of the components or categories (glass, metals, food, diapers, textiles/rubber/leather, and yard waste). This situation indicates how the waste stream is affected by the unique characteristics of a community. For example, Sidney is located along Interstate 80 which may explain the higher percentages found in the glass component, metals component, and food category; there are more restaurants and auto and truck repair shops along the interstate. Also, Cabela's corporate headquarters is located in Sidney. This type of operation impacts the community and its waste stream through the types of employees needed and changes the characteristics of a rural community. A similar situation applies to Chadron as it is home to Chadron State College. A college affects the waste stream through its transient population, highly-educated faculty, and increased food services. In addition to these unique characteristics, both of these rural communities serve as regional retail centers with the availability of a Walmart Supercenter in both locations.

The small rural designation exceeded its percentage of total samples in four of the components or categories (plastics, glass, metals, and food). The rural nature of the service area along with nearby recreational facilities that attract hunters, campers, fisherman, and other tourists likely impacted these components and categories.

4.3 DISTRIBUTION OF WASTE STREAM COMPONENTS

There are four waste-material components (paper fibers, plastics, glass, and metals) of the Nebraska waste stream. These four components combined, account for more than 68% of the statewide total waste stream, by weight.

The paper fibers component is divided into six material categories. The largest material category is mixed paper, which comprises 35.53% (by weight) of the paper fiber component. The second largest paper fibers material category is cardboard at 19.54%, by weight. Paperboard comprises the third largest paper fibers material category at 12.89%, by weight. Magazines, newsprint, and office paper each comprise between 9% and 12% of the paper fibers component, by weight. Table 4.11 presents the distribution of the paper fibers component among its material categories for the statewide waste stream. Chart 4.17 presents a graphic representation of this data.

TABLE 4.11
STATEWIDE DISTRIBUTION OF THE
PAPER FIBERS COMPONENT BY WEIGHT

Material Category	Net Weight (in pounds)	Percentage of Paper Fibers Component
Cardboard	11,864.20	19.54%
Office Paper	6,448.82	10.62%
Newsprint	7,321.39	12.06%
Magazines	5,688.35	9.37%
Paperboard/Liner Board	7,828.24	12.89%
Mixed Paper	21,579.17	35.53%
STATEWIDE PAPER FIBERS COMPONENT	**60,730.17**	**100.00%**

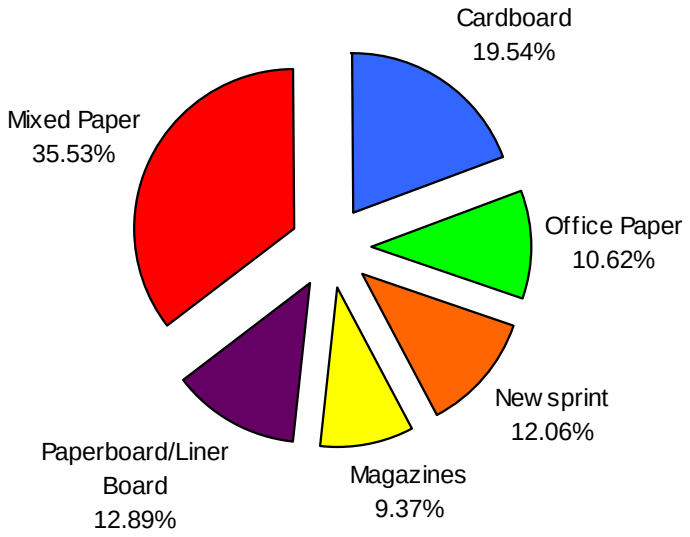


CHART 4.17
STATEWIDE DISTRIBUTION OF THE
PAPER FIBERS COMPONENT

The plastics component is divided into five material categories. The largest material category is film/wrap/bags and it comprises 36.34% of the plastics component, by weight. The second largest plastics material category is other plastics at 23.19%, by weight. PET #1 accounts for slightly less than 18% of the plastics component, by weight, and the other numbered plastics material category accounts for 14% of the plastics component (by weight). HDPE #2 is the smallest plastics material category at 8.49%, by weight. Table 4.12 presents the distribution of the plastics component among its material categories for the statewide waste stream. Chart 4.18 presents a graphic representation of this data.

TABLE 4.12
STATEWIDE DISTRIBUTION OF THE
PLASTICS COMPONENT BY WEIGHT

Material Category	Net Weight (in pounds)	Percentage of Plastics Component
PET #1	5,076.81	17.98%
HDPE #2	2,395.69	8.49%
Other Numbered Containers	3,951.40	14.00%
Plastic Film/Wrap/Bags	10,260.10	36.34%
Other Plastics	6,547.00	23.19%
STATEWIDE PLASTICS COMPONENT	**28,231.00**	**100.00%**

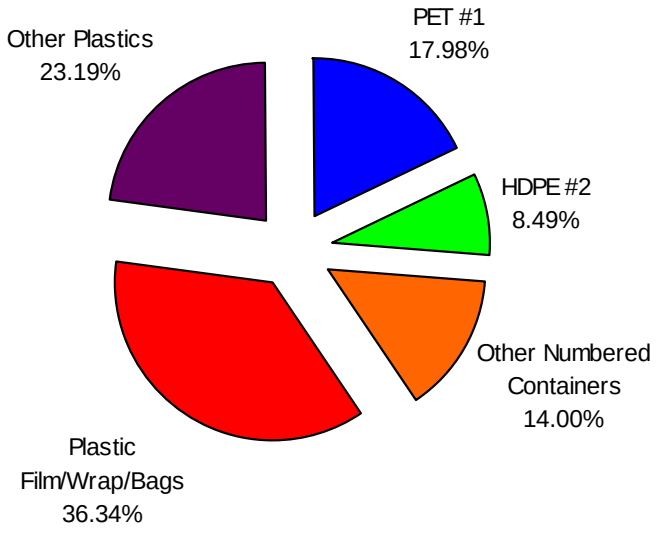


CHART 4.18
STATEWIDE DISTRIBUTION OF
THE PLASTICS COMPONENT

The glass component of the statewide waste stream is relatively small – less than either the food or textiles/rubber/leather material categories – and is divided into five material categories. The clear glass material category dominates the glass component; it comprises 52.97% of this component, by weight. The second largest material category is brown glass, which comprises 33.59% of the glass component, by weight. Green glass comprises 9.54% of the glass component (by weight), while other glass accounts for just 3.37% of the glass component (by weight). The blue glass material category comprises only 0.52% of the glass component, by weight. Table 4.13 presents the distribution of the glass component among its material categories for the statewide waste stream. Chart 4.19 presents a graphic representation of this data.

TABLE 4.13
STATEWIDE DISTRIBUTION OF THE
GLASS COMPONENT BY WEIGHT

Material Category	Net Weight (in pounds)	Percentage of Glass Component
Clear Glass Containers	3,841.91	52.97%
Brown Glass Containers	2,436.19	33.59%
Green Glass Containers	691.98	9.54%
Blue Glass Containers	37.65	0.52%
Other Glass	244.62	3.37%
STATEWIDE GLASS COMPONENT	**7,252.35**	**4.91%**

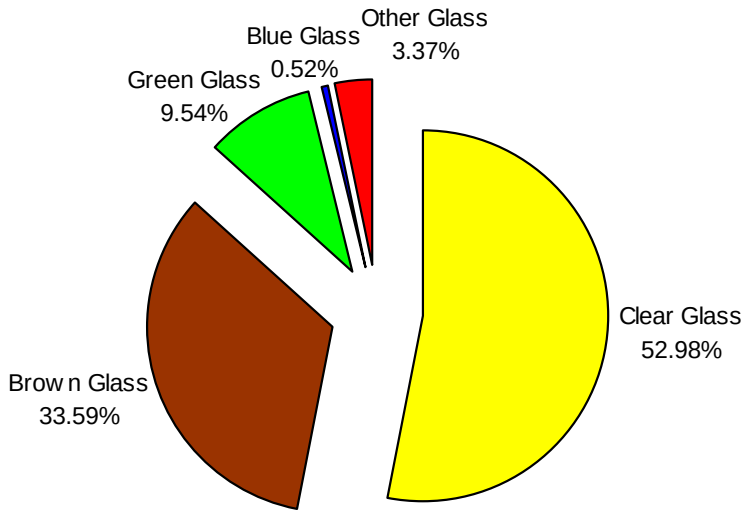


CHART 4.19
STATEWIDE DISTRIBUTION OF
THE GLASS COMPONENT

The metals component comprises less than 4% of the statewide waste stream, by weight, and it is divided into five material categories. The tin can and aluminum can material categories dominate the metals component and account for 41.76% and 30.51% of this component (by weight), respectively. Table 4.14 presents the distribution of the metals component among its material categories for the statewide waste stream. Chart 4.20 presents a graphic representation of this data.

TABLE 4.14
STATEWIDE DISTRIBUTION OF THE
METALS COMPONENT BY WEIGHT

Material Category	Net Weight (in pounds)	Percentage of Metals Component
Aluminum Cans	1,772.37	33.02%
Tin Cans	2,426.10	45.19%
Other Aluminum	463.10	8.63%
Other Tin	265.68	4.95%
Other Mixed Metals	440.88	8.21%
STATEWIDE METALS COMPONENT	**5,368.13**	**100.00%**

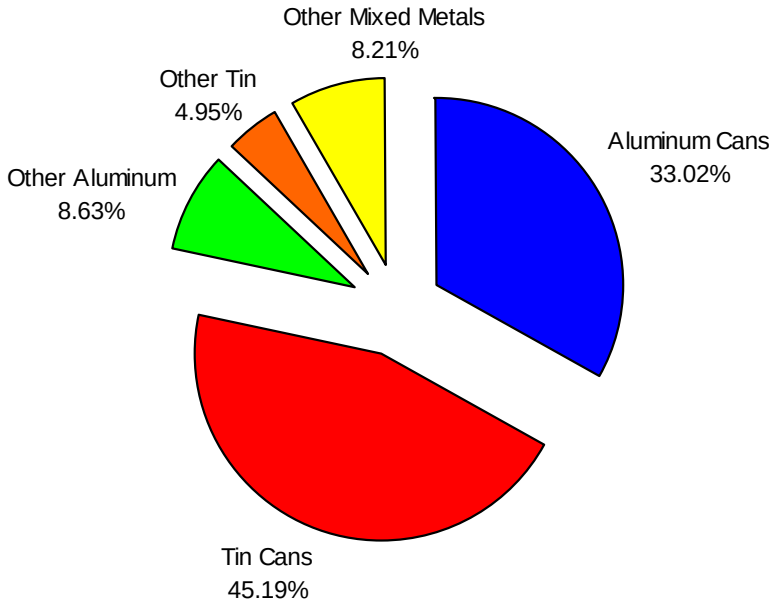


CHART 4.20
STATEWIDE DISTRIBUTION OF
THE METALS COMPONENT

The distribution of these four major components reflects the present characteristics of the waste stream in Nebraska. The paper fibers component provides a good example of how recycling impacts the waste stream. The most significant portion of the paper fibers component is mixed paper. Of all of the categories that comprise the paper fibers component, mixed paper typically holds the least value and the highest contamination rate. A similar circumstance exists with the plastics component. The largest portion of the plastics component is plastic film/wrap/bags. Again, this portion of the plastics waste stream is limited in its value and requires additional effort to recycle.

The glass and metals components of the waste stream are different than the plastics and paper fibers components. The most commonly recycled material category in the glass component is clear glass containers; however, clear glass containers dominate the glass component. This is also the situation with the metals component. Tin cans and aluminum cans are the most commonly recycled materials in the metals component; yet, these two material categories comprise more than 78% of the metals component.

The four major components of the waste stream – paper fibers, plastics, glass, and metals – comprise more than 68% of the total waste stream in Nebraska. The largest component of these four is paper fibers and the smallest is metals. The largest material categories within each of these four major components include mixed paper, plastic film/wrap/bags, clear glass containers, and tin cans. Of these categories, tin cans are the easiest to recycle while clear glass containers are the most difficult. Plastic film/wrap/bags and mixed paper are both recyclable; however, because these materials are usually highly contaminated and there are limited uses for the materials, they are very price sensitive.

Of the four major components, the paper fibers component provides the greatest opportunity for recovery and recycling. There is recycling potential for all of the material categories in the paper fibers component. More than 75% of the metals component is readily marketable and recyclable; while at least 50% to 60% of the plastics component is recyclable and approximately 27% of the plastics component (PET #1 and HDPE #2 material categories) is readily recyclable. The glass component presents the greatest potential for reuse; however, given its weight and limited value, these reuse needs tend to be localized.

When considering targets for waste reduction based on the analyses provided throughout this section, the paper fibers component appears to provide the most significant opportunity for further removal from the waste stream. Certain categories within the plastics and metals components also have potential for further reduction; specifically, the PET #1, HDPE, plastic film/wrap/bags, aluminum cans, and tin cans material categories.

5. SEASONAL WEIGHT AND VOLUME DATA ANALYSIS

The data collected during each of the four seasonal field sorting events was compiled by season and then consolidated into one database containing all 624 samples. The segregated seasonal data was analyzed; then the consolidated (all four seasons combined) was analyzed; and finally, a comparison of each season's and the consolidated data was performed.

5.1 SEASONAL DATA ANALYSIS

Fall 2007 – A total of 158 loads were sampled during the Fall 2007 field sorting event. A total of 38,419.87 pounds (19.21 tons) of solid waste was sorted and categorized during this field sorting event, and the average sample size was 243.16 pounds. Approximately 41.8% of the sampled loads (66 samples) contained residential waste; 36.1% of the sampled loads (57 samples) contained commercial waste; and 22.1% of the sampled loads (35 samples) contained mixed waste.

Table 5.1 presents a summary of the statewide weight data collected during the Fall 2007 field sorting event. By weight, the largest portion of the statewide waste stream was the paper fibers component, which comprised 42.93% of the total waste stream. The second and third largest portions (by weight) were the plastics component at 21.41% and the food category at 14.02%.

Table 5.2 presents a summary of the volume data collected during Fall 2007 field sorting event. By volume, the largest portion of the statewide waste stream was the paper fibers component, which comprised 42.24% of the total waste stream. The second and third largest portions, by volume, were the plastics component at 39.29% and textiles/rubber/leather category at 5.66%. The paper and plastics components combined accounted for more than 81% of the statewide waste stream by volume.

When each individual material category is evaluated, the single largest material category of the statewide waste stream was mixed paper, which comprised 15.21% of the waste stream by weight. The second and third largest material categories in the statewide waste stream were food at 14.02% and cardboard at 7.92% (by weight).

TABLE 5.1
FALL 2007 STATEWIDE WEIGHT DATA SUMMARY

Material Category/Component	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Cardboard	3,041.65	18.44%	7.92%
Office Paper	1,516.57	9.19%	3.95%
Newsprint	2,436.45	14.77%	6.34%
Magazines	1,325.62	8.04%	3.45%
Paperboard/Liner Board	2,329.79	14.13%	6.06%
Mixed Paper	5,843.47	35.43%	15.21%
TOTAL PAPER FIBERS	**16,493.55**		**42.93%**
PET #1	1,255.17	15.26%	3.27%
HDPE #2	628.95	7.65%	1.64%
Other Numbered Containers	1,257.74	15.29%	3.27%
Plastic Film/Wrap/Bags	2,465.08	29.97%	6.42%
Other Plastics	2,618.02	31.83%	6.81%
TOTAL PLASTICS	**8,224.96**		**21.41%**
Clear Glass Containers	878.72	48.41%	2.29%
Brown Glass Containers	722.33	39.80%	1.88%
Green Glass Containers	146.86	8.09%	0.38%
Blue Glass Containers	5.73	0.32%	0.01%
Other Glass	61.37	3.38%	0.16%
TOTAL GLASS	**1,815.01**		**4.72%**
Aluminum Cans	511.39	37.93%	1.33%
Tin Cans	583.39	43.27%	1.52%
Other Aluminum	127.08	9.43%	0.33%
Other Tin	30.78	2.28%	0.08%
Other Mixed Metals	95.49	7.08%	0.25%
TOTAL METALS	**1,348.13**		**3.51%**
Food	5,387.98		14.02%
Diapers	1,618.78		4.21%
Textiles/Rubber/Leather	1,718.15		4.47%
Yard Waste	1,155.76		3.01%
Household Hazardous Waste	10.22		0.03%
Electronic Waste	89.29		0.23%
Dry-Cell Batteries	28.26		0.07%
Misc. C/D Waste	21.44		0.06%
Wood	92.13		0.24%
Empty Aerosol Cans	73.60		0.19%
Non-Distinct Waste	173.47		0.45%
Other Misc. Wastes	169.14		0.44%
TOTAL WEIGHT OF SORTED SAMPLE	**38,419.87**		**100.00%**

TABLE 5.2
FALL 2007 STATEWIDE VOLUME DATA SUMMARY

Material Category/Component	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Cardboard	407.18	11.18%	4.72%
Office Paper	281.89	7.74%	3.27%
Newsprint	379.51	10.42%	4.40%
Magazines	241.46	6.63%	2.80%
Paperboard/Liner Board	899.53	24.70%	10.43%
Mixed Paper	1,432.22	39.33%	16.61%
TOTAL PAPER FIBERS	**3,641.80**		**42.24%**
PET #1	506.12	14.94%	5.87%
HDPE #2	388.24	11.46%	4.50%
Other Numbered Containers	641.70	18.95%	7.44%
Plastic Film/Wrap/Bags	998.01	29.47%	11.58%
Other Plastics	852.78	25.18%	9.89%
TOTAL PLASTICS	**3,386.85**		**39.29%**
Clear Glass Containers	78.32	61.44%	0.91%
Brown Glass Containers	41.18	32.31%	0.48%
Green Glass Containers	7.97	6.25%	0.09%
Blue Glass Containers			
Other Glass			
TOTAL GLASS	**127.47**		**1.48%**
Aluminum Cans	188.01	55.86%	2.18%
Tin Cans	112.84	33.53%	1.31%
Other Aluminum	35.70	10.61%	0.41%
Other Tin			
Other Mixed Metals			
TOTAL METALS	**336.55**		**3.90%**
Food	250.95		2.91%
Diapers	168.97		1.96%
Textiles/Rubber/Leather	488.11		5.66%
Yard Waste	220.14		2.55%
TOTAL VOLUME OF SORTED SAMPLE	8,620.84		**100.00**%

Assessing the individual material categories within each of the major components of the statewide waste stream, cardboard and mixed paper combined comprised more than 53% of the paper fibers component, by weight. The remaining four paper fibers material categories each comprised between 8% and 15% of this component, by weight. The plastics component was dominated by the other plastics material category at 31.83% of this component, by weight, and by the film/wrap/bags material category at 29.97% of this component, by weight. The glass component was comprised primarily of clear and brown glass containers, which combined accounted for more than 88% of the glass component, by weight. The aluminum cans and tin cans material categories comprised the majority of the metals component. When combined, these two materials categories accounted for more than 81% of the total metals component, by weight. The remaining material categories were dominated by food, which comprised 14.02% (by weight) of the statewide waste stream during the fall seasonal field sorting event. Each of the other material categories comprised less than 5% of the statewide waste stream, by weight.

Assessing the Fall 2007 statewide results by volume, the paper fibers component varied by only 0.69% between weight and volume. Unlike the paper fibers component, the plastics component varied greatly between weight and volume. The plastics component accounted for 17.88% more of the statewide waste stream by volume than by weight. The weight and volume variances in the glass component and the food category were also significant. The glass component accounted for 4.72% of the statewide waste stream by weight and only 1.48% of the statewide waste stream by volume. Similarly, food comprised 14.02% of the waste stream by weight and only 2.91% by volume.

Winter 2008 – A total of 148 loads were sampled during the Winter 2008 field sorting event. A total of 36,074.82 pounds (18.04 tons) of solid waste was sorted and categorized during this field sorting event, and the average sample size was 243.75 pounds. Approximately 47.3% of the sampled loads (70 samples) contained residential waste; 36.5% of the sampled loads (54 samples) contained commercial waste; and 16.2% of the sampled loads (24 samples) contained mixed waste.

Table 5.3 presents a summary of the statewide weight data collected during Winter 2008 field sorting event. By weight, the largest portion of the statewide waste stream was the paper fibers component, which comprised 41.34% of the total waste stream. The second and third largest portions (by weight) were the plastics component at 18.11% and the food category at 17.72%.

Table 5.4 presents a summary of the volume data collected during Winter 2008 field sorting event. By volume, the largest portion t of the statewide waste stream was the paper fibers component, which comprised 42.72% of the total waste stream. The second and third largest portions, by volume, were the plastics component at 36.46% and the textiles/rubber/leather category at 6.66%. The paper and plastics components combined accounted for almost 80% of the statewide waste stream by volume.

When each individual material category is evaluated, the single largest material category of the statewide waste stream was food, which comprised 17.72% of the waste stream by weight. The second and third largest material categories in the statewide waste stream were mixed paper at 14.08% and cardboard at 7.63% (by weight).

TABLE 5.3
WINTER 2008 STATEWIDE WEIGHT DATA SUMMARY

Material Category/Component	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Cardboard	2,753.63	18.46%	7.63%
Office Paper	2,066.40	13.86%	5.73%
Newsprint	1,541.53	10.34%	4.27%
Magazines	1,514.98	10.16%	4.20%
Paperboard/Liner Board	1,957.44	13.13%	5.43%
Mixed Paper	5,078.82	34.06%	14.08%
TOTAL PAPER FIBERS	**14,912.80**		**41.34%**
PET #1	1,243.73	19.04%	3.45%
HDPE #2	582.87	8.92%	1.62%
Other Numbered Containers	1,072.61	16.42%	2.97%
Plastic Film/Wrap/Bags	2,499.18	38.25%	6.93%
Other Plastics	1,134.72	17.37%	3.15%
TOTAL PLASTICS	**6,533.11**		**18.11%**
Clear Glass Containers	982.15	53.76%	2.72%
Brown Glass Containers	570.46	31.23%	1.58%
Green Glass Containers	198.76	10.88%	0.55%
Blue Glass Containers	8.24	0.45%	0.02%
Other Glass	67.30	3.68%	0.19%
TOTAL GLASS	**1,826.91**		**5.06%**
Aluminum Cans	436.72	30.74%	1.21%
Tin Cans	677.17	47.66%	1.88%
Other Aluminum	102.78	7.23%	0.28%
Other Tin	64.68	4.55%	0.18%
Other Mixed Metals	139.53	9.82%	0.39%
TOTAL METALS	**1,420.88**		**3.94%**
Food	6,392.60		17.72%
Diapers	1,406.86		3.90%
Textiles/Rubber/Leather	1,794.81		4.98%
Yard Waste	982.58		2.72%
Household Hazardous Waste	7.12		0.02%
Electronic Waste	123.24		0.34%
Dry-Cell Batteries	29.75		0.08%
Misc. C/D Waste	66.42		0.18%
Wood	139.32		0.39%
Empty Aerosol Cans	75.27		0.21%
Non-Distinct Waste	304.00		0.84%
Other Misc. Wastes	59.15		0.16%
TOTAL WEIGHT OF SORTED SAMPLE	**36,074.82**		**100.00**%

TABLE 5.4
WINTER 2008 STATEWIDE VOLUME DATA SUMMARY

Material Category/Component	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Cardboard	368.63	11.28%	4.82%
Office Paper	384.09	11.75%	5.02%
Newsprint	240.11	7.34%	3.14%
Magazines	275.95	8.44%	3.61%
Paperboard/Liner Board	755.77	23.12%	9.88%
Mixed Paper	1,244.81	38.08%	16.27%
TOTAL PAPER FIBERS	**3,269.36**		**42.72%**
PET #1	501.50	17.98%	6.55%
HDPE #2	359.80	12.90%	4.70%
Other Numbered Containers	547.25	19.61%	7.15%
Plastic Film/Wrap/Bags	1,011.81	36.27%	13.22%
Other Plastics	369.62	13.25%	4.83%
TOTAL PLASTICS	**2,789.98**		**36.46%**
Clear Glass Containers	87.54	66.90%	1.14%
Brown Glass Containers	32.52	24.86%	0.43%
Green Glass Containers	10.78	8.24%	0.14%
Blue Glass Containers			
Other Glass			
TOTAL GLASS	**130.84**		**1.71%**
Aluminum Cans	160.56	50.11%	2.10%
Tin Cans	130.98	40.88%	1.71%
Other Aluminum	28.87	9.01%	0.38%
Other Tin			
Other Mixed Metals			
TOTAL METALS	**320.41**		**4.19%**
Food	297.75		3.89%
Diapers	146.85		1.92%
Textiles/Rubber/Leather	509.89		6.66%
Yard Waste	187.16		2.45%
TOTAL VOLUME OF SORTED SAMPLE	7,652.24		**100.00**%

Assessing the individual material categories within each of the major components of the statewide waste stream, cardboard and mixed paper combined comprised more than 52% of the paper fibers component, by weight. The remaining four paper fibers material categories each comprised between 9% and 14% of this component, by weight. The plastics component was dominated by the film/wrap/bags material category at 38.25% of this component, by weight. The glass component was comprised primarily of clear and brown glass containers, which combined accounted for almost 85% of the glass component, by weight. The aluminum cans and tin cans material categories comprised the majority of the metals component. When combined, these two materials categories accounted for more than 78% of the total metals component, by weight. The remaining material categories were dominated by food, which comprised 17.72% (by weight) of the statewide waste stream during the winter seasonal field sorting event. Each of the other material categories comprised less than 5% of the statewide waste stream, by weight.

Assessing the Winter 2008 statewide results by volume, the paper fibers component varied by only 1.38% between weight and volume. Unlike the paper fibers component, the plastics component varied greatly between weight and volume. The plastics component accounted for 18.35% more of the statewide waste stream by volume than by weight. The weight and volume variances in the glass component and the food category were also significant. The glass component accounted for 5.06% of the statewide waste stream by weight and only 1.71% of the statewide waste stream by volume. Similarly, food comprised 17.72% of the waste stream by weight and only 3.89% by volume.

Spring 2008 – A total of 147 loads were sampled during the Spring 2008 field sorting event. A total of 34,607.29 pounds (17.30 tons) of solid waste was sorted and categorized during this field sorting event, and the average sample size was 235.42 pounds. Approximately 46.9% of the sampled loads (69 samples) contained residential waste; 36.1% of the sampled loads (53 samples) contained commercial waste; and 17.0% of the sampled loads (25 samples) contained mixed waste.

Table 5.5 presents a summary of the statewide weight data collected during Spring 2008 field sorting event. By weight, the largest portion of the statewide waste stream was the paper fibers component, which comprised 40.92% of the total waste stream. The second and third largest portions (by weight) were the plastics component at 18.62% and the food category at 15.81%.

Table 5.6 presents a summary of the volume data collected during Spring 2008 field sorting event. By volume, the largest portion of the statewide waste stream was the paper fibers component, which comprised 41.33% of the total waste stream. The second and third largest portions, by volume, were the plastics component at 37.03% and the textiles/rubber/leather category at 7.28%. The paper and plastics components combined accounted for more than 78% of the statewide waste stream by volume.

When each individual material category is evaluated, the single largest material category of the statewide waste stream was food, which comprised 15.81% of the waste stream by weight. The second and third largest material categories in the statewide waste stream were mixed paper at 14.15% and cardboard at 9.15% (by weight).

TABLE 5.5
SPRING 2008 STATEWIDE WEIGHT DATA SUMMARY

Material Category/Component	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Cardboard	3,165.70	22.35%	9.15%
Office Paper	1,453.01	10.26%	4.20%
Newsprint	1,618.79	11.43%	4.68%
Magazines	1,398.45	9.88%	4.04%
Paperboard/Liner Board	1,629.89	11.51%	4.71%
Mixed Paper	4,895.55	34.57%	14.15%
TOTAL PAPER FIBERS	**14,161.39**		**40.92%**
PET #1	1,167.30	18.12%	3.37%
HDPE #2	559.03	8.68%	1.62%
Other Numbered Containers	876.91	13.61%	2.53%
Plastic Film/Wrap/Bags	2,540.72	39.43%	7.34%
Other Plastics	1,299.15	20.16%	3.75%
TOTAL PLASTICS	**6,443.11**		**18.62%**
Clear Glass Containers	919.22	56.55%	2.66%
Brown Glass Containers	509.03	31.31%	1.47%
Green Glass Containers	148.71	9.15%	0.43%
Blue Glass Containers	6.23	0.38%	0.02%
Other Glass	42.44	2.61%	0.12%
TOTAL GLASS	**1,625.63**		**4.70%**
Aluminum Cans	350.69	29.13%	1.01%
Tin Cans	608.56	50.55%	1.76%
Other Aluminum	113.19	9.40%	0.33%
Other Tin	49.31	4.10%	0.14%
Other Mixed Metals	82.22	6.83%	0.24%
TOTAL METALS	**1,203.97**		**3.48%**
Food	5,470.98		15.81%
Diapers	1,353.26		3.91%
Textiles/Rubber/Leather	1,878.24		5.43%
Yard Waste	1,361.13		3.93%
Household Hazardous Waste	17.46		0.05%
Electronic Waste	151.82		0.44%
Dry-Cell Batteries	28.95		0.08%
Misc. C/D Waste	37.22		0.11%
Wood	118.16		0.34%
Empty Aerosol Cans	77.95		0.23%
Non-Distinct Waste	670.74		1.94%
Other Misc. Wastes	7.28		0.02%
TOTAL WEIGHT OF SORTED SAMPLE	**34,607.29**		**100.00%**

TABLE 5.6
SPRING 2008 STATEWIDE VOLUME DATA SUMMARY

Material Category/Component	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Cardboard	423.79	13.99%	5.78%
Office Paper	270.08	8.91%	3.68%
Newsprint	252.15	8.32%	3.44%
Magazines	254.73	8.41%	3.47%
Paperboard/Liner Board	629.30	20.77%	8.58%
Mixed Paper	1,199.89	39.60%	16.37%
TOTAL PAPER FIBERS	**3,029.93**		**41.33%**
PET #1	470.69	17.34%	6.42%
HDPE #2	345.08	12.71%	4.71%
Other Numbered Containers	447.40	16.48%	6.10%
Plastic Film/Wrap/Bags	1,028.63	37.89%	14.03%
Other Plastics	423.18	15.59%	5.77%
TOTAL PLASTICS	**2,714.98**		**37.03%**
Clear Glass Containers	81.93	68.84%	1.12%
Brown Glass Containers	29.02	24.38%	0.40%
Green Glass Containers	8.07	6.78%	0.11%
Blue Glass Containers			
Other Glass			
TOTAL GLASS	**119.02**		**1.62%**
Aluminum Cans	128.93	46.31%	1.76%
Tin Cans	117.71	42.28%	1.61%
Other Aluminum	31.79	11.42%	0.43%
Other Tin			
Other Mixed Metals			
TOTAL METALS	**278.43**		**3.80%**
Food	254.82		3.48%
Diapers	141.26		1.93%
Textiles/Rubber/Leather	533.59		7.28%
Yard Waste	259.26		3.54%
TOTAL VOLUME OF SORTED SAMPLE	**7,331.29**		**100.00%**

Assessing the individual material categories within each of the major components of the statewide waste stream, cardboard and mixed paper combined comprised almost 57% of the paper fibers component, by weight. The remaining four paper fibers material categories each comprised between 9% and 12% of this component, by weight. The plastics component was dominated by the film/wrap/bags material category at 39.43% of this component, by weight. The glass component was comprised primarily of clear and brown glass containers, which combined accounted for more than 87% of the glass component, by weight. The aluminum cans and tin cans material categories comprised the majority of the metals component. When combined, these two materials categories accounted almost 80% of the total metals component, by weight. The remaining material categories were dominated by food, which comprised 15.81% (by weight) of the statewide waste stream during the spring seasonal field sorting event. Each of the other material categories comprised less than 6% of the statewide waste stream, by weight.

Assessing the Spring 2008 statewide results by volume, the paper fibers component varied by only 0.41% between weight and volume. Unlike the paper fibers component, the plastics component varied greatly between weight and volume. The plastics component accounted for 18.41% more of the statewide waste stream by volume than by weight. The weight and volume variances in the glass component and the food category were also significant. The glass component accounted for 4.70% of the statewide waste stream by weight and only 1.62% of the statewide waste stream by volume. Similarly, food comprised 15.81% of the waste stream by weight and only 3.48% by volume.

Summer 2008 – A total of 171 loads were sampled during the Summer 2008 field sorting event. A total of 38,473.63 pounds (19.24 tons) of solid waste was sorted and categorized during this field sorting event, and the average sample size was 224.99 pounds. Approximately 46.2% of the sampled loads (79 samples) contained residential waste; 39.2% of the sampled loads (67 samples) contained commercial waste; and 14.6% of the sampled loads (25 samples) contained mixed waste.

Table 5.7 presents a summary of the statewide weight data collected during Summer 2008 field sorting event. By weight, the largest portion of the statewide waste stream was the paper fibers component, which comprised 39.41% of the total waste stream. The second and third largest portions (by weight) were the food category at 18.98% and the plastics component at 18.27%.

Table 5.8 presents a summary of the volume data collected during Summer 2008 field sorting event. By volume, the largest portion of the statewide waste stream was the paper fibers component, which comprised 42.10% of the total waste stream. The second and third largest portions, by volume, were the plastics component at 37.09% and the textiles/rubber/leather category at 7.16%. The paper and plastics components combined accounted for more than 79% of the statewide waste stream by volume.

When each individual material category is evaluated, the single largest material category of the statewide waste stream was food, which comprised 18.98% of the waste stream by weight. The second and third largest material categories in the statewide waste stream were mixed paper at 14.97% and cardboard at 7.55% (by weight).

TABLE 5.7
SUMMER 2008 STATEWIDE WEIGHT DATA SUMMARY

Material Category/Component	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Cardboard	2,903.22	19.15%	7.55%
Office Paper	1,412.84	9.32%	3.67%
Newsprint	1,724.62	11.37%	4.48%
Magazines	1,449.30	9.56%	3.77%
Paperboard/Liner Board	1,911.12	12.60%	4.97%
Mixed Paper	5,761.33	38.00%	14.97%
TOTAL PAPER FIBERS	**15,162.43**		**39.41%**
PET #1	1,410.61	20.07%	3.67%
HDPE #2	624.84	8.89%	1.62%
Other Numbered Containers	744.14	10.59%	1.93%
Plastic Film/Wrap/Bags	2,755.12	39.19%	7.16%
Other Plastics	1,495.11	21.27%	3.89%
TOTAL PLASTICS	**7,029.82**		**18.27%**
Clear Glass Containers	1,061.82	53.50%	2.76%
Brown Glass Containers	634.37	31.96%	1.65%
Green Glass Containers	197.65	9.96%	0.51%
Blue Glass Containers	17.45	0.88%	0.05%
Other Glass	73.51	3.70%	0.19%
TOTAL GLASS	**1,984.80**		**5.16%**
Aluminum Cans	473.57	33.94%	1.23%
Tin Cans	556.98	39.92%	1.45%
Other Aluminum	120.05	8.60%	0.31%
Other Tin	120.91	8.67%	0.31%
Other Mixed Metals	123.64	8.86%	0.32%
TOTAL METALS	**1,395.15**		**3.63%**
Food	7,301.11		18.98%
Diapers	1,471.38		3.82%
Textiles/Rubber/Leather	1,994.71		5.18%
Yard Waste	683.46		1.78%
Household Hazardous Waste	9.40		0.02%
Electronic Waste	151.58		0.39%
Dry-Cell Batteries	33.76		0.09%
Misc. C/D Waste	198.96		0.52%
Wood	310.97		0.81%
Empty Aerosol Cans	81.98		0.21%
Non-Distinct Waste	537.13		1.40%
Other Misc. Wastes	126.99		0.33%
TOTAL WEIGHT OF SORTED SAMPLE	**38,473.63**		**100.00%**

TABLE 5.8
SUMMER 2008 STATEWIDE VOLUME DATA SUMMARY

Material Category/Component	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Cardboard	388.65	11.66%	4.91%
Office Paper	262.61	7.88%	3.32%
Newsprint	268.63	8.06%	3.39%
Magazines	263.99	7.92%	3.33%
Paperboard/Liner Board	737.88	22.13%	9.32%
Mixed Paper	1,412.09	42.36%	17.83%
TOTAL PAPER FIBERS	**3,333.86**		**42.10%**
PET #1	568.79	19.37%	7.18%
HDPE #2	385.70	13.13%	4.87%
Other Numbered Containers	379.66	12.93%	4.79%
Plastic Film/Wrap/Bags	1,115.43	37.98%	14.09%
Other Plastics	487.01	16.58%	6.15%
TOTAL PLASTICS	**2,936.60**		**37.09%**
Clear Glass Containers	94.64	66.87%	1.20%
Brown Glass Containers	36.17	25.55%	0.46%
Green Glass Containers	10.72	7.58%	0.14%
Blue Glass Containers			
Other Glass			
TOTAL GLASS	**141.53**		**1.79%**
Aluminum Cans	174.11	55.17%	2.20%
Tin Cans	107.73	34.14%	1.36%
Other Aluminum	33.72	10.69%	0.43%
Other Tin			
Other Mixed Metals			
TOTAL METALS	**315.56**		**3.99%**
Food	340.06		4.29%
Diapers	153.59		1.94%
Textiles/Rubber/Leather	566.68		7.16%
Yard Waste	130.18		1.64%
TOTAL VOLUME OF SORTED SAMPLE	**7,918.06**		**100.00%**

Assessing the individual material categories within each of the major components of the statewide waste stream, cardboard and mixed paper combined comprised more than 57% of the paper fibers component, by weight. The remaining four paper fibers material categories each comprised between 9% and 13% of this component, by weight. The plastics component was dominated by the film/wrap/bags material category at 39.19% of this component, by weight. The glass component was comprised primarily of clear and brown glass containers, which combined accounted for more than 85% of the glass component, by weight. The aluminum cans and tin cans material categories comprised the majority of the metals component. When combined, these two materials categories accounted for almost 74% of the total metals component, by weight. The remaining material categories were dominated by food, which comprised 18.98% (by weight) of the statewide waste stream during the summer seasonal field sorting event. Each of the other material categories comprised less than 6% of the statewide waste stream, by weight.

Assessing the Summer 2008 statewide results by volume, the paper fibers component varied by 2.69% between weight and volume. Unlike the paper fibers component, the plastics component varied greatly between weight and volume. The plastics component accounted for 18.82% more of the statewide waste stream by volume than by weight. The weight and volume variances in the glass component and the food category were also significant. The glass component accounted for 5.16% of the statewide waste stream by weight and only 1.79% of the statewide waste stream by volume. Similarly, food comprised 18.98% of the waste stream by weight and only 4.29% by volume.

5.2 CONSOLIDATED DATA ANALYSIS

A total of 624 loads of solid waste over a period of 80 days were selected for sampling during the Fall 2007, Winter 2008, Spring 2008, and Summer 2008 (consolidated) field sorting events. Of these 624 samples, 284 were comprised of residential waste (45.5%); 231 were comprised of commercial waste (37.0%); and 109 were comprised of mixed waste (17.5%). Table 5.9 presents a compilation of the number of loads – segregated by the types of waste – sampled during each seasonal field sorting event. Weight and volume data for each individual sample can be found in the appendices of this report.

TABLE 5.9
NUMBER OF LOADS AND TYPE OF WASTE FOR ALL SAMPLED LOADS STATEWIDE

Type of Waste	Number of Loads				
	Fall 2007	Winter 2008	Spring 2008	Summer 2008	Total Number of Samples
Residential	66	70	69	70	284
Commercial	57	54	53	67	231
Mixed	35	24	25	25	109
Total Number of Samples	**158**	**148**	**147**	**171**	**624**

Table 5.10 presents a summary of the weight data for the consolidated 80-day statewide field sorting events. The largest portion of the waste stream, by weight, was the paper fibers component at 41.15%. The second and third largest portions, by weight, were the plastics component at 19.13% and the food category at 16.64%. Chart 5.1 presents a graphic representation of the consolidated statewide weight data.

Table 5.11 presents a summary of the volume data for the consolidated statewide field sorting events. The largest portion of the waste stream by volume was the paper fibers component, which comprised 42.11% of the waste stream. The second largest portion, by volume, was the plastics component at 37.52%; and the third largest portion was the textiles/rubber/leather category, which comprised 6.66% of the waste stream, by volume. The paper and plastics components accounted for more than 79% of the total waste stream, by volume. Chart 5.2 presents a graphic representation of the consolidated statewide volume data.

Assessing the individual material categories within each of the major components of the consolidated statewide waste stream, cardboard and mixed paper combined, comprised more than 55% of the paper fibers component, by weight. The remaining four paper fibers material categories each comprised between 9% and 13% of this component, by weight. The plastics component was dominated by the film/wrap/bags material category at 36.34% of this component, by weight. The glass component was comprised primarily of clear and brown glass containers, which combined accounted for almost 87% of the glass component, by weight. The aluminum cans and tin cans material categories comprised the majority of the metals component. When combined, these two materials categories accounted for slightly more than 78% of the total metals component, by weight. The remaining material categories were dominated by food, which comprised 16.64% (by weight) of the statewide waste stream. Each of the other material categories comprised exactly 5% or less of the statewide waste stream, by weight.

Assessing the consolidated statewide results by volume, the paper fibers component varied by only 0.96% between its weight and volume. Unlike the paper fibers component, the plastics component varied greatly between weight and volume. The plastics component accounted for 18.39% more of the statewide waste stream by volume than by weight. The weight and volume variances in the glass component and the food category were also significant. The glass component accounted for 4.91% of the statewide waste stream by weight and only 1.65% of the statewide waste stream by volume. Similarly, food comprised 16.64% of the waste stream by weight and only 3.63% by volume.

TABLE 5.10
STATEWIDE CONSOLIDATED WEIGHT DATA SUMMARY

Material Category/Component	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Cardboard	11,864.20	19.54%	8.04%
Office Paper	6,448.82	10.62%	4.37%
Newsprint	7,321.39	12.06%	4.96%
Magazines	5,688.35	9.37%	3.85%
Paperboard/Liner Board	7,828.24	12.89%	5.30%
Mixed Paper	21,579.17	35.53%	14.62%
TOTAL PAPER FIBERS	**60,730.17**		**41.15%**
PET #1	5,076.81	17.98%	3.44%
HDPE #2	2,395.69	8.49%	1.62%
Other Numbered Containers	3,951.40	14.00%	2.68%
Plastic Film/Wrap/Bags	10,260.10	36.34%	6.95%
Other Plastics	6,547.00	23.19%	4.44%
TOTAL PLASTICS	**28,231.00**		**19.13%**
Clear Glass Containers	3,841.91	52.97%	2.60%
Brown Glass Containers	2,436.19	33.59%	1.65%
Green Glass Containers	691.98	9.54%	0.47%
Blue Glass Containers	37.65	0.52%	0.03%
Other Glass	244.62	3.37%	0.17%
TOTAL GLASS	**7,252.35**		**4.91%**
Aluminum Cans	1,772.37	33.02%	1.20%
Tin Cans	2,426.10	45.19%	1.64%
Other Aluminum	463.10	8.63%	0.31%
Other Tin	265.68	4.95%	0.18%
Other Mixed Metals	440.88	8.21%	0.30%
TOTAL METALS	**5,368.13**		**3.64%**
Food	24,552.67		16.64%
Diapers	5,850.28		3.96%
Textiles/Rubber/Leather	7,385.91		5.00%
Yard Waste	4,182.93		2.83%
Household Hazardous Waste	44.20		0.03%
Electronic Waste	515.93		0.35%
Dry-Cell Batteries	120.72		0.08%
Misc. C/D Waste	324.04		0.22%
Wood	660.58		0.45%
Empty Aerosol Cans	308.80		0.21%
Non-Distinct Waste	1,685.34		1.14%
Other Misc. Wastes	362.56		0.25%
TOTAL WEIGHT OF SORTED SAMPLE	**147,575.61**		**100.00%**

TABLE 5.11
STATEWIDE CONSOLIDATED VOLUME DATA SUMMARY

Material Category/Component	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Cardboard	1,588.25	11.96%	5.04%
Office Paper	1,198.67	9.03%	3.80%
Newsprint	1,140.40	8.59%	3.62%
Magazines	1,036.13	7.81%	3.29%
Paperboard/Liner Board	3,022.49	22.77%	9.59%
Mixed Paper	5,289.01	39.84%	16.78%
TOTAL PAPER FIBERS	**13,274.94**		**42.11%**
PET #1	2,047.10	17.31%	6.49%
HDPE #2	1,478.82	12.50%	4.69%
Other Numbered Containers	2,016.02	17.04%	6.40%
Plastic Film/Wrap/Bags	4,153.89	35.12%	13.18%
Other Plastics	2,132.57	18.03%	6.77%
TOTAL PLASTICS	**11,828.40**		**37.52%**
Clear Glass Containers	342.42	65.99%	1.09%
Brown Glass Containers	138.89	26.77%	0.44%
Green Glass Containers	37.55	7.24%	0.12%
Blue Glass Containers			
Other Glass			
TOTAL GLASS	**518.86**		**1.65%**
Aluminum Cans	651.61	52.09%	2.07%
Tin Cans	469.26	37.51%	1.49%
Other Aluminum	130.08	10.40%	0.41%
Other Tin			
Other Mixed Metals			
TOTAL METALS	**1,250.96**		**3.97%**
Food	1,143.58		3.63%
Diapers	610.68		1.94%
Textiles/Rubber/Leather	2,098.27		6.66%
Yard Waste	796.75		2.53%
TOTAL VOLUME OF SORTED SAMPLE	**31,522.43**		**100.00%**

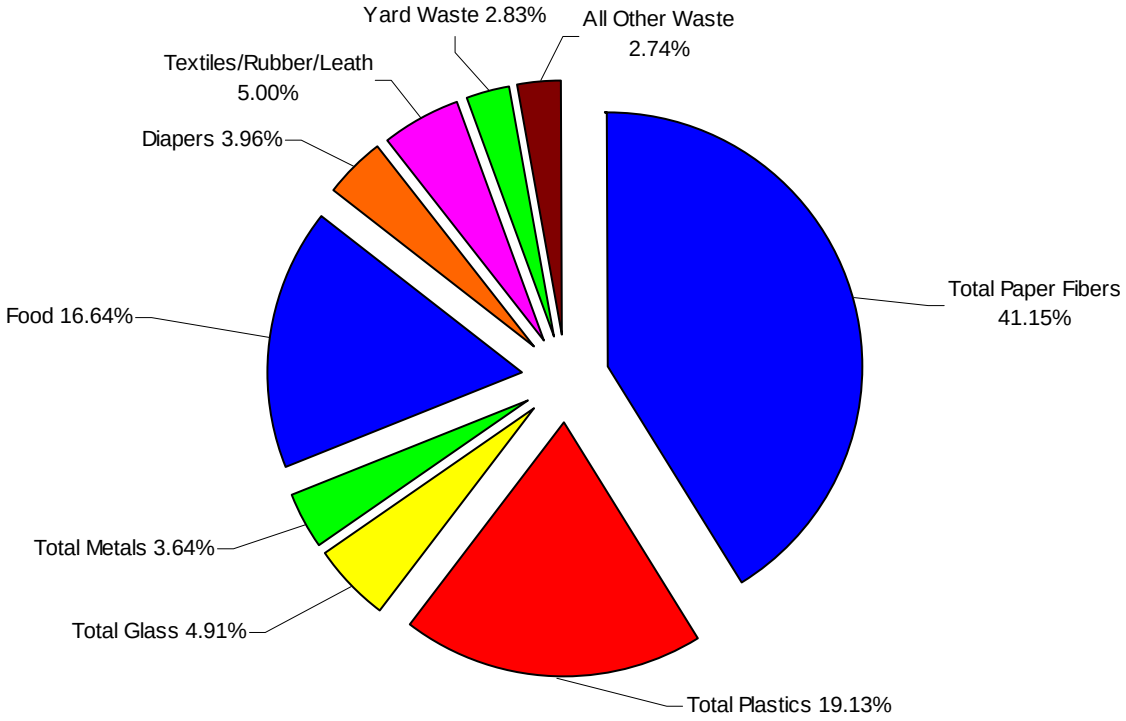


CHART 5.1
DISTRIBUTION OF THE CONSOLIDATED STATEWIDE WEIGHT DATA

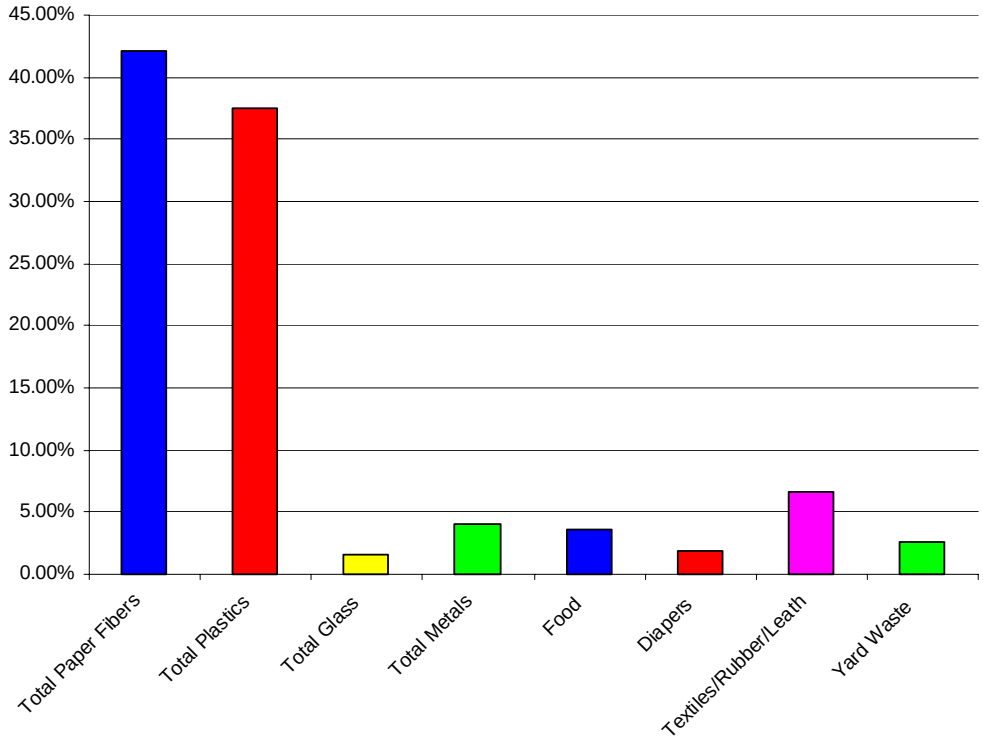


CHART 5.2
DISTRIBUTION OF THE CONSOLIDATED STATEWIDE VOLUME DATA

5.3 SEASONAL AND CONSOLIDATED DATA COMPARISON

Table 5.12 and Table 5.13 provide a seasonal comparison of the consolidated statewide waste stream by weight and volume, respectively. In addition, graphs comparing the four waste-material components (paper fibers, plastics, glass, and metals) and the four major other waste categories (food, diapers, textiles/rubber/leather, and yard waste) at the eight participating facilities (or sites) and the consolidated statewide waste stream are presented in Chart 5.3 through Chart 5.10. These graphs provide insight to the impact seasons have on the waste stream. In addition, these graphs also indicate how variations that occurred at the eight sites affect the overall characteristics of the waste stream.

As can be seen in these graphs, only the paper fibers component and the food category trend similarly among the eight sites and the consolidated statewide waste stream. The other six waste-material components or categories have at least one site that is out of sync with the other sites or the consolidated statewide waste stream. For the plastics, glass, and metals components, the site that is out of sync is Valentine. Because this site is small and the least number of samples were captured and sorted at this facility, being out of sync with the other sites or the consolidated statewide waste stream is not surprising.

When comparing the remaining three waste-material categories (diapers, textiles/rubber/leather, and yard waste), three or more sites are out of sync. For all three of these waste-material categories, the Valentine site is out of sync. In addition, the Chadron and Norfolk sites are out of sync in the diapers category; none of the sites are in sync in the textiles/rubber/leather category; and the Chadron, Sidney, and Hastings sites are out of sync in the yard waste category.

The volatility of the diapers, textiles/rubber/leather, and yard waste categories reflects the characteristics of these categories. These categories can be affected in a number of ways which results in variance from the norm. The birth rate and age of the population in a community both affect the diapers category. For example, as the age of the population increases and the number of nursing homes increases, more adult diapers are found in the waste stream and the diapers category increases.

The textiles/rubber/leather category is impacted by a variety of circumstances. The sites that are not in sync with the consolidated statewide waste stream varied from the largest site (Omaha) to the smallest site (Valentine). This category of the waste stream is more sensitive to changes in a community than any other. Increased population movement, increased retirements or deaths, the end of semesters at local colleges, and employment reductions all impact the amount of textiles/rubber/leather entering the waste stream.

The yard waste category is directly impacted by the seasons. It is also impacted by weather conditions. For example, warm spells during typically dormant periods often result in a surge in yard waste as people tend to undertake some yard work or address vegetation problems or damage that may have occurred during the winter season. This weather effect is possibly the reason for the variations from the norm at the Sidney and Hastings sites.

Although a few of the four waste-material components and the four major other waste categories at some of the sites are out of sync with the consolidated statewide waste stream, the majority of the sites are in sync for seven of these eight components or categories. The only exception is the textiles/rubber/leather category, where none of the sites are in sync with the consolidated statewide waste stream. It is important to note that the textiles/rubber/leather category of the consolidated statewide waste stream varies less than 0.6% from season to season. This variation is comparable to the other seven waste-material components and categories.

TABLE 5.12
STATEWIDE COMPARISON OF SEASONAL WEIGHT DATA PERCENTAGES

Material Category/Component	WEIGHT DATA PERCENTAGES	
	Fall 2007	Winter 2008
Cardboard	7.92%	7.63%
Office Paper	3.95%	5.73%
Newsprint	6.34%	4.27%
Magazines	3.45%	4.20%
Paperboard/Liner Board	6.06%	5.43%
Mixed Paper	15.21%	14.08%
TOTAL PAPER FIBERS	**42.93%**	**41.34%**
PET #1	3.27%	3.45%
HDPE #2	1.64%	1.62%
Other Numbered Containers	3.27%	2.97%
Plastic Film/Wrap/Bags	6.42%	6.93%
Other Plastics	6.81%	3.15%
TOTAL PLASTICS	**21.41%**	**18.11%**
Clear Glass Containers	2.29%	2.72%
Brown Glass Containers	1.88%	1.58%
Green Glass Containers	0.38%	0.55%
Blue Glass Containers	0.01%	0.02%
Other Glass	0.16%	0.19%
TOTAL GLASS	**4.72%**	**5.06%**
Aluminum Cans	1.33%	1.21%
Tin Cans	1.52%	1.88%
Other Aluminum	0.33%	0.28%
Other Tin	0.08%	0.18%
Other Mixed Metals	0.25%	0.39%
TOTAL METALS	**3.51%**	**3.94%**
Food	14.02%	17.72%
Diapers	4.21%	3.90%
Textiles/Rubber/Leather	4.47%	4.98%
Yard Waste	3.01%	2.72%
Household Hazardous Waste	0.03%	0.02%
Electronic Waste	0.23%	0.34%
Dry-Cell Batteries	0.07%	0.08%
Misc. C/D Waste	0.06%	0.18%
Wood	0.24%	0.39%
Empty Aerosol Cans	0.19%	0.21%
Non-Distinct Waste	0.45%	0.84%
Other Misc. Wastes	0.44%	0.16%

TABLE 5.12 (continued)
STATEWIDE COMPARISON OF SEASONAL WEIGHT DATA PERCENTAGES

WEIGHT DATA PERCENTAGES			
Spring 2008	Summer 2008	Consolidated	Material Category/Component
9.15%	7.55%	8.04%	Cardboard
4.20%	3.67%	4.37%	Office Paper
4.68%	4.48%	4.96%	Newsprint
4.04%	3.77%	3.85%	Magazines
4.71%	4.97%	5.30%	Paperboard/Liner Board
14.15%	14.97%	14.62%	Mixed Paper
40.92%	**39.41%**	**41.15%**	**TOTAL PAPER FIBERS**
3.37%	3.67%	3.44%	PET #1
1.62%	1.62%	1.62%	HDPE #2
2.53%	1.93%	2.68%	Other Numbered Containers
7.34%	7.16%	6.95%	Plastic Film/Wrap/Bags
3.75%	3.89%	4.44%	Other Plastics
18.62%	**18.27%**	**19.13%**	**TOTAL PLASTICS**
2.66%	2.76%	2.60%	Clear Glass Containers
1.47%	1.65%	1.65%	Brown Glass Containers
0.43%	0.51%	0.47%	Green Glass Containers
0.02%	0.05%	0.03%	Blue Glass Containers
0.12%	0.19%	0.17%	Other Glass
4.70%	**5.16%**	**4.91%**	**TOTAL GLASS**
1.01%	1.23%	1.20%	Aluminum Cans
1.76%	1.45%	1.64%	Tin Cans
0.33%	0.31%	0.31%	Other Aluminum
0.14%	0.31%	0.18%	Other Tin
0.24%	0.32%	0.30%	Other Mixed Metals
3.48%	**3.63%**	**3.64%**	**TOTAL METALS**
15.81%	18.98%	16.64%	Food
3.91%	3.82%	3.96%	Diapers
5.43%	5.18%	5.00%	Textiles/Rubber/Leather
3.93%	1.78%	2.83%	Yard Waste
0.05%	0.02%	0.03%	Household Hazardous Waste
0.44%	0.39%	0.35%	Electronic Waste
0.08%	0.09%	0.08%	Dry-Cell Batteries
0.11%	0.52%	0.22%	Misc. C/D Waste
0.34%	0.81%	0.45%	Wood
0.23%	0.21%	0.21%	Empty Aerosol Cans
1.94%	1.40%	1.14%	Non-Distinct Waste
0.02%	0.33%	0.25%	Other Misc. Wastes

TABLE 5.13
STATEWIDE COMPARISON OF SEASONAL VOLUME DATA PERCENTAGES

Material Category/Component	VOLUME DATA PERCENTAGES	
	Fall 2007	Winter 2008
Cardboard	4.72%	4.82%
Office Paper	3.27%	5.02%
Newsprint	4.40%	3.14%
Magazines	2.80%	3.61%
Paperboard/Liner Board	10.43%	9.88%
Mixed Paper	16.61%	16.27%
TOTAL PAPER FIBERS	**42.24%**	**42.72%**
PET #1	5.87%	6.55%
HDPE #2	4.50%	4.70%
Other Numbered Containers	7.44%	7.15%
Plastic Film/Wrap/Bags	11.58%	13.22%
Other Plastics	9.89%	4.83%
TOTAL PLASTICS	**39.29%**	**36.46%**
Clear Glass Containers	0.91%	1.14%
Brown Glass Containers	0.48%	0.43%
Green Glass Containers	0.09%	0.14%
Blue Glass Containers		
Other Glass		
TOTAL GLASS	**1.48%**	**1.71%**
Aluminum Cans	2.18%	2.10%
Tin Cans	1.31%	1.71%
Other Aluminum	0.41%	0.38%
Other Tin		
Other Mixed Metals		
TOTAL METALS	**3.90%**	**4.19%**
Food	2.91%	3.89%
Diapers	1.96%	1.92%
Textiles/Rubber/Leather	5.66%	6.66%
Yard Waste	2.55%	2.45%

TABLE 5.13 (continued)
STATEWIDE COMPARISON OF SEASONAL VOLUME DATA PERCENTAGES

VOLUME DATA PERCENTAGES			
Spring 2008	**Summer 2008**	**Consolidated**	**Material Category/Component**
5.78%	4.91%	5.04%	Cardboard
3.68%	3.32%	3.80%	Office Paper
3.44%	3.39%	3.62%	Newsprint
3.47%	3.33%	3.29%	Magazines
8.58%	9.32%	9.59%	Paperboard/Liner Board
16.37%	17.83%	16.78%	Mixed Paper
41.33%	**42.10%**	**42.11%**	**TOTAL PAPER FIBERS**
6.42%	7.18%	6.49%	PET #1
4.71%	4.87%	4.69%	HDPE #2
6.10%	4.79%	6.40%	Other Numbered Containers
14.03%	14.09%	13.18%	Plastic Film/Wrap/Bags
5.77%	6.15%	6.77%	Other Plastics
37.03%	**37.09%**	**37.52%**	**TOTAL PLASTICS**
1.12%	1.20%	1.09%	Clear Glass Containers
0.40%	0.46%	0.44%	Brown Glass Containers
0.11%	0.14%	0.12%	Green Glass Containers
			Blue Glass Containers
			Other Glass
1.62%	**1.79%**	**1.65%**	**TOTAL GLASS**
1.76%	2.20%	2.07%	Aluminum Cans
1.61%	1.36%	1.49%	Tin Cans
0.43%	0.43%	0.41%	Other Aluminum
			Other Tin
			Other Mixed Metals
3.80%	**3.99%**	**3.97%**	**TOTAL METALS**
3.48%	4.29%	3.63%	Food
1.93%	1.94%	1.94%	Diapers
7.28%	7.16%	6.66%	Textiles/Rubber/Leather
3.54%	1.64%	2.53%	Yard Waste

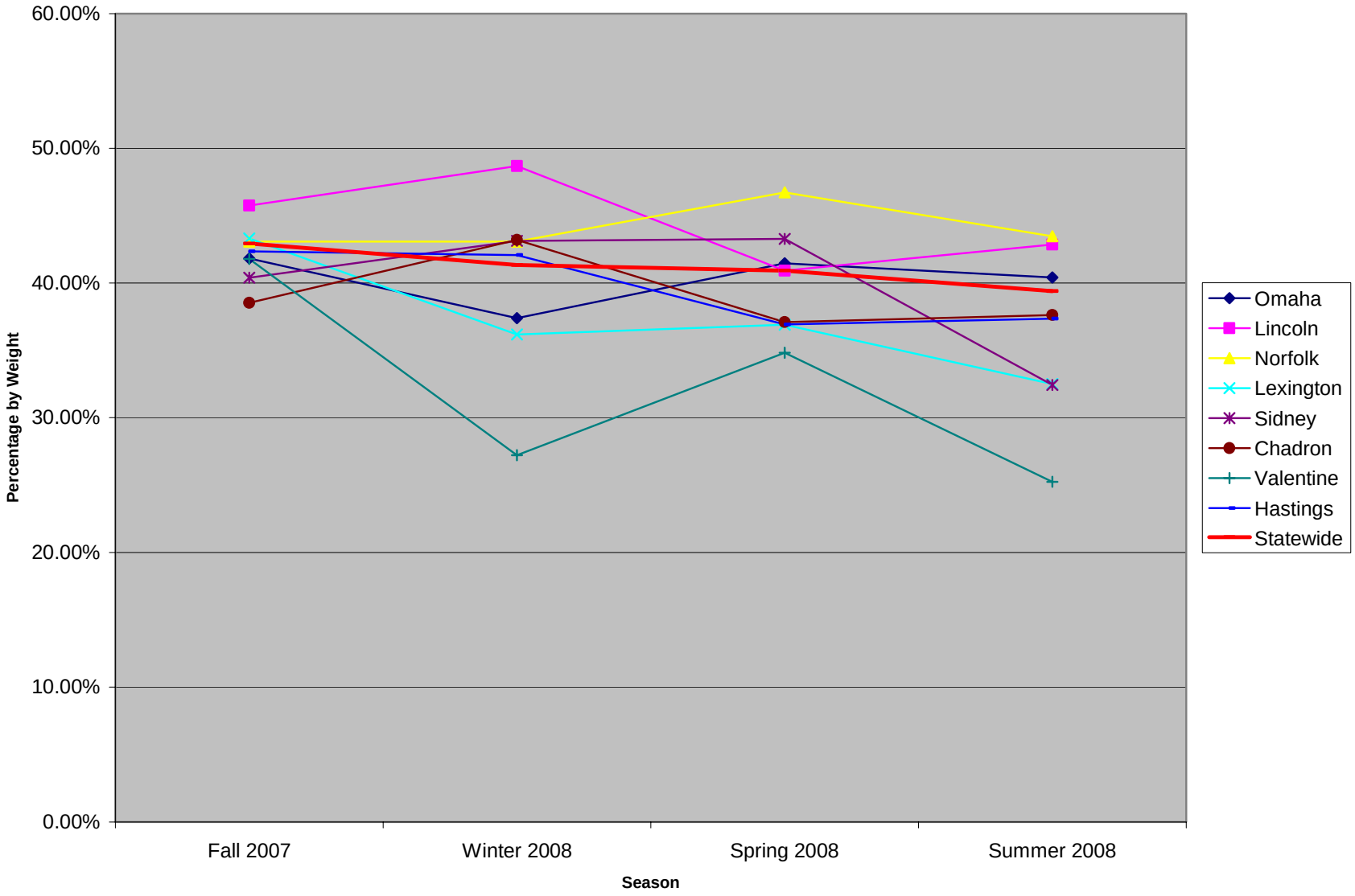


CHART 5.3
PERCENTAGE OF THE PAPER FIBERS COMPONENT FOR EACH PARTICIPATING FACILITY AND CONSOLIDATED STATEWIDE WASTE STREAMS

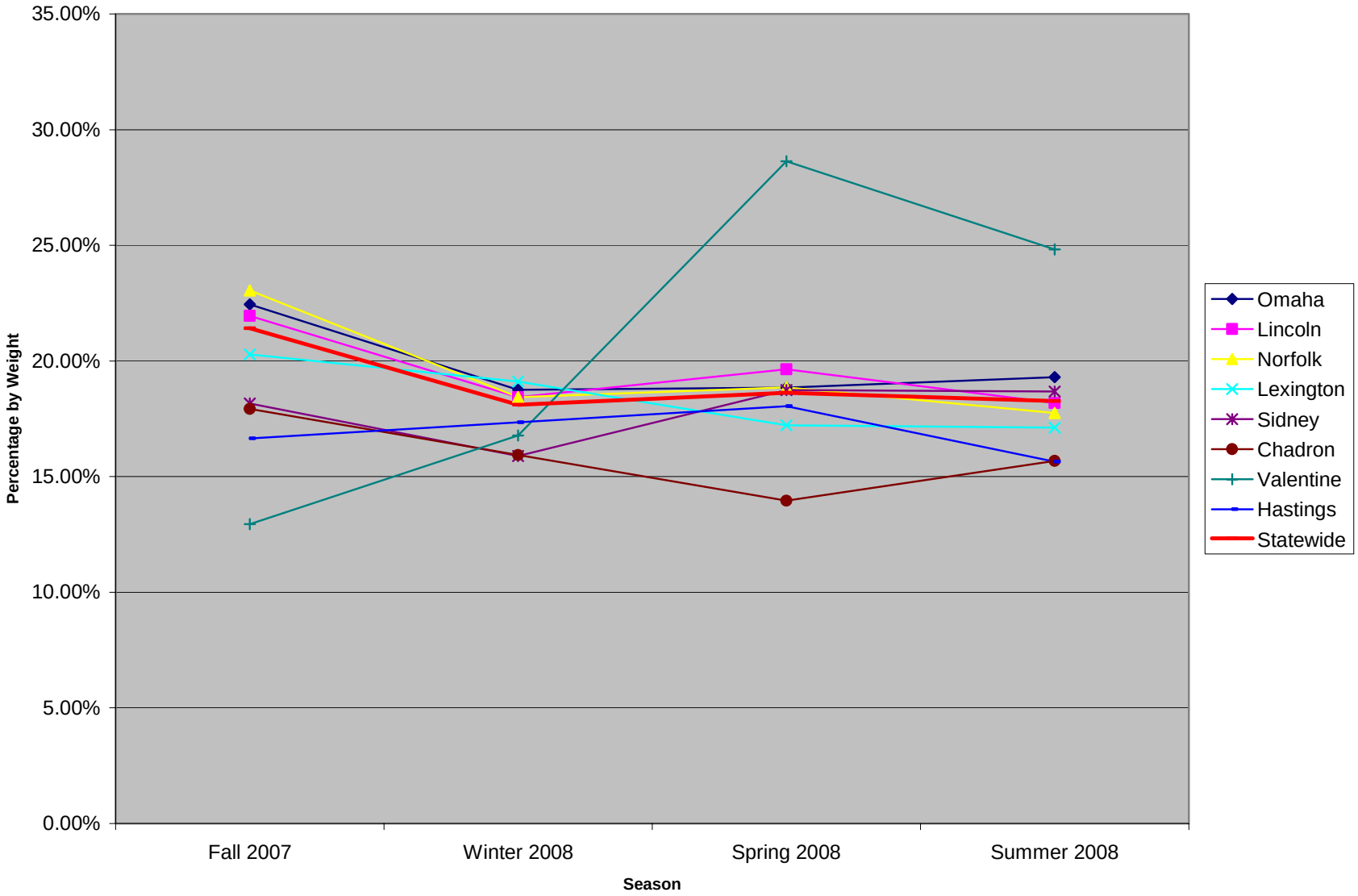


CHART 5.4
PERCENTAGE OF THE PLASTICS COMPONENT FOR EACH PARTICIPATING FACILITY AND CONSOLIDATED STATEWIDE WASTE STREAMS

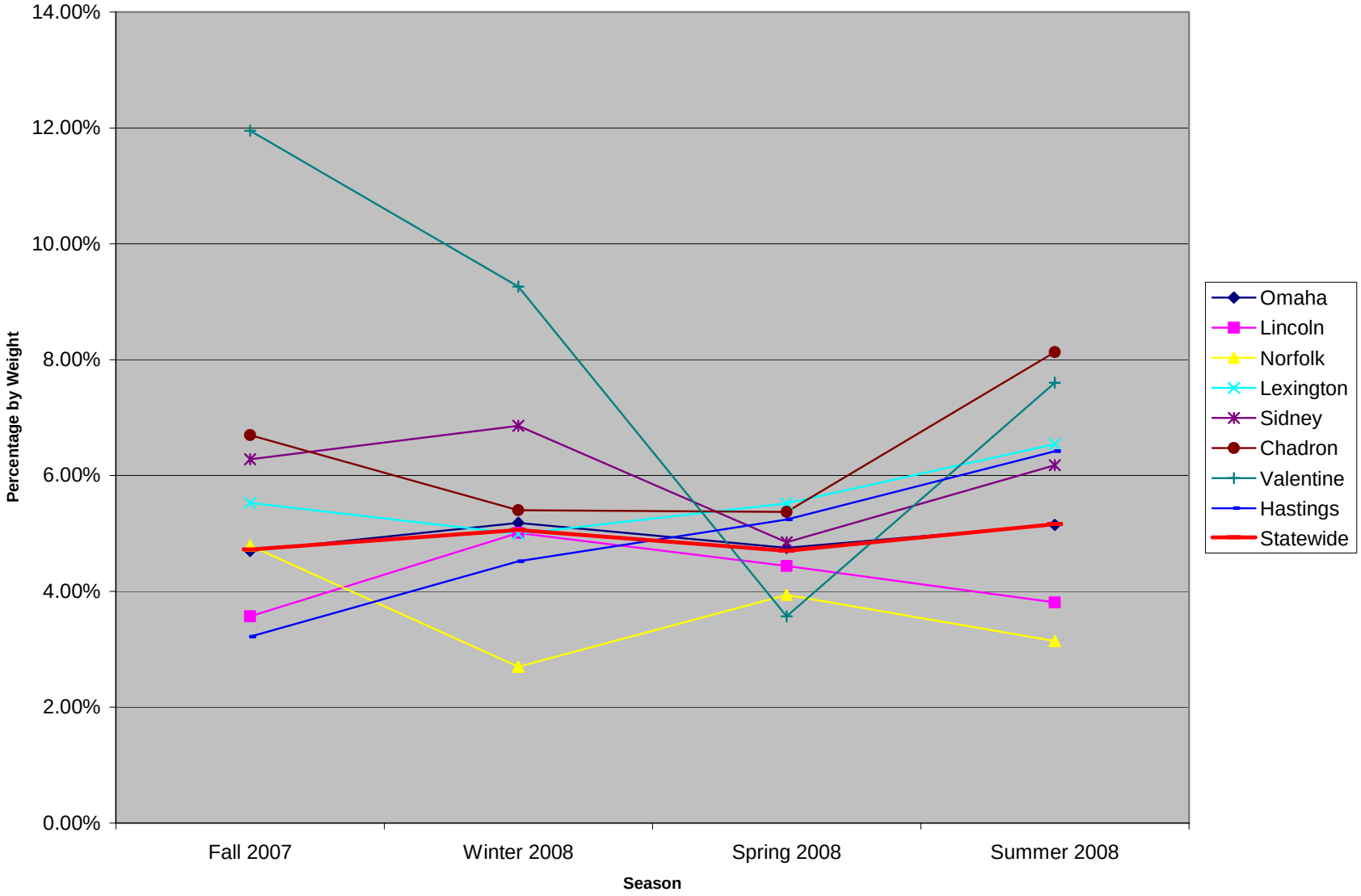


CHART 5.5
PERCENTAGE OF THE GLASS COMPONENT FOR EACH PARTICIPATING FACILITY AND CONSOLIDATED STATEWIDE WASTE STREAMS

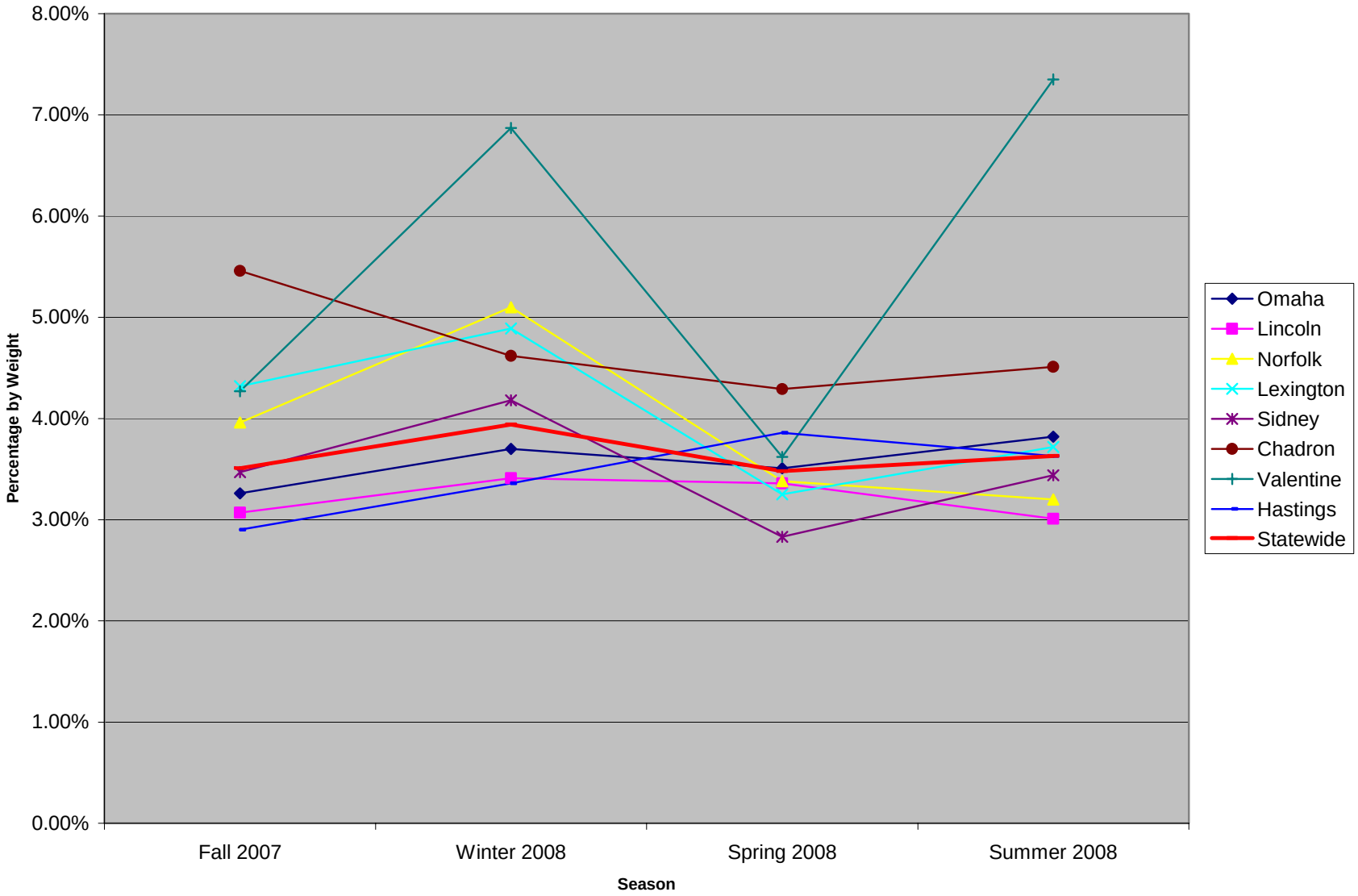


CHART 5.6
PERCENTAGE OF THE METALS COMPONENT FOR EACH
PARTICIPATING FACILITY AND CONSOLIDATED STATEWIDE WASTE STREAMS

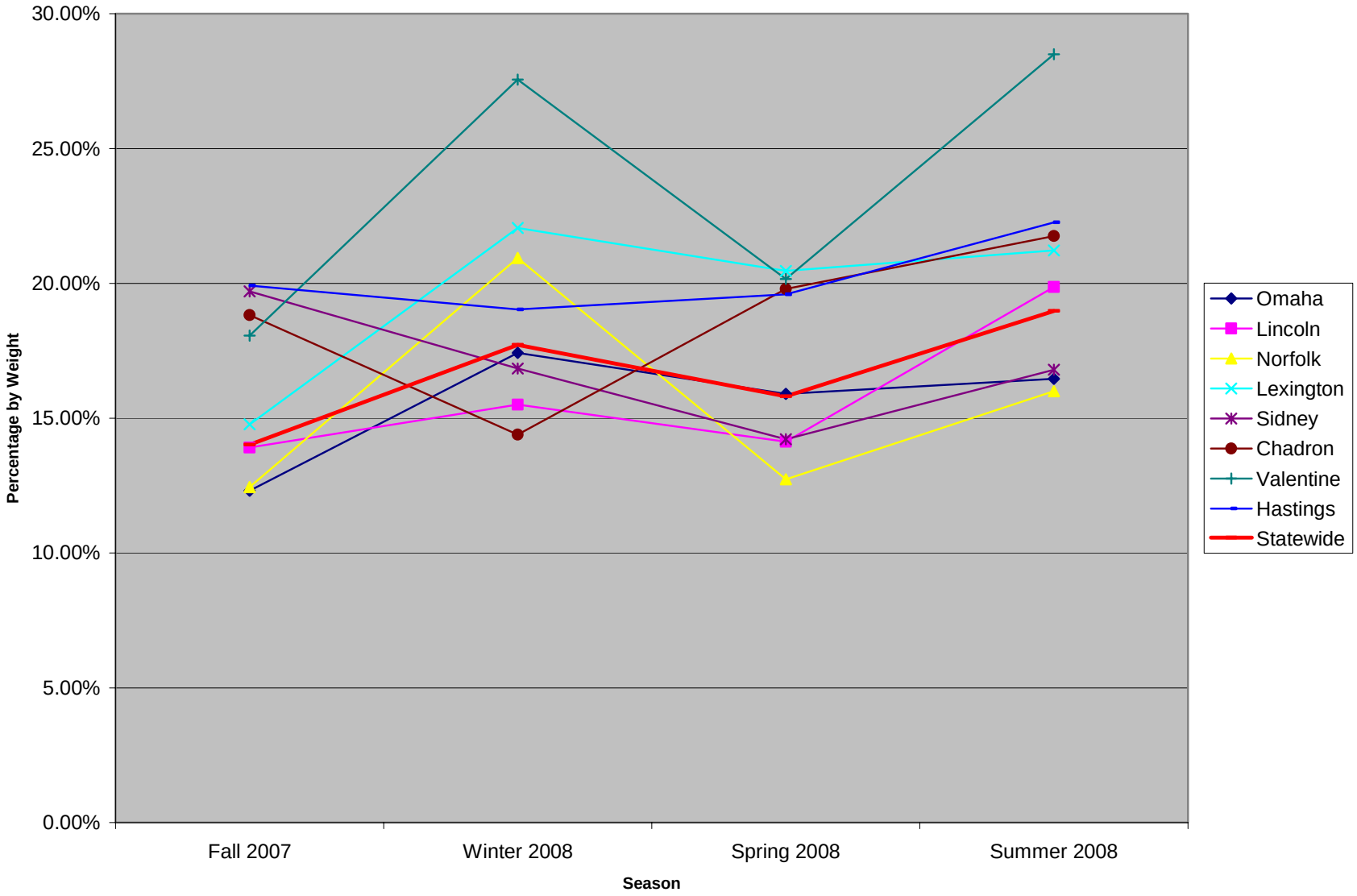


CHART 5.7
PERCENTAGE OF THE FOOD CATEGORY FOR EACH
PARTICIPATING FACILITY AND CONSOLIDATED STATEWIDE WASTE STREAMS

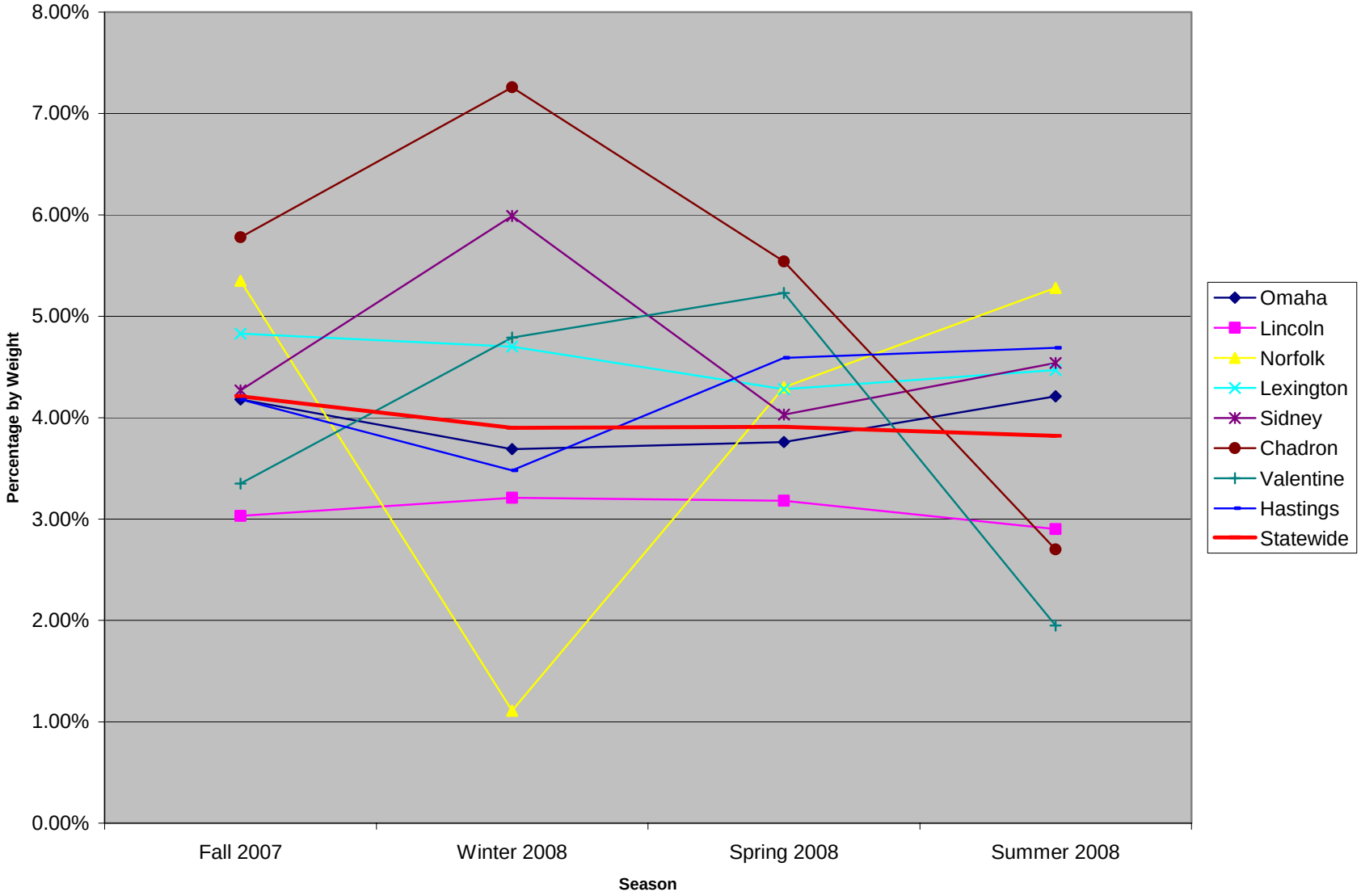


CHART 5.8
PERCENTAGE OF THE DIAPERS CATEGORY FOR EACH PARTICIPATING FACILITY AND CONSOLIDATED STATEWIDE WASTE STREAMS

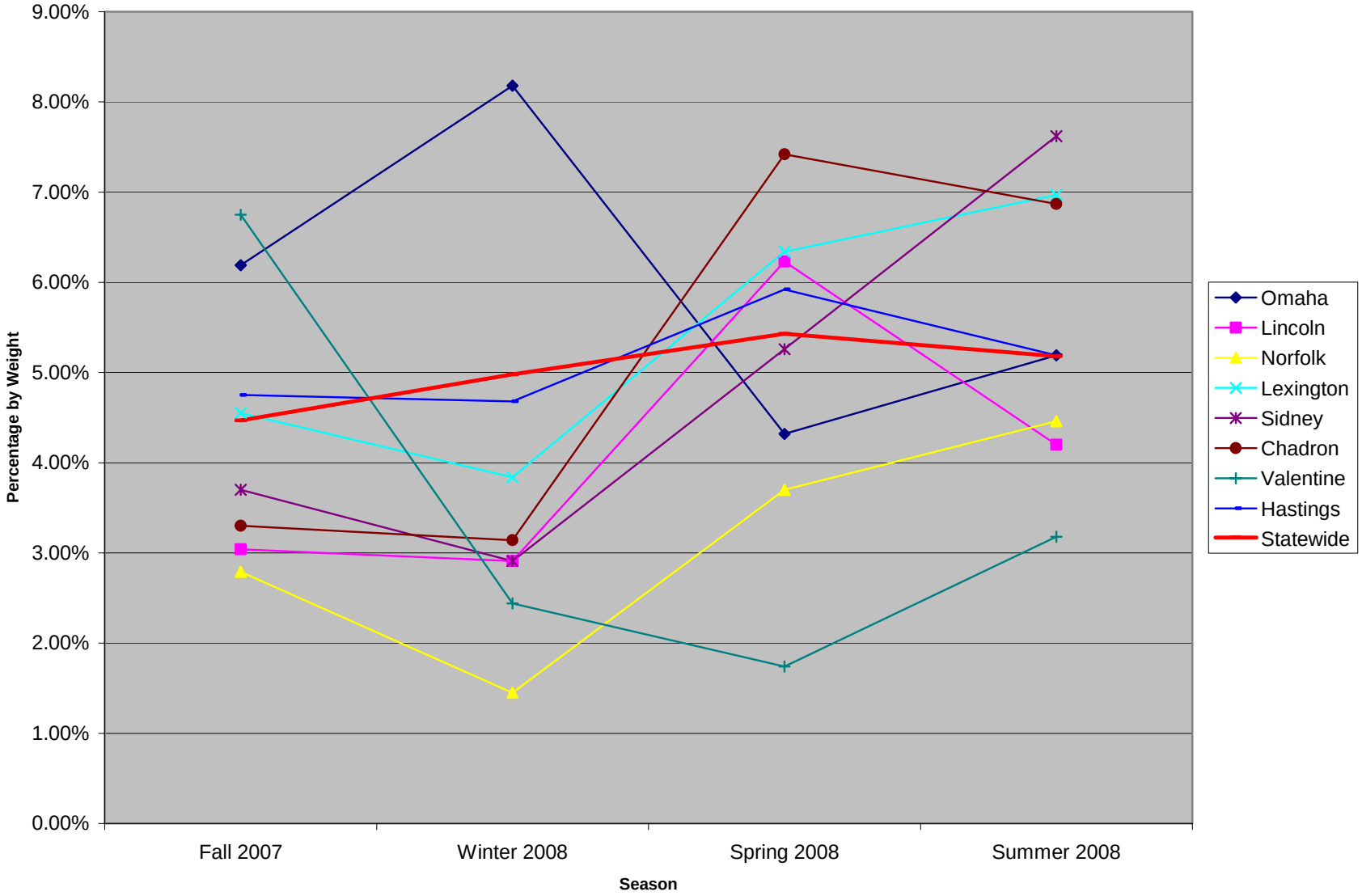


CHART 5.9
PERCENTAGE OF THE TEXTILES / RUBBER / LEATHER CATEGORY FOR EACH PARTICIPATING FACILITY AND CONSOLIDATED STATEWIDE WASTE STREAMS

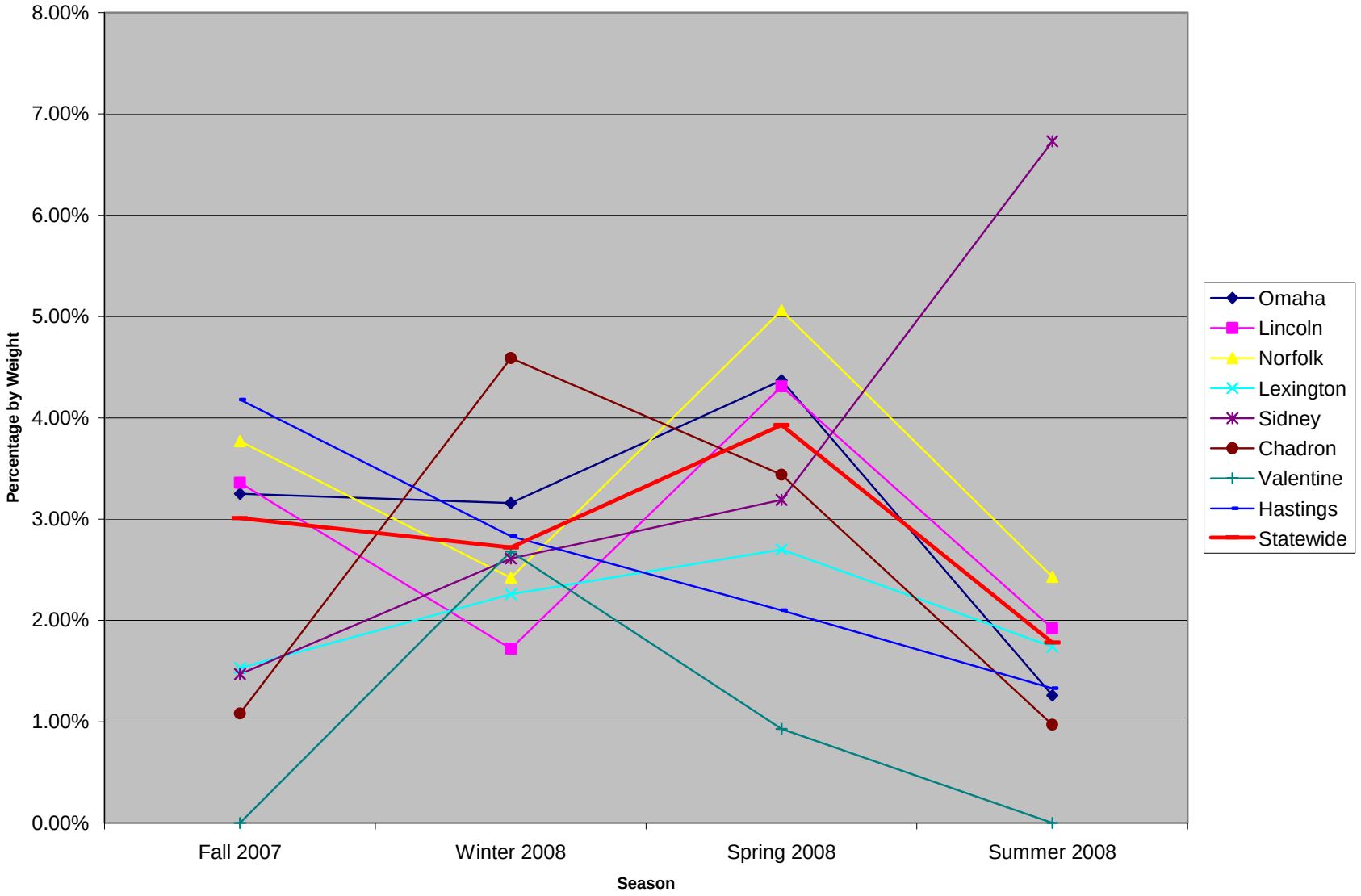


CHART 5.10
PERCENTAGE OF THE YARD WASTE CATEGORY FOR EACH PARTICIPATING FACILITY AND CONSOLIDATED STATEWIDE WASTE STREAMS

6. TYPE OF WASTE ANALYSIS

In addition to conducting an analysis using the statewide weight and volume information, an analysis based on the type of waste (residential, commercial, and mixed) was also conducted. This analysis utilized the consolidated statewide seasonal data (Fall 2007, Winter 2008, Spring 2008, and Summer 2008 combined).

6.1 RESIDENTIAL WASTE STREAM

During the Fall 2007, Winter 2008, Spring 2008, and Summer 2008 (consolidated) field sorting events, a total of 284 loads of residential waste were sampled. Table 6.1 presents a summary of the statewide weight data for the sampled residential loads. The largest portion of the statewide residential samples, by weight, was the paper fibers component at 35.33%. The second and third largest portions, by weight, were the plastics component at 19.27% and the food category at 17.22%. Chart 6.1 presents a graphic representation of the consolidated statewide residential weight data.

Table 6.2 presents a summary of the volume data for the statewide residential waste stream. By volume, the largest portion of the statewide residential waste stream was the paper fibers component at 38.38%. The second and third largest portions, by volume, were the plastics component at 37.44% and the textiles/rubber/leather category at 8.29%. The paper and plastics components combined comprised more than 75% of the volume of the statewide residential waste stream. Chart 6.2 presents a graphic representation of the consolidated statewide residential volume data.

TABLE 6.1
STATEWIDE RESIDENTIAL WEIGHT DATA SUMMARY

Material Category/Component	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Cardboard	1,320.97	5.67%	2.00%
Office Paper	2,082.03	8.93%	3.16%
Newsprint	4,029.80	17.28%	6.11%
Magazines	2,955.07	12.67%	4.48%
Paperboard/Liner Board	3,947.13	16.93%	5.98%
Mixed Paper	8,979.90	38.52%	13.61%
TOTAL PAPER FIBERS	**23,314.90**		**35.33%**
PET #1	2,091.22	16.44%	3.17%
HDPE #2	1,230.26	9.67%	1.86%
Other Numbered Containers	1,612.93	12.68%	2.44%
Plastic Film/Wrap/Bags	4,566.95	35.91%	6.92%
Other Plastics	3,215.29	25.28%	4.87%
TOTAL PLASTICS	**12,716.65**		**19.27%**
Clear Glass Containers	2,218.75	54.19%	3.36%
Brown Glass Containers	1,266.37	30.93%	1.92%
Green Glass Containers	441.92	10.79%	0.67%
Blue Glass Containers	23.63	0.58%	0.04%
Other Glass	143.47	3.50%	0.22%
TOTAL GLASS	**4,094.14**		**6.20%**
Aluminum Cans	876.80	33.04%	1.33%
Tin Cans	1,246.97	46.98%	1.89%
Other Aluminum	237.32	8.94%	0.36%
Other Tin	106.85	4.03%	0.16%
Other Mixed Metals	186.12	7.01%	0.28%
TOTAL METALS	**2,654.06**		**4.02%**
Food	11,361.31		17.22%
Diapers	3,388.06		5.13%
Textiles/Rubber/Leather	4,148.18		6.29%
Yard Waste	2,369.48		3.59%
Household Hazardous Waste	25.12		0.04%
Electronic Waste	223.74		0.34%
Dry-Cell Batteries	61.62		0.09%
Misc. C/D Waste	116.00		0.18%
Wood	257.86		0.39%
Empty Aerosol Cans	169.41		0.26%
Non-Distinct Waste	998.33		1.51%
Other Misc. Wastes	84.68		0.13%
TOTAL WEIGHT OF SORTED SAMPLE	**65,984.18**		**100.00%**

TABLE 6.2
STATEWIDE RESIDENTIAL VOLUME DATA SUMMARY

Material Category/Component	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Cardboard	176.84	3.24%	1.24%
Office Paper	386.99	7.09%	2.72%
Newsprint	627.69	11.51%	4.42%
Magazines	538.26	9.87%	3.79%
Paperboard/Liner Board	1,523.99	27.94%	10.72%
Mixed Paper	2,200.96	40.35%	15.49%
TOTAL PAPER FIBERS	**5,454.73**		**38.38%**
PET #1	843.23	15.84%	5.93%
HDPE #2	759.42	14.27%	5.34%
Other Numbered Containers	822.92	15.46%	5.79%
Plastic Film/Wrap/Bags	1,848.97	34.74%	13.01%
Other Plastics	1,047.33	19.68%	7.37%
TOTAL PLASTICS	**5,321.87**		**37.44%**
Clear Glass Containers	197.75	67.28%	1.39%
Brown Glass Containers	72.20	24.56%	0.51%
Green Glass Containers	23.98	8.16%	0.17%
Blue Glass Containers			
Other Glass			
TOTAL GLASS	**293.93**		**2.07%**
Aluminum Cans	322.35	51.15%	2.27%
Tin Cans	241.19	38.27%	1.70%
Other Aluminum	66.66	10.58%	0.47%
Other Tin			
Other Mixed Metals			
TOTAL METALS	**630.21**		**4.43%**
Food	529.17		3.72%
Diapers	353.66		2.49%
Textiles/Rubber/Leather	1,178.46		8.29%
Yard Waste	451.33		3.18%
TOTAL VOLUME OF SORTED SAMPLE	**14,213.36**		**100.00%**

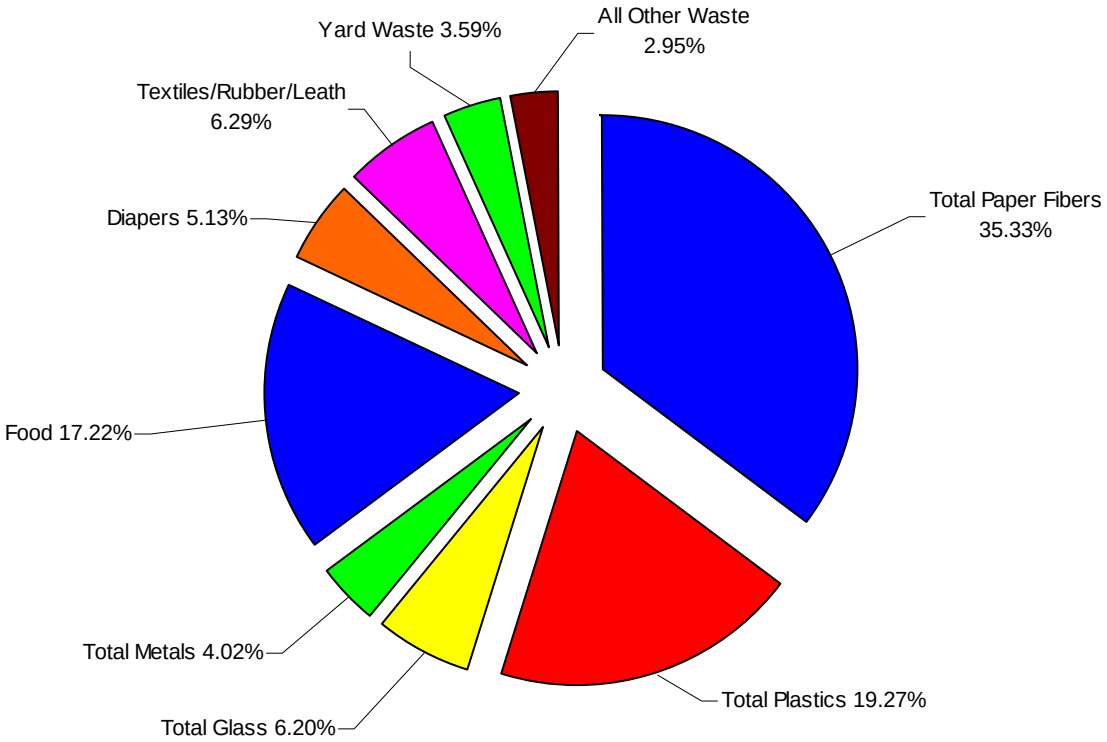


CHART 6.1
DISTRIBUTION OF THE CONSOLIDATED STATEWIDE RESIDENTIAL WEIGHT DATA

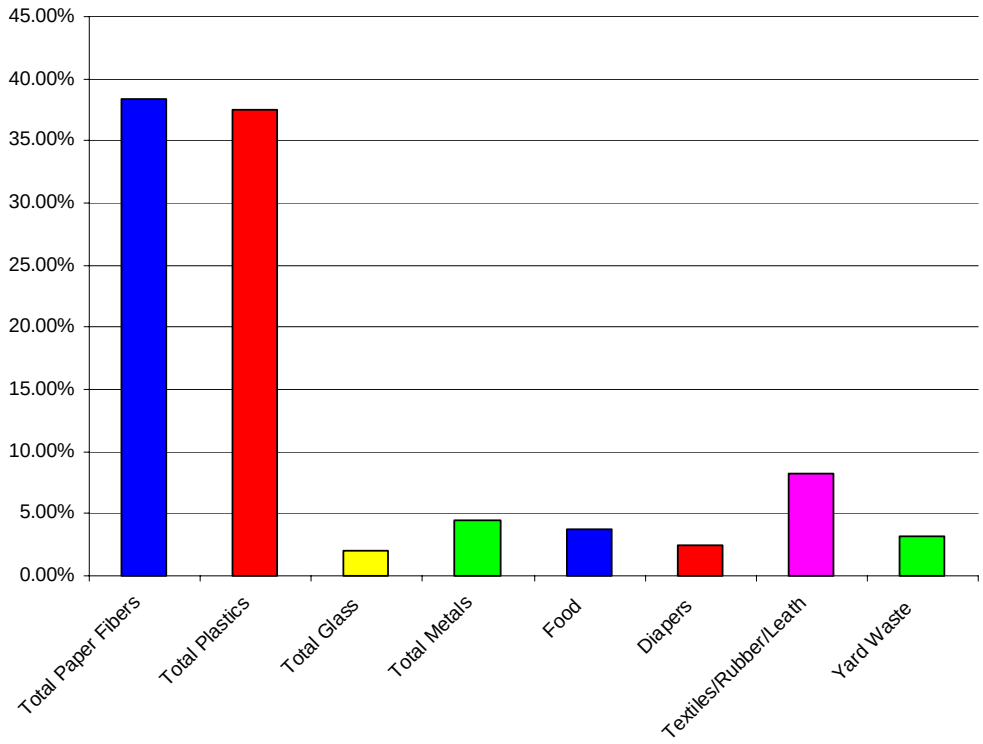


CHART 6.2
DISTRIBUTION OF THE CONSOLIDATED STATEWIDE RESIDENTIAL VOLUME DATA

Table 6.3 and Table 6.4 provide a seasonal comparison of the consolidated statewide residential waste stream by weight and volume, respectively. Additionally, Table 6.5 presents a summary of the variance from season to season for the four waste-material components and four major other waste categories of the residential waste stream. As can be seen in these tables, the largest variance occurred in the food category, which comprised 13.57% of the waste stream in Fall 2007 and rose to 20.26% of the waste stream in Summer 2008. The second largest variance was in the plastics component. This component accounted for 22.28% of the waste stream in Fall 2007 and then dropped to a consistent 18.14%, 18.36%, and 18.37% for the other three seasons. The remaining six waste-material components and categories varied from 3.92% to 0.32% among the four seasons. Five of the eight waste-material components' or categories' percentage of the waste stream decreased from Fall 2007 to Summer 2008. The remaining three components and categories rose from Fall 2007 to Summer 2008.

No residential loads of waste were sorted at three of the participating facilities – Norfolk, Chadron, and Valentine – during the Spring 2008 and Summer 2008 field sorting events. This situation does not appear to impact consolidated statewide residential data. Typically, when only residential and commercial loads are considered, residential loads comprise from 52% to 60% of the waste stream. Although no residential loads of waste were sampled at some of the participating facilities, residential waste comprises 55% of the waste stream when the mixed waste loads are removed from Nebraska's consolidated statewide waste stream and only residential and commercial loads are considered. Residential waste comprises 46% of Nebraska's consolidated statewide waste stream when all types of loads (residential, commercial, and mixed waste) are considered.

Of the four waste-material components and the four major other waste categories, it appears that only plastics, food, and yard waste were affected by seasonal changes. The reason for the dramatic change in the plastics component is difficult to determine. The season-to-season variations in the food and yard waste categories are explained by variations in behaviors from season to season. For example, the percentage of food found in the waste stream increased from 13.57% in Fall 2007 to 20.26% in Summer 2008. There is an increased availability of certain foods during summer months – sweet corn, melons, garden vegetables, etc. – and a consequent increase in the waste from these types of food products.

Variations in the yard waste category appear to reflect two distinctly opposite circumstances. It would be anticipated that yard waste found in the waste stream would increase in the fall and spring seasons. Interestingly, yard waste comprised 4.03% of the waste stream in Fall 2007, 3.15% in Winter 2008, 5.56% in Spring 2008, and 1.80% in Summer 2008. Nebraska's yard waste ban was in effect during the Fall 2007, Spring 2008, and Summer 2008 field sorting events (April 1 through November 30). The relatively small decrease in the percentage of yard waste found in the Fall 2007 and Winter 2008 residential samples (a 0.86% variance) may indicate that yard waste is being stored and then disposed when the yard waste ban is not in effect. In turn, the dramatic drop in the percentage of yard waste found in the Spring 2008 and Summer 2008 (a 3.76% variance) indicates the yard waste ban is working.

TABLE 6.3
STATEWIDE COMPARISON OF SEASONAL WEIGHT DATA PERCENTAGES FOR RESIDENTIAL WASTE

Material Category/Component	WEIGHT DATA PERCENTAGES	
	Fall 2007	Winter 2008
Cardboard	3.15%	1.85%
Office Paper	2.52%	4.15%
Newsprint	8.15%	4.88%
Magazines	3.61%	4.77%
Paperboard/Liner Board	6.40%	6.33%
Mixed Paper	13.71%	13.19%
TOTAL PAPER FIBERS	**37.55%**	**35.18%**
PET #1	2.93%	3.01%
HDPE #2	1.75%	1.90%
Other Numbered Containers	3.00%	2.83%
Plastic Film/Wrap/Bags	6.21%	7.12%
Other Plastics	8.38%	3.27%
TOTAL PLASTICS	**22.28%**	**18.14%**
Clear Glass Containers	2.99%	3.65%
Brown Glass Containers	2.21%	1.87%
Green Glass Containers	0.54%	0.86%
Blue Glass Containers	0.02%	0.04%
Other Glass	0.23%	0.24%
TOTAL GLASS	**5.99%**	**6.66%**
Aluminum Cans	1.47%	1.28%
Tin Cans	1.86%	2.08%
Other Aluminum	0.37%	0.31%
Other Tin	0.10%	0.13%
Other Mixed Metals	0.23%	0.38%
TOTAL METALS	**4.03%**	**4.18%**
Food	13.57%	18.27%
Diapers	5.46%	5.16%
Textiles/Rubber/Leather	5.62%	6.89%
Yard Waste	4.03%	3.15%
Household Hazardous Waste	0.05%	0.04%
Electronic Waste	0.24%	0.26%
Dry-Cell Batteries	0.07%	0.10%
Misc. C/D Waste	0.11%	0.27%
Wood	0.30%	0.38%
Empty Aerosol Cans	0.21%	0.25%
Non-Distinct Waste	0.49%	0.89%
Other Misc. Wastes	0.01%	0.18%

TABLE 6.3 (continued)
STATEWIDE COMPARISON OF SEASONAL WEIGHT DATA PERCENTAGES FOR RESIDENTIAL WASTE

WEIGHT DATA PERCENTAGES			
Spring 2008	**Summer 2008**	**Consolidated**	**Material Category/Component**
1.58%	1.44%	2.00%	Cardboard
2.97%	2.95%	3.16%	Office Paper
5.93%	5.52%	6.11%	Newsprint
4.56%	4.93%	4.48%	Magazines
5.38%	5.81%	5.98%	Paperboard/Liner Board
13.20%	14.29%	13.61%	Mixed Paper
33.63%	**34.95%**	**35.33%**	**TOTAL PAPER FIBERS**
3.19%	3.53%	3.17%	PET #1
1.93%	1.88%	1.86%	HDPE #2
2.13%	1.83%	2.44%	Other Numbered Containers
7.26%	7.08%	6.92%	Plastic Film/Wrap/Bags
3.85%	4.05%	4.87%	Other Plastics
18.36%	**18.37%**	**19.27%**	**TOTAL PLASTICS**
3.25%	3.55%	3.36%	Clear Glass Containers
1.90%	1.71%	1.92%	Brown Glass Containers
0.59%	0.68%	0.67%	Green Glass Containers
0.01%	0.07%	0.04%	Blue Glass Containers
0.16%	0.23%	0.22%	Other Glass
5.91%	**6.24%**	**6.20%**	**TOTAL GLASS**
1.18%	1.37%	1.33%	Aluminum Cans
2.01%	1.63%	1.89%	Tin Cans
0.42%	0.34%	0.36%	Other Aluminum
0.17%	0.25%	0.16%	Other Tin
0.25%	0.27%	0.28%	Other Mixed Metals
4.03%	**3.86%**	**4.02%**	**TOTAL METALS**
16.55%	20.26%	17.22%	Food
5.08%	4.85%	5.13%	Diapers
6.50%	6.14%	6.29%	Textiles/Rubber/Leather
5.56%	1.80%	3.59%	Yard Waste
0.05%	0.02%	0.04%	Household Hazardous Waste
0.41%	0.44%	0.34%	Electronic Waste
0.11%	0.10%	0.09%	Dry-Cell Batteries
0.15%	0.17%	0.18%	Misc. C/D Waste
0.53%	0.36%	0.39%	Wood
0.30%	0.26%	0.26%	Empty Aerosol Cans
2.83%	1.87%	1.51%	Non-Distinct Waste
0.01%	0.30%	0.13%	Other Misc. Wastes

TABLE 6.4
STATEWIDE COMPARISON OF SEASONAL VOLUME
DATA PERCENTAGES FOR RESIDENTIAL WASTE

Material Category/Component	VOLUME DATA PERCENTAGES	
	Fall 2007	Winter 2008
Cardboard	1.86%	1.15%
Office Paper	2.07%	3.59%
Newsprint	5.59%	3.54%
Magazines	2.90%	4.04%
Paperboard/Liner Board	10.89%	11.37%
Mixed Paper	14.82%	15.04%
TOTAL PAPER FIBERS	**38.13%**	**38.74%**
PET #1	5.21%	5.65%
HDPE #2	4.77%	5.45%
Other Numbered Containers	6.75%	6.72%
Plastic Film/Wrap/Bags	11.09%	13.42%
Other Plastics	12.03%	4.96%
TOTAL PLASTICS	**39.85%**	**36.20%**
Clear Glass Containers	1.18%	1.51%
Brown Glass Containers	0.55%	0.50%
Green Glass Containers	0.13%	0.22%
Blue Glass Containers		
Other Glass		
TOTAL GLASS	**1.86%**	**2.22%**
Aluminum Cans	2.39%	2.19%
Tin Cans	1.59%	1.87%
Other Aluminum	0.46%	0.40%
Other Tin		
Other Mixed Metals		
TOTAL METALS	**4.44%**	**4.47%**
Food	2.79%	3.96%
Diapers	2.51%	2.51%
Textiles/Rubber/Leather	7.03%	9.11%
Yard Waste	3.38%	2.79%

TABLE 6.4 (continued)
STATEWIDE COMPARISON OF SEASONAL VOLUME DATA PERCENTAGES FOR RESIDENTIAL WASTE

VOLUME DATA PERCENTAGES			
Spring 2008	**Summer 2008**	**Consolidated**	**Material Category/Component**
1.00%	0.93%	1.24%	Cardboard
2.61%	2.63%	2.72%	Office Paper
4.37%	4.13%	4.42%	Newsprint
3.93%	4.31%	3.79%	Magazines
9.81%	10.76%	10.72%	Paperboard/Liner Board
15.28%	16.80%	15.49%	Mixed Paper
37.00%	**39.55%**	**38.38%**	**TOTAL PAPER FIBERS**
6.08%	6.82%	5.93%	PET #1
5.62%	5.57%	5.34%	HDPE #2
5.14%	4.47%	5.79%	Other Numbered Containers
13.89%	13.75%	13.01%	Plastic Film/Wrap/Bags
5.92%	6.33%	7.37%	Other Plastics
36.65%	**36.94%**	**37.44%**	**TOTAL PLASTICS**
1.37%	1.52%	1.39%	Clear Glass Containers
0.51%	0.47%	0.51%	Brown Glass Containers
0.15%	0.18%	0.17%	Green Glass Containers
			Blue Glass Containers
			Other Glass
2.03%	**2.16%**	**2.07%**	**TOTAL GLASS**
2.06%	2.41%	2.27%	Aluminum Cans
1.83%	1.51%	1.70%	Tin Cans
0.56%	0.46%	0.47%	Other Aluminum
			Other Tin
			Other Mixed Metals
4.45%	**4.38%**	**4.43%**	**TOTAL METALS**
3.64%	4.53%	3.72%	Food
2.51%	2.43%	2.49%	Diapers
8.72%	8.37%	8.29%	Textiles/Rubber/Leather
5.01%	0.93%	3.18%	Yard Waste

TABLE 6.5
SELECTED COMPONENTS' AND CATEGORIES' PERCENTAGE OF THE CONSOLIDATED STATEWIDE RESIDENTIAL WEIGHT DATA

Waste-Material Component/Category	Fall 2007	Winter 2008	Spring 2008	Summer 2008	Maximum Variance
Paper Fibers	37.55%	35.18%	33.63%	34.95%	3.92%
Plastics	22.28%	18.14%	18.36%	18.37%	4.14%
Glass	5.99%	6.66%	5.91%	6.24%	0.75%
Metals	4.03%	4.18%	4.03%	3.86%	0.32%
Food	13.57%	18.27%	16.55%	20.26%	6.69%
Diapers	5.46%	5.16%	5.08%	4.85%	0.61%
Textiles/Rubber/Leather	5.62%	6.89%	6.50%	6.14%	1.27%
Yard Waste	4.03%	3.15%	5.56%	1.80%	3.76%
TOTAL	98.53%	97.63%	95.62%	96.47%	2.91%

6.2 COMMERCIAL WASTE STREAM

During the 80 days of statewide field sorting events (consolidated), 231 loads of commercial waste were sampled. Table 6.6 presents a summary of the weight data for these commercial loads. By weight, the largest portion of the statewide commercial samples was the paper fibers component at 47.93%. The second largest portion of the commercial waste stream was the plastics component at 19.49%, by weight. The third largest portion of the statewide commercial samples was food at 15.86%. Chart 6.3 presents a graphic representation of the consolidated statewide commercial weight data.

Table 6.7 presents a summary of the volume data for the statewide commercial loads. The largest portions of the consolidated statewide commercial waste stream, by volume, were the paper fibers component at 46.48%, the plastics component at 38.29%, and the textiles/rubber/leather category at 4.73%, respectively. The paper and plastics components combined accounted for more than 84% of the volume of the commercial loads sampled statewide. Chart 6.4 presents a graphic representation of the consolidated statewide commercial volume data.

TABLE 6.6
STATEWIDE COMMERCIAL WEIGHT DATA SUMMARY

Material Category/Component	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Cardboard	7,932.37	30.09%	14.42%
Office Paper	3,274.08	12.42%	5.95%
Newsprint	2,085.60	7.91%	3.79%
Magazines	1,629.18	6.18%	2.96%
Paperboard/Liner Board	2,370.91	8.99%	4.31%
Mixed Paper	9,067.77	34.40%	16.49%
TOTAL PAPER FIBERS	**26,359.91**		**47.93%**
PET #1	1,884.52	17.58%	3.43%
HDPE #2	722.35	6.74%	1.31%
Other Numbered Containers	1,625.68	15.16%	2.96%
Plastic Film/Wrap/Bags	4,100.06	38.25%	7.45%
Other Plastics	2,387.50	22.27%	4.34%
TOTAL PLASTICS	**10,720.11**		**19.49%**
Clear Glass Containers	911.00	50.82%	1.66%
Brown Glass Containers	660.80	36.86%	1.20%
Green Glass Containers	150.20	8.38%	0.27%
Blue Glass Containers	10.59	0.59%	0.02%
Other Glass	59.90	3.34%	0.11%
TOTAL GLASS	**1,792.49**		**3.26%**
Aluminum Cans	545.50	32.35%	0.99%
Tin Cans	656.57	38.93%	1.19%
Other Aluminum	156.18	9.26%	0.28%
Other Tin	126.23	7.48%	0.23%
Other Mixed Metals	201.99	11.98%	0.37%
TOTAL METALS	**1,686.47**		**3.07%**
Food	8,724.49		15.86%
Diapers	1,202.70		2.19%
Textiles/Rubber/Leather	1,943.26		3.53%
Yard Waste	1,031.03		1.87%
Household Hazardous Waste	4.92		0.01%
Electronic Waste	214.10		0.39%
Dry-Cell Batteries	32.56		0.06%
Misc. C/D Waste	191.00		0.35%
Wood	347.28		0.63%
Empty Aerosol Cans	81.72		0.15%
Non-Distinct Waste	455.57		0.83%
Other Misc. Wastes	213.55		0.39%
TOTAL WEIGHT OF SORTED SAMPLE	**55,001.16**		**100.00%**

TABLE 6.7
STATEWIDE COMMERCIAL VOLUME DATA SUMMARY

Material Category/Component	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Cardboard	1,061.90	19.56%	9.09%
Office Paper	608.57	11.21%	5.21%
Newsprint	324.86	5.98%	2.78%
Magazines	296.75	5.47%	2.54%
Paperboard/Liner Board	915.41	16.86%	7.84%
Mixed Paper	2,222.49	40.93%	19.03%
TOTAL PAPER FIBERS	**5,429.98**		**46.48%**
PET #1	759.89	16.99%	6.50%
HDPE #2	445.90	9.97%	3.82%
Other Numbered Containers	829.43	18.54%	7.10%
Plastic Film/Wrap/Bags	1,659.94	37.11%	14.21%
Other Plastics	777.69	17.39%	6.66%
TOTAL PLASTICS	**4,472.84**		**38.29%**
Clear Glass Containers	81.19	63.92%	0.70%
Brown Glass Containers	37.67	29.66%	0.32%
Green Glass Containers	8.15	6.42%	0.07%
Blue Glass Containers			
Other Glass			
TOTAL GLASS	**127.02**		**1.09%**
Aluminum Cans	200.55	54.00%	1.72%
Tin Cans	127.00	34.19%	1.09%
Other Aluminum	43.87	11.81%	0.38%
Other Tin			
Other Mixed Metals			
TOTAL METALS	**371.42**		**3.18%**
Food	406.36		3.48%
Diapers	125.54		1.07%
Textiles/Rubber/Leather	552.06		4.73%
Yard Waste	196.39		1.68%
TOTAL VOLUME OF SORTED SAMPLE	**11,681.60**		**100.00%**

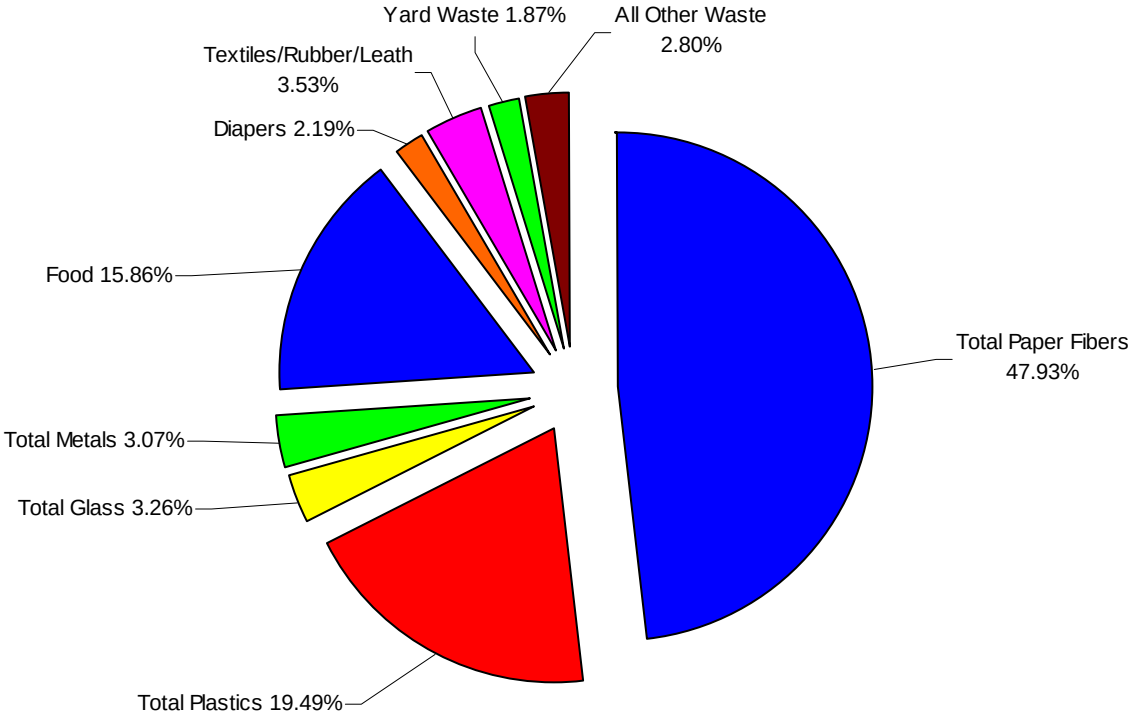


CHART 6.3
DISTRIBUTION OF THE CONSOLIDATED STATEWIDE COMMERCIAL WEIGHT DATA

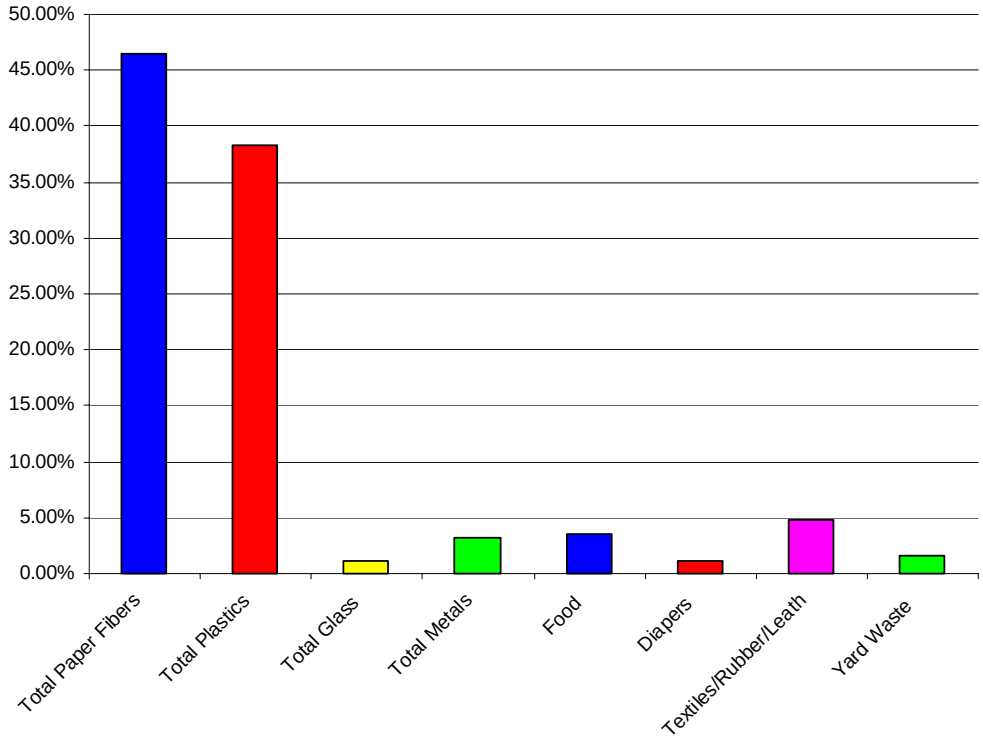


CHART 6.4
DISTRIBUTION OF THE CONSOLIDATED STATEWIDE COMMERCIAL VOLUME DATA

Table 6.8 and Table 6.9 provide a seasonal comparison of the consolidated statewide commercial waste stream by weight and volume, respectively. Additionally, Table 6.10 presents a summary of the variance from season to season for the four waste-material components and the four major other waste categories of the commercial waste stream. As can be seen in these tables, the largest variance occurred in the paper fibers and plastics components, with a maximum variance among the four seasons of 2.99% and 2.92%, respectively. The paper fibers component of the waste stream 45.93% in Summer 2008 and a consistent 48.92% in Spring 2008, 48.46% in Winter 2008, and 48.76% in Fall 2007. The plastics component comprised 21.35% of the waste stream in Fall 2007 and fell to 18.43% of the waste stream in Winter 2008.

The second largest variance was in the food category. This category accounted for 14.45% of the waste stream in Fall 2007 and then rose to 17.01% in Winter 2008. The remaining five waste-material components and categories varied from 0.98% to 0.33% among the four seasons. Four of the eight waste-material components' or categories' percentage of the waste stream decreased from Fall 2007 to Summer 2008. The remaining four components or categories rose from Fall 2007 to Summer 2008; with these increases less than 1.0% except the food category which increased 2.56%.

No commercial loads of waste were sorted at two of the participating facilities – Chadron and Valentine – during three of the four seasonal field sorting events. No commercial loads of waste were sorted at the Lexington site during two of the four seasonal field sorting events. This situation does not appear to impact consolidated statewide commercial data. Typically, when only residential and commercial loads are considered, commercial loads comprise from 40% to 48% of the waste stream. Although no commercial loads of waste were sampled at some of the participating facilities, commercial waste comprises 45% of the waste stream when the mixed waste loads are removed from Nebraska's consolidated statewide waste stream and only residential and commercial loads are considered. Commercial waste comprises 37% of Nebraska's consolidated statewide waste stream when all types of loads (residential, commercial, and mixed waste) are considered.

Of the four waste-material components and the four major other waste categories, it appears that only plastics component and food category were affected by seasonal changes. The reason for the change in the plastics component appears to be the result of random fluctuations in the waste stream as the only season that is not consistent is fall. The season-to-season variations in the food component are explained by variations in behaviors from season to season.

It is important to note that yard waste comprised a small percentage of the commercial waste stream (1.80% to 2.50%) which indicates that residents do not appear to be disposing of their yard waste in commercial dumpsters in an effort to circumvent the yard waste ban.

Unlike residential waste, fewer loads of commercial waste were captured and sampled (284 residential samples vs. 231 commercial samples). Additionally, at the small sites, the number of loads of commercial waste that were sampled was significantly reduced. There is a much smaller variance in the four waste-material components and four major other waste categories among the seasons when the commercial waste stream is compared to the residential waste stream. The maximum variance in the residential waste stream ranged from 6.69% to 0.32%; and this variance ranged from 2.99% to 0.33% in the commercial waste stream.

TABLE 6.8
STATEWIDE COMPARISON OF SEASONAL WEIGHT DATA PERCENTAGES FOR COMMERCIAL WASTE

Material Category/Component	WEIGHT DATA PERCENTAGES	
	Fall 2007	Winter 2008
Cardboard	14.02%	14.06%
Office Paper	5.31%	7.92%
Newsprint	4.47%	3.48%
Magazines	2.67%	3.36%
Paperboard/Liner Board	5.32%	4.19%
Mixed Paper	16.98%	15.45%
TOTAL PAPER FIBERS	**48.76%**	**48.46%**
PET #1	3.23%	3.28%
HDPE #2	1.30%	1.25%
Other Numbered Containers	3.63%	3.33%
Plastic Film/Wrap/Bags	6.70%	7.38%
Other Plastics	6.51%	3.19%
TOTAL PLASTICS	**21.35%**	**18.43%**
Clear Glass Containers	1.41%	1.72%
Brown Glass Containers	1.40%	1.21%
Green Glass Containers	0.15%	0.28%
Blue Glass Containers	0.01%	0.00%
Other Glass	0.08%	0.12%
TOTAL GLASS	**3.05%**	**3.34%**
Aluminum Cans	1.01%	1.06%
Tin Cans	0.91%	1.50%
Other Aluminum	0.32%	0.30%
Other Tin	0.06%	0.26%
Other Mixed Metals	0.34%	0.48%
TOTAL METALS	**2.63%**	**3.61%**
Food	14.45%	17.01%
Diapers	2.66%	1.76%
Textiles/Rubber/Leather	3.27%	3.50%
Yard Waste	1.80%	1.75%
Household Hazardous Waste	0.00%	0.01%
Electronic Waste	0.24%	0.47%
Dry-Cell Batteries	0.07%	0.04%
Misc. C/D Waste	0.02%	0.10%
Wood	0.28%	0.51%
Empty Aerosol Cans	0.16%	0.15%
Non-Distinct Waste	0.37%	0.73%
Other Misc. Wastes	0.87%	0.15%

TABLE 6.8 (continued)
STATEWIDE COMPARISON OF SEASONAL WEIGHT DATA PERCENTAGES FOR COMMERCIAL WASTE

WEIGHT DATA PERCENTAGES			
Spring 2008	**Summer 2008**	**Consolidated**	**Material Category/Component**
15.17%	14.48%	14.42%	Cardboard
6.19%	4.61%	5.95%	Office Paper
3.53%	3.69%	3.79%	Newsprint
3.49%	2.44%	2.96%	Magazines
3.91%	3.88%	4.31%	Paperboard/Liner Board
16.63%	16.84%	16.49%	Mixed Paper
48.92%	**45.93%**	**47.93%**	**TOTAL PAPER FIBERS**
3.43%	3.72%	3.43%	PET #1
1.31%	1.38%	1.31%	HDPE #2
2.90%	2.10%	2.96%	Other Numbered Containers
7.77%	7.91%	7.45%	Plastic Film/Wrap/Bags
3.82%	3.90%	4.34%	Other Plastics
19.24%	**19.02%**	**19.49%**	**TOTAL PLASTICS**
1.88%	1.63%	1.66%	Clear Glass Containers
1.06%	1.14%	1.20%	Brown Glass Containers
0.31%	0.35%	0.27%	Green Glass Containers
0.03%	0.03%	0.02%	Blue Glass Containers
0.10%	0.13%	0.11%	Other Glass
3.38%	**3.27%**	**3.26%**	**TOTAL GLASS**
0.86%	1.02%	0.99%	Aluminum Cans
1.34%	1.05%	1.19%	Tin Cans
0.25%	0.27%	0.28%	Other Aluminum
0.13%	0.43%	0.23%	Other Tin
0.24%	0.39%	0.37%	Other Mixed Metals
2.83%	**3.16%**	**3.07%**	**TOTAL METALS**
14.82%	16.93%	15.86%	Food
2.03%	2.28%	2.19%	Diapers
3.84%	3.53%	3.53%	Textiles/Rubber/Leather
2.50%	1.55%	1.87%	Yard Waste
0.02%	0.01%	0.01%	Household Hazardous Waste
0.55%	0.32%	0.39%	Electronic Waste
0.05%	0.07%	0.06%	Dry-Cell Batteries
0.10%	1.05%	0.35%	Misc. C/D Waste
0.22%	1.38%	0.63%	Wood
0.13%	0.15%	0.15%	Empty Aerosol Cans
1.32%	0.91%	0.83%	Non-Distinct Waste
0.05%	0.46%	0.39%	Other Misc. Wastes

TABLE 6.9
STATEWIDE COMPARISON OF SEASONAL VOLUME
DATA PERCENTAGES FOR COMMERCIAL WASTE

Material Category/Component	VOLUME DATA PERCENTAGES	
	Fall 2007	Winter 2008
Cardboard	8.48%	8.94%
Office Paper	4.46%	6.99%
Newsprint	3.15%	2.58%
Magazines	2.20%	2.91%
Paperboard/Liner Board	9.28%	7.69%
Mixed Paper	18.82%	18.00%
TOTAL PAPER FIBERS	**46.39%**	**47.11%**
PET #1	5.88%	6.29%
HDPE #2	3.62%	3.67%
Other Numbered Containers	8.37%	8.07%
Plastic Film/Wrap/Bags	12.26%	14.20%
Other Plastics	9.58%	4.94%
TOTAL PLASTICS	**39.72%**	**37.17%**
Clear Glass Containers	0.57%	0.73%
Brown Glass Containers	0.36%	0.33%
Green Glass Containers	0.04%	0.07%
Blue Glass Containers		
Other Glass		
TOTAL GLASS	**0.97%**	**1.13%**
Aluminum Cans	1.68%	1.85%
Tin Cans	0.79%	1.38%
Other Aluminum	0.40%	0.40%
Other Tin		
Other Mixed Metals		
TOTAL METALS	**2.87%**	**3.64%**
Food	3.04%	3.76%
Diapers	1.26%	0.87%
Textiles/Rubber/Leather	4.21%	4.73%
Yard Waste	1.55%	1.58%

TABLE 6.9 (continued)
STATEWIDE COMPARISON OF SEASONAL VOLUME DATA PERCENTAGES FOR COMMERCIAL WASTE

VOLUME DATA PERCENTAGES			
Spring 2008	**Summer 2008**	**Consolidated**	**Material Category/Component**
9.50%	9.43%	9.09%	Cardboard
5.38%	4.17%	5.21%	Office Paper
2.57%	2.79%	2.78%	Newsprint
2.97%	2.16%	2.54%	Magazines
7.06%	7.29%	7.84%	Paperboard/Liner Board
19.07%	20.09%	19.03%	Mixed Paper
46.56%	**45.94%**	**46.48%**	**TOTAL PAPER FIBERS**
6.47%	7.30%	6.50%	PET #1
3.79%	4.15%	3.82%	HDPE #2
6.92%	5.22%	7.10%	Other Numbered Containers
14.72%	15.60%	14.21%	Plastic Film/Wrap/Bags
5.83%	6.18%	6.66%	Other Plastics
37.72%	**38.45%**	**38.29%**	**TOTAL PLASTICS**
0.78%	0.71%	0.70%	Clear Glass Containers
0.28%	0.32%	0.32%	Brown Glass Containers
0.08%	0.09%	0.07%	Green Glass Containers
			Blue Glass Containers
			Other Glass
1.14%	**1.11%**	**1.09%**	**TOTAL GLASS**
1.48%	1.83%	1.72%	Aluminum Cans
1.22%	0.99%	1.09%	Tin Cans
0.32%	0.37%	0.38%	Other Aluminum
			Other Tin
			Other Mixed Metals
3.03%	**3.19%**	**3.18%**	**TOTAL METALS**
3.23%	3.84%	3.48%	Food
0.99%	1.16%	1.07%	Diapers
5.10%	4.88%	4.73%	Textiles/Rubber/Leather
2.23%	1.43%	1.68%	Yard Waste

TABLE 6.10
SELECTED COMPONENTS' AND CATEGORIES' PERCENTAGE OF THE CONSOLIDATED STATEWIDE COMMERCIAL WEIGHT DATA

Waste-Material Component/Category	Fall 2007	Winter 2008	Spring 2008	Summer 2008	Maximum Variance
Paper Fibers	48.76%	48.46%	48.92%	45.93%	2.99%
Plastics	21.35%	18.43%	19.24%	19.02%	2.92%
Glass	3.05%	3.34%	3.38%	3.27%	0.33%
Metals	2.63%	3.61%	2.83%	3.16%	0.98%
Food	14.45%	17.01%	14.82%	16.93%	2.56%
Diapers	2.66%	1.76%	2.03%	2.28%	0.90%
Textiles/Rubber/Leather	3.27%	3.50%	3.84%	3.53%	0.57%
Yard Waste	1.80%	1.75%	2.50%	1.55%	0.95%
TOTAL	97.97%	97.86%	97.56%	95.67%	2.30%

6.3 MIXED WASTE STREAM

During the Fall 2007, Winter 2008, Spring 2008, and Summer 2008 (consolidated) statewide field sorting events, a total of 109 loads of mixed waste were sampled. Table 6.11 presents a summary of the statewide weight data for these mixed loads. The largest portion of the mixed waste stream was the paper fibers component, which comprised 41.58% of the samples, by weight. The second and third largest portions of these mixed waste samples, by weight, were the plastics component at 18.03% and the food category at 16.80%.

Table 6.12 presents a summary of the volume data for the statewide mixed loads. By volume, the largest portions of the mixed waste stream were the paper fibers component at 42.47%, the plastics component at 36.14%, and the textiles/rubber/leather category at 6.53%, respectively. The paper and plastics components combined accounted for more than 78% of the volume of these mixed waste samples. Chart 6.5 presents a graphic representation of the weight data for the statewide mixed waste samples and Chart 6.6 presents a graphic representation of the statewide volume data for the mixed waste samples.

TABLE 6.11
STATEWIDE MIXED WEIGHT DATA SUMMARY

Material Category/Component	Net Weight (pounds)	% of Material Category	% of Sorted Sample
Cardboard	2,610.86	23.62%	9.82%
Office Paper	1,092.71	9.88%	4.11%
Newsprint	1,205.99	10.91%	4.54%
Magazines	1,104.10	9.99%	4.15%
Paperboard/Liner Board	1,510.20	13.66%	5.68%
Mixed Paper	3,531.50	31.94%	13.28%
TOTAL PAPER FIBERS	**11,055.36**		**41.58%**
PET #1	1,101.07	22.97%	4.14%
HDPE #2	443.08	9.24%	1.67%
Other Numbered Containers	712.79	14.87%	2.68%
Plastic Film/Wrap/Bags	1,593.09	33.23%	5.99%
Other Plastics	944.21	19.69%	3.55%
TOTAL PLASTICS	**4,794.24**		**18.03%**
Clear Glass Containers	712.16	52.15%	2.68%
Brown Glass Containers	509.02	37.27%	1.91%
Green Glass Containers	99.86	7.31%	0.38%
Blue Glass Containers	3.43	0.25%	0.01%
Other Glass	41.25	3.02%	0.16%
TOTAL GLASS	**1,365.72**		**5.14%**
Aluminum Cans	350.07	34.07%	1.32%
Tin Cans	522.56	50.85%	1.97%
Other Aluminum	69.60	6.77%	0.26%
Other Tin	32.60	3.17%	0.12%
Other Mixed Metals	52.77	5.14%	0.20%
TOTAL METALS	**1,027.60**		**3.86%**
Food	4,466.87		16.80%
Diapers	1,259.52		4.74%
Textiles/Rubber/Leather	1,294.47		4.87%
Yard Waste	782.42		2.94%
Household Hazardous Waste	14.16		0.05%
Electronic Waste	78.09		0.29%
Dry-Cell Batteries	26.54		0.10%
Misc. C/D Waste	17.04		0.06%
Wood	55.44		0.21%
Empty Aerosol Cans	57.67		0.22%
Non-Distinct Waste	231.44		0.87%
Other Misc. Wastes	63.69		0.24%
TOTAL WEIGHT OF SORTED SAMPLE	**26,590.27**		**100.00%**

TABLE 6.12
STATEWIDE MIXED VOLUME DATA SUMMARY

Material Category/Component	Volume (cubic feet)	% of Material Category	% of Sorted Sample
Cardboard	349.51	14.62%	6.21%
Office Paper	203.11	8.50%	3.61%
Newsprint	187.85	7.86%	3.34%
Magazines	201.11	8.41%	3.57%
Paperboard/Liner Board	583.09	24.39%	10.36%
Mixed Paper	865.56	36.21%	15.38%
TOTAL PAPER FIBERS	**2,390.23**		**42.47%**
PET #1	443.98	21.83%	7.89%
HDPE #2	273.51	13.45%	4.86%
Other Numbered Containers	363.67	17.88%	6.46%
Plastic Film/Wrap/Bags	644.98	31.71%	11.46%
Other Plastics	307.56	15.12%	5.47%
TOTAL PLASTICS	**2,033.69**		**36.14%**
Clear Glass Containers	63.47	64.83%	1.13%
Brown Glass Containers	29.02	29.64%	0.52%
Green Glass Containers	5.42	5.53%	0.10%
Blue Glass Containers			
Other Glass			
TOTAL GLASS	**97.91**		**1.74%**
Aluminum Cans	128.70	51.62%	2.29%
Tin Cans	101.08	40.54%	1.80%
Other Aluminum	19.55	7.84%	0.35%
Other Tin			
Other Mixed Metals			
TOTAL METALS	**249.33**		**4.43%**
Food	208.05		3.70%
Diapers	131.47		2.34%
Textiles/Rubber/Leather	367.75		6.53%
Yard Waste	149.03		2.65%
TOTAL VOLUME OF SORTED SAMPLE	**5,627.47**		**100.00%**

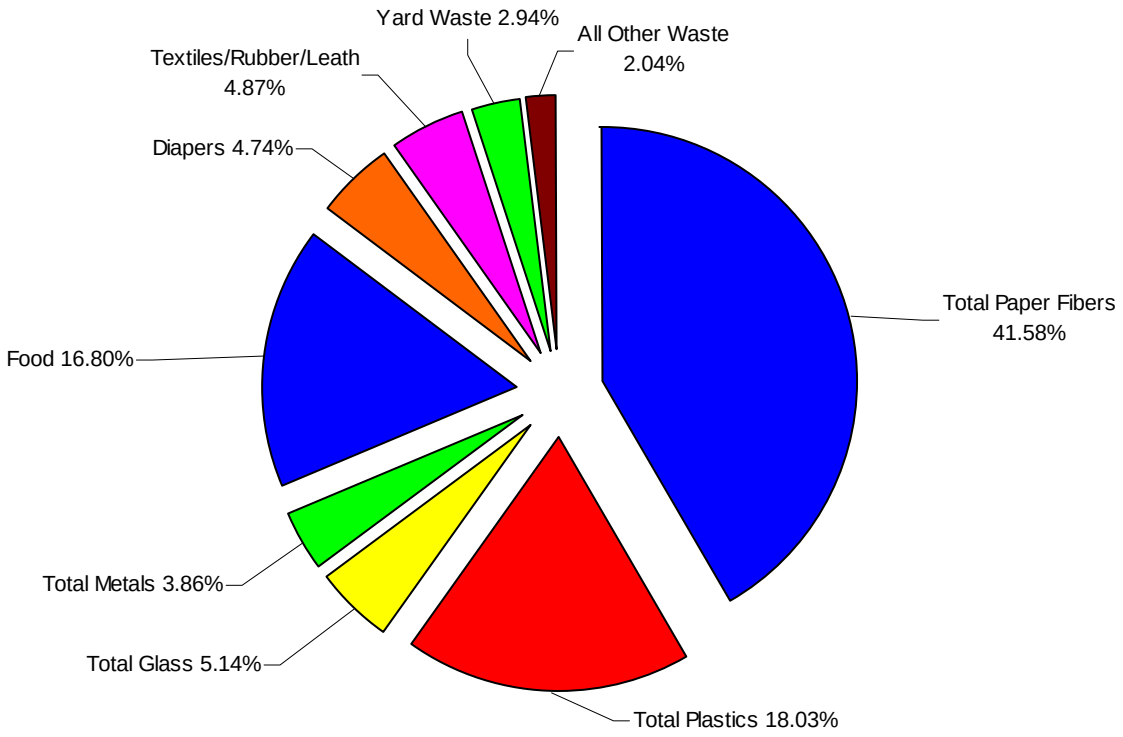


CHART 6.5
DISTRIBUTION OF THE CONSOLIDATED STATEWIDE MIXED WASTE WEIGHT DATA

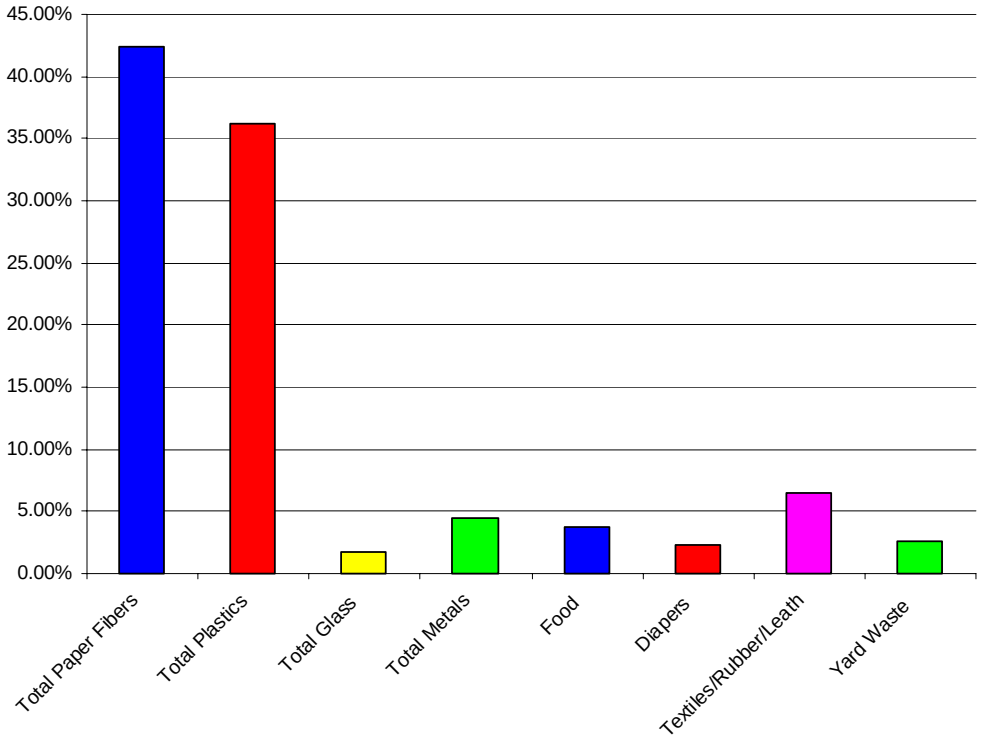


CHART 6.6
DISTRIBUTION OF THE CONSOLIDATED STATEWIDE MIXED WASTE VOLUME DATA

Table 6.13 and Table 6.14 provide a seasonal comparison of the consolidated statewide mixed waste stream by weight and volume, respectively. Additionally, Table 6.15 presents a summary of the variance from season to season for the four waste-material components and the four major other waste categories of the mixed waste stream. As can be seen in these tables, the largest variance occurred in the paper fibers component, which comprised 44.03% of the waste stream in Fall 2007 and 35.12% of the waste stream in Summer 2008. The second largest variance was in the food category. This category accounted for 14.21% of the waste stream in Fall 2007 and then rose to 20.67% in Summer 2008. The remaining six waste-material components and categories varied from 3.92% to 0.95% among the four seasons. Three of the of the eight waste-material components' or categories' percentage of the waste stream decreased from Fall 2007 to Summer 2008. The remaining five components and categories rose from Fall 2007 to Summer 2008; these increases ranged from 0.79% to 6.46%.

No mixed waste loads were sorted at five of the participating facilities – Omaha, Lincoln, Hastings, Sidney and Valentine – during at least two of the four seasonal field sorting events. This situation did appear to impact consolidated statewide mixed waste data. Because no mixed waste loads were sampled at the Omaha facility and only one mixed waste load was sampled at the Lincoln facility, the urban sector of the mixed waste stream is likely under represented. Additionally, of the 109 mixed waste loads sampled, more than 75% of these loads were captured at three sites – Lexington, Norfolk, and Chadron. These three sites provide a reasonable cross section of the smaller sites; however, they are not representative of the majority of the sites.

The amount of residential or commercial waste in a mixed waste load greatly impacted the mixed waste stream. Because the proportion of residential and commercial waste likely varied significantly from one mixed waste load to another, the amount of any of the four waste-material components and four major other waste categories varied significantly. As was discussed in the previous section, there is a much smaller variance in the four waste-material components and four major other waste categories among the seasons when the commercial waste stream is compared to the residential waste stream. Additionally, given the inherent variance in the four waste-material components and four major other waste categories due to the mixing of residential and commercial waste, it is difficult to identify any seasonal impact.

TABLE 6.13
STATEWIDE COMPARISON OF SEASONAL WEIGHT DATA PERCENTAGES FOR MIXED WASTE

Material Category/Component	WEIGHT DATA PERCENTAGES	
	Fall 2007	Winter 2008
Cardboard	7.47%	9.29%
Office Paper	4.51%	5.18%
Newsprint	5.84%	4.36%
Magazines	4.34%	4.49%
Paperboard/Liner Board	6.58%	5.70%
Mixed Paper	15.29%	13.44%
TOTAL PAPER FIBERS	**44.03%**	**42.46%**
PET #1	3.95%	5.05%
HDPE #2	1.94%	1.65%
Other Numbered Containers	3.24%	2.56%
Plastic Film/Wrap/Bags	6.36%	5.35%
Other Plastics	4.39%	2.69%
TOTAL PLASTICS	**19.88%**	**17.30%**
Clear Glass Containers	2.31%	2.40%
Brown Glass Containers	2.01%	1.61%
Green Glass Containers	0.44%	0.30%
Blue Glass Containers	0.01%	0.00%
Other Glass	0.16%	0.17%
TOTAL GLASS	**4.92%**	**4.49%**
Aluminum Cans	1.56%	1.35%
Tin Cans	1.82%	2.15%
Other Aluminum	0.28%	0.18%
Other Tin	0.08%	0.14%
Other Mixed Metals	0.14%	0.19%
TOTAL METALS	**3.87%**	**4.01%**
Food	14.21%	17.81%
Diapers	4.26%	5.21%
Textiles/Rubber/Leather	4.17%	2.92%
Yard Waste	2.96%	3.74%
Household Hazardous Waste	0.02%	0.00%
Electronic Waste	0.20%	0.28%
Dry-Cell Batteries	0.09%	0.14%
Misc. C/D Waste	0.02%	0.15%
Wood	0.08%	0.13%
Empty Aerosol Cans	0.20%	0.24%
Non-Distinct Waste	0.51%	0.96%
Other Misc. Wastes	0.58%	0.15%

TABLE 6.13 (continued)
STATEWIDE COMPARISON OF SEASONAL WEIGHT
DATA PERCENTAGES FOR MIXED WASTE

WEIGHT DATA PERCENTAGES			
Spring 2008	**Summer 2008**	**Consolidated**	**Material Category/Component**
16.18%	7.11%	9.82%	Cardboard
3.26%	3.29%	4.11%	Office Paper
3.81%	3.50%	4.54%	Newsprint
3.84%	3.86%	4.15%	Magazines
4.64%	5.40%	5.68%	Paperboard/Liner Board
11.48%	11.96%	13.28%	Mixed Paper
43.21%	**35.12%**	**41.58%**	**TOTAL PAPER FIBERS**
3.73%	3.94%	4.14%	PET #1
1.44%	1.51%	1.67%	HDPE #2
2.81%	1.80%	2.68%	Other Numbered Containers
6.67%	5.35%	5.99%	Plastic Film/Wrap/Bags
3.36%	3.36%	3.55%	Other Plastics
18.01%	**15.96%**	**18.03%**	**TOTAL PLASTICS**
2.74%	3.46%	2.68%	Clear Glass Containers
1.21%	2.85%	1.91%	Brown Glass Containers
0.27%	0.47%	0.38%	Green Glass Containers
0.02%	0.03%	0.01%	Blue Glass Containers
0.06%	0.23%	0.16%	Other Glass
4.30%	**7.04%**	**5.14%**	**TOTAL GLASS**
0.89%	1.38%	1.32%	Aluminum Cans
1.97%	1.99%	1.97%	Tin Cans
0.25%	0.33%	0.26%	Other Aluminum
0.09%	0.20%	0.12%	Other Tin
0.20%	0.29%	0.20%	Other Mixed Metals
3.40%	**4.19%**	**3.86%**	**TOTAL METALS**
15.94%	20.67%	16.80%	Food
4.77%	4.94%	4.74%	Diapers
5.94%	6.80%	4.87%	Textiles/Rubber/Leather
2.70%	2.35%	2.94%	Yard Waste
0.13%	0.06%	0.05%	Household Hazardous Waste
0.29%	0.46%	0.29%	Electronic Waste
0.07%	0.11%	0.10%	Dry-Cell Batteries
0.00%	0.11%	0.06%	Misc. C/D Waste
0.09%	0.62%	0.21%	Wood
0.21%	0.22%	0.22%	Empty Aerosol Cans
0.91%	1.28%	0.87%	Non-Distinct Waste
0.01%	0.07%	0.24%	Other Misc. Wastes

TABLE 6.14
STATEWIDE COMPARISON OF SEASONAL VOLUME DATA PERCENTAGES FOR MIXED WASTE

Material Category/Component	VOLUME DATA PERCENTAGES	
	Fall 2007	Winter 2008
Cardboard	4.45%	5.98%
Office Paper	3.73%	4.63%
Newsprint	4.05%	3.26%
Magazines	3.51%	3.93%
Paperboard/Liner Board	11.30%	10.58%
Mixed Paper	16.68%	15.84%
TOTAL PAPER FIBERS	**43.72%**	**44.21%**
PET #1	7.09%	9.78%
HDPE #2	5.32%	4.90%
Other Numbered Containers	7.35%	6.29%
Plastic Film/Wrap/Bags	11.46%	10.42%
Other Plastics	6.36%	4.21%
TOTAL PLASTICS	**37.59%**	**35.59%**
Clear Glass Containers	0.92%	1.03%
Brown Glass Containers	0.51%	0.44%
Green Glass Containers	0.11%	0.08%
Blue Glass Containers		
Other Glass		
TOTAL GLASS	**1.53%**	**1.55%**
Aluminum Cans	2.55%	2.38%
Tin Cans	1.56%	2.00%
Other Aluminum	0.35%	0.25%
Other Tin		
Other Mixed Metals		
TOTAL METALS	**4.45%**	**4.63%**
Food	2.95%	3.99%
Diapers	1.98%	2.62%
Textiles/Rubber/Leather	5.27%	3.99%
Yard Waste	2.51%	3.43%

TABLE 6.14 (continued)
STATEWIDE COMPARISON OF SEASONAL VOLUME DATA PERCENTAGES FOR MIXED WASTE

VOLUME DATA PERCENTAGES			
Spring 2008	**Summer 2008**	**Consolidated**	**Material Category/Component**
10.40%	4.79%	6.21%	Cardboard
2.91%	3.08%	3.61%	Office Paper
2.85%	2.75%	3.34%	Newsprint
3.36%	3.54%	3.57%	Magazines
8.60%	10.49%	10.36%	Paperboard/Liner Board
13.50%	14.76%	15.38%	Mixed Paper
41.60%	**39.40%**	**42.47%**	**TOTAL PAPER FIBERS**
7.21%	8.00%	7.89%	PET #1
4.27%	4.69%	4.86%	HDPE #2
6.88%	4.63%	6.46%	Other Numbered Containers
12.95%	10.90%	11.46%	Plastic Film/Wrap/Bags
5.26%	5.50%	5.47%	Other Plastics
36.58%	**33.72%**	**36.14%**	**TOTAL PLASTICS**
1.17%	1.55%	1.13%	Clear Glass Containers
0.33%	0.82%	0.52%	Brown Glass Containers
0.07%	0.13%	0.10%	Green Glass Containers
			Blue Glass Containers
			Other Glass
1.58%	**2.50%**	**1.74%**	**TOTAL GLASS**
1.56%	2.55%	2.29%	Aluminum Cans
1.83%	1.94%	1.80%	Tin Cans
0.33%	0.47%	0.35%	Other Aluminum
			Other Tin
			Other Mixed Metals
3.73%	**4.97%**	**4.43%**	**TOTAL METALS**
3.56%	4.84%	3.70%	Food
2.39%	2.60%	2.34%	Diapers
8.10%	9.72%	6.53%	Textiles/Rubber/Leather
2.47%	2.25%	2.65%	Yard Waste

TABLE 6.15
SELECTED COMPONENTS' AND CATEGORIES' PERCENTAGE OF THE CONSOLIDATED STATEWIDE MIXED WASTE WEIGHT DATA

Waste-Material Component	Fall 2007	Winter 2008	Spring 2008	Summer 2008	Maximum Variance
Paper Fibers	44.03%	42.46%	43.21%	35.12%	8.91%
Plastics	19.88%	17.30%	18.01%	15.96%	3.92%
Glass	4.92%	4.49%	4.30%	7.04%	2.74%
Metals	3.87%	4.01%	3.40%	4.19%	0.79%
Food	14.21%	17.81%	15.94%	20.67%	6.46%
Diapers	4.26%	5.21%	4.77%	4.94%	0.95%
Textiles/Rubber/Leather	4.17%	2.92%	5.94%	6.80%	3.88%
Yard Waste	2.96%	3.74%	2.70%	2.35%	1.39%
TOTAL	98.30%	97.94%	98.27%	97.07%	1.23%

6.4 WASTE STREAM COMPARISONS

As previously stated, 624 loads of solid waste were sampled during the four seasonal statewide field sorting events. Of these samples, 284 contained residential waste, 231 were comprised of commercial waste, and 109 contained mixed waste. When the data for all 624 samples was combined, the largest portion (by weight) was the paper fibers component at 41.15%. The paper fibers component found in the statewide residential loads (35.33%) was 5.82% less than all of the 624 samples combined. Conversely, the paper fibers component found in the statewide commercial loads (47.93%) was 6.78% higher than all of the 624 samples combined. The paper fibers component found in the statewide mixed samples was 41.58%, which is only 0.43% higher than the combined samples.

The second largest portion of the 624 combined samples, by weight, was the plastics component at 19.13%. When the plastics component of the commercial samples (19.49%) was compared to this component of the 624 combined samples, the commercial samples contained only 0.36% more plastics. Similarly, when the plastics component of the residential samples (19.27%) was compared to this component of the 624 combined samples, the residential samples contained only 0.14% more plastics. The plastics component of the mixed samples comprised 18.03% of the samples' weight, which is 1.10% lower than the plastics component of the combined statewide samples.

The third largest portion of the 624 combined samples, by weight, was food at 16.64%. Food found in the statewide commercial samples (15.86%) was 0.78% lower when compared to all of the 624 combined samples. Food found in the statewide residential samples (17.22%) was 0.58% more when compared to all of the 624 combined samples. Similarly, the statewide mixed waste samples were comprised of 16.80% food, which is 0.36% higher than the 624 combined samples.

The largest portion of the 624 combined samples, by volume, was the paper fibers component at 42.11%. The statewide commercial samples contained 4.37% more paper fibers (46.48%) than the combined samples. Conversely, statewide residential samples contained 3.73% less paper fibers (38.38%), by volume, than the 624 combined samples. The statewide mixed waste samples contained 42.47% paper fibers, by volume, which is only 0.36% higher than the paper fibers component of the 624 combined samples.

By volume, the second largest portion of the combined 624 samples was the plastics component at 37.52%. When the plastics component of the statewide commercial samples (38.39%) was compared to the plastics component of the 624 combined samples, the commercial samples contained only 0.77% more plastics than the combined samples. When the plastics component of the residential samples (37.44%) was compared to the plastics component of the 624 combined samples, the residential samples contained only 0.08% less plastics. The plastics component of the statewide mixed waste samples was 36.14%, which is 1.38% lower than the combined samples.

The textiles/rubber/leather category of the combined samples was the third largest portion of the waste stream (by volume) at 6.66%. The statewide commercial samples contained 1.93% less textiles/rubber/leather (4.73%), by volume, than the 624 combined samples. Conversely, the statewide residential samples contained 1.63% more textiles/rubber/leather (8.29%), by volume, than the combined samples. The textiles/rubber/leather category of the statewide mixed waste samples, at 6.53%, contained only 0.13% less than the 624 combined samples.

Table 6.16 presents a comparison of the waste-material components and categories for the statewide residential, commercial and mixed waste samples captured during the four seasonal field sorting events. Chart 6.7 presents a graphic representation of this data.

TABLE 6.16
COMPARISON OF THE CONSOLIDATED STATEWIDE WEIGHT DATA FOR RESIDENTIAL, COMMERCIAL AND MIXED WASTE SAMPLES

CONSOLIDATED FIELD SORTING EVENTS (FALL 2007, WINTER 2008, SPRING 2008, AND SUMMER 2008)

Material Category/Component	Percentage of the Net Weight of the Sorted Samples		
	Residential Waste Stream	Commercial Waste Stream	Mixed Waste Stream
Cardboard	2.00%	14.42%	9.82%
Office Paper	3.16%	5.95%	4.11%
Newsprint	6.11%	3.79%	4.54%
Magazines	4.48%	2.96%	4.15%
Paperboard/Liner Board	5.98%	4.31%	5.68%
Mixed Paper	13.61%	16.49%	13.28%
TOTAL PAPER FIBERS	**35.33%**	**47.93%**	**41.58%**
PET #1	3.17%	3.43%	4.14%
HDPE #2	1.86%	1.31%	1.67%
Other Numbered Containers	2.44%	2.96%	2.68%
Plastic Film/Wrap/Bags	6.92%	7.45%	5.99%
Other Plastics	4.87%	4.34%	3.55%
TOTAL PLASTICS	**19.27%**	**19.49%**	**18.03%**
Clear Glass Containers	3.36%	1.66%	2.68%
Brown Glass Containers	1.92%	1.20%	1.91%
Green Glass Containers	0.67%	0.27%	0.38%
Blue Glass Containers	0.04%	0.02%	0.01%
Other Glass	0.22%	0.11%	0.16%
TOTAL GLASS	**6.20%**	**3.26%**	**5.14%**
Aluminum Cans	1.33%	0.99%	1.32%
Tin Cans	1.89%	1.19%	1.97%
Other Aluminum	0.36%	0.28%	0.26%
Other Tin	0.16%	0.23%	0.12%
Other Mixed Metals	0.28%	0.37%	0.20%
TOTAL METALS	**4.02%**	**3.07%**	**3.86%**
Food	17.22%	15.86%	16.80%
Diapers	5.13%	2.19%	4.74%
Textiles/Rubber/Leather	6.29%	3.53%	4.87%
Yard Waste	3.59%	1.87%	2.94%
Household Hazardous Waste	0.04%	0.01%	0.05%
Electronic Waste	0.34%	0.39%	0.29%
Dry-Cell Batteries	0.09%	0.06%	0.10%
Misc. C/D Waste	0.18%	0.35%	0.06%
Wood	0.39%	0.63%	0.21%
Empty Aerosol Cans	0.26%	0.15%	0.22%
Non-Distinct Waste	1.51%	0.83%	0.87%
Other Misc. Wastes	0.13%	0.39%	0.24%

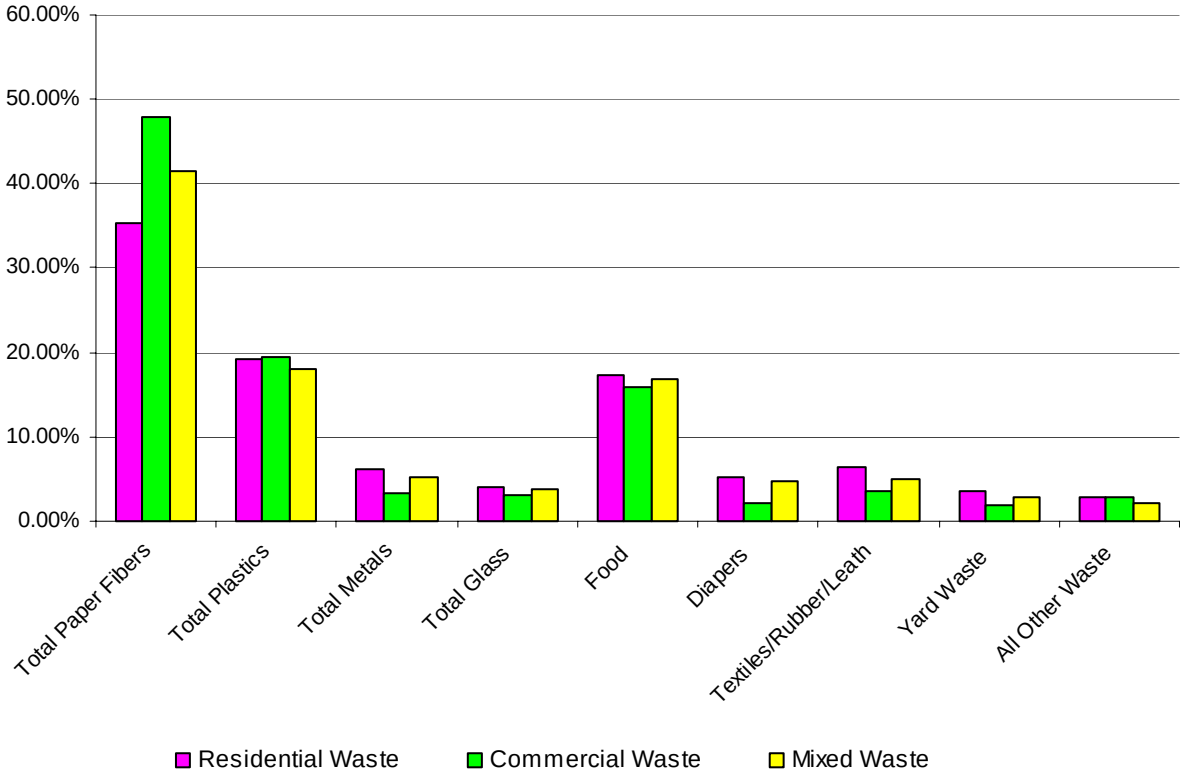


CHART 6.7
DISTRIBUTION OF CONSOLIDATED STATEWIDE WEIGHT DATA
FOR RESIDENTIAL, COMMERCIAL AND MIXED WASTE SAMPLES

When evaluating and analyzing the waste stream it is important to consider where the various loads of residential, commercial, and mixed waste were captured and sampled. Table 6.17 presents the percentage of residential, commercial and mixed waste loads that were captured and sampled at facilities in the large urban designation, small urban designation, large rural designation, and small rural designation.

The large urban and small urban designations most significantly impacted the residential and commercial waste streams. These two designations contributed more than 90% of the residential and commercial loads captured and sampled for this study. These two designations contributed from 89% (Spring 2008) to 95% (Summer 2008) of all residential loads captured and sampled; and from 89% (Spring 2008) to 96% (Fall 2007) of all commercial loads captured and sampled. These percentages are not surprising when the collection methods that are normally followed in most rural communities are considered. Most collection routes in rural communities encompass both commercial and residential waste because of the size of the communities' waste streams and as a matter of efficiency. Those mixed waste loads found in the small urban designation result because the facilities in these designations serve both small urban areas and surrounding rural areas.

TABLE 6.17
PERCENTAGE OF RESIDENTIAL, COMMERCIAL, AND MIXED WASTE LOADS SAMPLED AND SEGREGATED BY DESIGNATION

Designation	Fall 2007			Winter 2008			Spring 2008			Summer 2008			Total		
	R	C	M	R	C	M	R	C	M	R	C	M	R	C	M
Large Urban	76%	74%	3%	67%	70%	0%	60%	81%	0%	73%	79%	0%	69%	76%	1%
Small Urban	18%	22%	71%	23%	24%	50%	29%	8%	64%	22%	13%	46%	23%	15%	62%
Large Rural	6%	5%	20%	8%	7%	46%	10%	11%	32%	2%	4%	54%	6%	7%	34%
Small Rural	0%	0%	6%	1%	0%	5%	0%	0%	4%	2%	3%	0%	1%	1%	4%

*R = Residential Waste * C = Commercial Waste * M = Mixed Waste*

7. VISUAL INSPECTION ANALYSIS

A visual inspection of each of the loads selected for sampling was undertaken as a part of this study. The visual inspection process entailed noting items seen when the collection vehicle discharged its load and while walking around the entire perimeter of the load once it was discharged (a walk around). The walk around was first conducted in a clockwise direction. Once the entire perimeter was traversed, a second walk around was conducted in a counter-clockwise direction.

The items noted during the visual inspection process were divided into two groups. The first group included electronic items and items that were of significant interest. These items were counted and noted when sighted. The second group was comprised of a list of items that were anticipated to be found in a load of solid waste; however, these items were too bulky and/or heavy to be included in a 200 to 300 pound sample. These items were not quantified, instead it was noted if they were sighted. Table 7.1 provides the inspection results for those items where the quantity of the item was noted. Table 7.2 presents the group of items that were sighted but not quantified along with the number of total statewide loads these items were sighted.

7.1 SEASONAL VISUAL INSPECTION ANALYSIS

Fall 2007 – During the Fall 2007 field sorting event, the most frequently quantified item in the 158 loads was small appliances (see Table 7.1). Small appliances were found in 49.4% (or 78) of the loads sampled during this seasonal field sorting event; and a total of 99 small appliances were found in these 78 loads. The second most frequently quantified item was mattresses, which were found in 18.1% (or 29) of the fall samples; 39 mattresses were found in these 29 loads. The third most often quantified item was wood pallets, which were found in 15.5% of the 158 loads sampled (or 24 loads) during the fall field sorting event; and a total of 59 wood pallets were found in these 24 loads. During the Fall 2007 field sorting event, the only quantified items that were not identified in any of the 158 sampled loads included fluorescent bulbs, oil filters, and dead animals.

Of the eight electronic items listed (CPUs, keyboards, printers, televisions, stereos, speakers, and VCR or DVD players), televisions were the most frequently identified item (14 televisions found in 11.1% of the loads). The other most identified electronic equipment included computer monitors, printers, stereos, and VCR or DVD players.

When assessing the items that were sighted but not quantified (see Table 7.2), the most frequently sighted item during the Fall 2007 field sorting event was plastic bins. Plastic bins were sighted in 70.9% of the 158 loads sampled during this seasonal field sorting event. The second most frequently sighted item was lumber, which was sighted in 64.6% of the 158 sampled loads. The third most frequently sighted item during the fall field sorting event was carpet, which was found in 53.2% of the 158 loads sampled during this season.

Styrofoam and metal were sighted in at least 40% of the 158 loads sampled during the Fall 2007 field sorting event. The items that were sighted the least during this field sorting event included PVC pipe, plastic strap, and books. These three items were not sighted in any of the 158 loads sampled during this season. Of the 32 items sighted but not quantified, 13 were noted in less than 10% of the loads; and of these 13 items, 3 were noted in less than 1% of the 158 loads sampled during the Fall 2007 field sorting event.

Winter 2008 – During the Winter 2008 field sorting event, the most frequently quantified item in the 148 loads was small appliances (see Table 7.1). Small appliances were found in 48.0% (or 71) of the loads sampled during this seasonal field sorting event; and a total of 135 small appliances were found in these 71 loads. The second most frequently quantified item was wood pallets, which were found in 18.3% (or 27) of the winter samples; 53 wood pallets were found in these 27 loads. The third most often quantified item was stereos, which were found in 14.2% of the 148 loads sampled (or 21 loads) during the winter field sorting event; and a total of 24 stereos were found in these 21 loads.

Of the eight electronic items listed (CPUs, keyboards, printers, televisions, stereos, speakers, and VCR or DVD players), stereos were the most frequently identified item (24 stereos found in 14.2% of the loads). The other most identified electronic equipment included computer printers, speakers, televisions, and computer monitors.

When assessing the items that were sighted but not quantified (see Table 7.2), the most frequently sighted item during the Winter 2008 field sorting event was lumber. Lumber was sighted in 64.2% of the 148 loads sampled during this seasonal field sorting event. The second most frequently sighted item was carpet, which was sighted in 53.4% of the 148 sampled loads. The third most frequently sighted item during the winter field sorting event was plastic bins, which were found in 43.9% of the 148 loads sampled during this season.

Wood furniture was sighted in at least 40% of the 148 loads sampled during the Winter 2008 field sorting event. The items that were sighted the least during this field sorting event included yard equipment, bicycles, and doors. Yard equipment wasn't noted in any of the 148 winter samples. Of the 32 items sighted but not quantified, 16 were noted in less than 10% of the loads; and of these 16 items, 2 were noted in less than 1% of the 148 loads sampled during the Winter 2008 field sorting event.

Spring 2008 – During the Spring 2008 field sorting event, the most frequently quantified item in the 147 loads was small appliances (see Table 7.1). Small appliances were found in 34.9% (or 51) of the loads sampled during this seasonal field sorting event; and a total of 93 small appliances were found in these 51 loads. The second most frequently quantified item was wood pallets, which were found in 23.1% (or 34) of the spring samples; 70 wood pallets were found in these 34 loads. The third most often quantified item was mattresses, which were found in 15.7% of the 147 loads sampled (or 23 loads) during the spring field sorting event; and a total of 30 mattresses were found in these 23 loads.

Of the eight electronic items listed (CPUs, keyboards, printers, televisions, stereos, speakers, and VCR or DVD players), stereos were the most frequently identified item (17 stereos found in 11.6% of the loads). The other most identified electronic equipment included computer printers, televisions, and CPUs.

When assessing the items that were sighted but not quantified (see Table 7.2), the most frequently sighted item during the Spring 2008 field sorting event was lumber. Lumber was sighted in 72.1% of the 147 loads sampled during this seasonal field sorting event. The second most frequently sighted item was plastic bins, which were sighted in 59.2% of the 147 sampled loads. The third most frequently sighted item during the spring field sorting event was limbs and brush, which were found in 57.8% of the 147 loads sampled during this season.

Carpet and yard waste were sighted in at least 40% of the 147 loads sampled during the Spring 2008 field sorting event. The items that were sighted the least during this field sorting event included doors, office furniture, child car seats, and stuffed toys. Of the 32 items sighted but not quantified, 14 were noted in less than 10% of the loads; and of these 14 items, all were noted in more than 1% of the 147 loads sampled during the Spring 2008 field sorting event.

Summer 2008 – During the Summer 2008 field sorting event, the most frequently quantified item in the 171 loads was small appliances (see Table 7.1). Small appliances were found in 38.6% (or 66) of the loads sampled during this seasonal field sorting event; and a total of 103 small appliances were found in these 66 loads. The second most frequently quantified item was wood pallets, which were found in 24.6% (or 42) of the summer samples; 79 wood pallets were found in these 42 loads. The third most often quantified item was mattresses, which were found in 15.2% of the 171 loads sampled (or 26 loads) during the summer field sorting event; and a total of 33 mattresses were found in these 26 loads.

Of the eight electronic items listed (CPUs, keyboards, printers, televisions, stereos, speakers, and VCR or DVD players), televisions were the most frequently identified item (24 televisions found in 11.1% of the loads). The other most identified electronic equipment included stereos, computer printers, and monitors.

When assessing the items that were sighted but not quantified (see Table 7.2), the most frequently sighted item during the Summer 2008 field sorting event was lumber. Lumber was sighted in 65.5% of the 171 loads sampled during this seasonal field sorting event. The second most frequently sighted item was plastic bins, which were sighted in 56.7% of the 171 sampled loads. The third most frequently sighted item during the summer field sorting event was carpet, which was found in 44.5% of the 171 loads sampled during this season.

Styrofoam was sighted in at least 40% of the 171 loads sampled during the Summer 2008 field sorting event. The items that were sighted the least during this field sorting event included shingles, windows, and books. Of the 32 items sighted but not quantified, 16 were noted in less than 10% of the loads; and of these 16 items, all were noted in more than 1% of the 171 loads sampled during the Summer 2008 field sorting event.

7.2 CONSOLIDATED VISUAL INSPECTION ANALYSIS

When the data from the four seasonal field sorting events is consolidated, the most frequently quantified item in the 624 loads was small appliances (see Table 7.1). Small appliances were found in 41.4% (or 258) of the loads sampled during the seasonal field sorting events; and a total of 430 small appliances were found in these 258 loads. The second most frequently quantified item was wood pallets, which were found in 20.5% (or 128) of all the loads sampled during the seasonal field sorting events; 261 wood pallets were found in these 128 loads. The third most often quantified item was mattresses, which were found in 14.7% of the 624 loads sampled (or 92 loads) during the four seasonal field sorting events; and a total of 132 mattresses were found in these 92 loads.

Of the eight electronic items listed (CPUs, keyboards, printers, televisions, stereos, speakers, and VCR or DVD players), stereos were the most frequently quantified item (76 stereos found in 11.7% of the loads). The other most quantified electronic equipment included computer printers and monitors.

When assessing the items that were sighted but not quantified (see Table 7.2), the most frequently sighted item during the field sorting events was lumber. Lumber was sighted in 66.5% of the 624 sampled loads. The second most frequently sighted item was plastic bins, which were sighted in 57.9% of the 624 sampled loads. The third most frequently sighted item during the statewide consolidated field sorting event was carpet, which was found in 50.2% of the 624 loads sampled during this season.

The items that were sighted the least during the field sorting events included doors, strollers, and books. Of the 32 items sighted but not quantified, 15 were noted in less than 10% of the loads; and of these 15 items, all were noted in more than 1% of the 624 loads sampled during the statewide consolidated field sorting event. When the quantified and sighted groups are combined, the three most identified items include lumber, plastic bins, and carpet. Of these 50 items, only four items were identified in more than 40% of the 624 sampled loads. Additionally, eight of these items were identified in 30% of the sampled loads; and 14 of these 50 items were identified in 20% of the 624 sampled loads. In turn, 28 of the 50 items were identified in 10% or less of the 624 loads sampled during the field sorting events.

The amount of each item quantified in Table 7.1 is of significance. For example, oil filters were found in 24 sampled loads and the average number of oil filters found in each load totaled four. Similarly, computer keyboards were found in 13 loads and the average number of keyboards found in each load totaled two. Wood pallets were found in 127 of the 624 sampled loads and the average number of wood pallets found in these loads totaled two. In turn, a majority of the time the average number of an item found in each load totaled one.

TABLE 7.1
STATEWIDE QUANTIFIED VISUAL INSPECTION INFORMATION

Quantified Items	Fall 2007 158 Samples	Winter 2008 148 Samples	Spring 2008 147 Samples	Summer 2008 171 Samples	Consolidated 624 Samples	Total Number of Items Sighted
	Percent of sampled loads in which the following were noted:					
CPUs	9.7	8.8	8.2	4.7	7.7	53
Keyboards	0.6	3.4	2.0	2.4	2.4	26
Monitors	10.3	8.8	7.5	6.4	8.0	55
Printers	10.2	12.2	10.4	8.8	11.1	85
Televisions	11.1	9.5	8.8	11.1	9.6	66
Stereos	9.6	14.2	11.6	9.3	11.7	76
Speakers	7.3	8.8	2.7	2.9	4.7	30
VCR or DVD Players	9.7	8.1	7.5	4.7	7.4	54
Tires	5.7	5.4	10.2	10.5	8.3	73
Wood Pallets	15.5	18.3	23.1	24.6	20.5	261
Small Appliances	49.4	48.0	34.9	38.6	41.4	430
Large Appliances	3.2	3.4	3.4	5.3	4.0	26
Sofas	13.9	13.5	6.8	7.6	9.0	59
Stuffed Chairs	10.4	13.5	4.1	9.4	9.3	68
Mattresses	18.1	10.1	15.7	15.2	14.7	132
Fluorescent Bulbs	0.0	4.1	0.0	1.8	1.4	19
Oil Filters	0.0	9.5	4.1	4.1	4.3	103
Dead Animals	0.0	6.8	3.4	0.6	2.6	23

TABLE 7.2
STATEWIDE VISUAL INSPECTION RESULTS

Observed Items	Fall 2007 158 Samples	Winter 2008 148 Samples	Spring 2008 147 Samples	Summer 2008 171 Samples	Consolidated 624 Samples
	Percent of sampled loads in which the following were noted:				
Lumber	64.6	64.2	72.1	65.5	66.5
Plumbing Fixtures	16.5	18.2	6.1	5.9	11.5
Electric Wire/Cable	31.0	30.4	14.3	11.1	21.5
Insulation	13.3	8.1	4.1	4.1	7.4
Siding	12.0	9.5	6.1	10.5	9.6
Shingles	8.9	4.1	5.5	3.5	5.5
PVC Pipe	0.0	8.8	10.2	10.5	7.4
Plastic Strap	0.0	26.4	10.2	22.8	14.9
Carpet	53.2	53.4	50.3	44.5	50.2
Metal	43.1	22.9	30.6	18.7	28.7
Doors	3.8	1.3	2.1	5.3	3.2
Windows	7.6	4.7	5.5	2.3	5.0
Drywall	9.5	23.0	13.6	9.4	13.6
Linoleum	2.5	4.0	7.5	4.1	4.5
Styrofoam	45.6	28.4	38.8	42.1	38.9
Plastic Bins	70.9	43.9	59.2	56.7	57.9
Patio Furniture	16.5	4.7	10.2	10.5	10.6
Wood Furniture	38.6	41.2	32.0	16.4	31.6
Metal Furniture	23.4	13.5	25.2	17.5	19.9
Office Furniture	7.6	10.1	2.0	5.2	6.2
Yard Equipment	8.2	0.0	6.8	7.6	5.8
Garden Hose	35.4	12.1	29.9	23.4	25.3
Bicycles	8.2	2.0	5.5	4.7	5.1
Child Car Seats	13.3	6.1	3.4	6.4	7.4
Strollers	4.4	3.4	5.4	4.1	4.3
Plastic Toys	22.8	22.3	25.4	22.4	23.2
Stuffed Toys	5.1	8.1	3.4	5.3	5.5
Books	0.0	2.7	10.9	3.5	4.2
Car Parts – Body	13.3	16.2	16.3	8.2	13.3
Car Parts – Engine	15.8	9.4	5.4	4.7	8.8
Limbs & Brush	37.4	20.2	57.8	39.5	38.7
Yard Waste	38.6	4.7	47.6	39.0	32.8

7.3 SEASONAL AND CONSOLIDATED VISUAL INSPECTION DATA COMPARISON

During the four seasonal field sorting events undertaken for this project, data was collected for 50 different items sighted in the 624 loads sampled for this study. An important result of analyzing this data was determining how frequently certain classifications of waste were sighted during the visual inspections of the 624 sampled loads. Specifically, we segregated and analyzed the following classifications:

E-Waste: Includes CPU's, Monitors, Keyboards, Printers, Computer Parts, Televisions, Stereos, DVDs and VCRs, and Stereos and Speakers.

Furniture: Includes Sofas, Stuffed Chairs, Mattresses, Patio Furniture, Wood Furniture, and Metal Furniture.

Limbs and Brush: Includes Limbs, Brush, and Yard Waste (for purposes of this specific analysis, only yard waste that was sighted in the sampled loads was included).

Construction and Demolition Debris: Includes Lumber, Dry Wall, Plumbing Fixtures, Electric Cable, Insulation, Plastic Bins, Siding, Shingles, PVC Pipe, Carpet, Doors, Windows, and Linoleum.

Table 7.3 provides the percentage of sampled residential loads in which items from these four classifications were sighted. Table 7.4 provides the percentage of sampled commercial loads in which items from these four classifications were sighted. Table 7.5 provides the percentage of sampled mixed waste loads in which items from these four classifications were sighted.

TABLE 7.3
PERCENTAGE OF SAMPLED RESIDENTIAL LOADS IN WHICH ITEMS FROM FOUR CLASSIFICATIONS WERE SIGHTED

Sites	Fall 2007				Winter 2008			
	E	F	LB	CD	E	F	LB	CD
Omaha	24%	52%	9%	73%	44%	56%	25%	69%
Lincoln	35%	82%	76%	100%	47%	100%	53%	93%
Norfolk	0%	100%	67%	67%	0%	0%	0%	0%
Lexington	50%	75%	50%	100%	29%	29%	14%	71%
Hastings	0%	100%	50%	100%	67%	44%	0%	44%
Sidney	25%	75%	50%	75%	20%	40%	0%	80%
Chadron	0%	0%	0%	0%	0%	100%	100%	100%
Valentine	0%	0%	0%	0%	0%	100%	0%	100%
All Residential Loads Sampled	26%	68%	38%	82%	43%	66%	26%	73%

*E = Electronic Waste * F = Furniture * LB = Limbs and Brush*
CD = Construction and Demolition Debris

TABLE 7.3 (continued)
PERCENTAGE OF SAMPLED RESIDENTIAL LOADS IN WHICH ITEMS FROM FOUR CLASSIFICATIONS WERE SIGHTED

Spring 2008				Summer 2008				Total			
E	F	LB	CD	E	F	LB	CD	E	F	LB	CD
14%	19%	62%	67%	19%	39%	33%	81%	26%	43%	30%	73%
33%	71%	86%	90%	29%	71%	100%	76%	35%	84%	81%	89%
50%	50%	100%	50%	0%	100%	0%	100%	11%	89%	67%	67%
20%	80%	40%	80%	25%	100%	25%	100%	30%	65%	30%	85%
46%	69%	31%	69%	23%	46%	54%	85%	41%	57%	32%	70%
75%	50%	75%	75%	0%	100%	50%	0%	33%	60%	40%	80%
33%	33%	100%	100%	0%	0%	0%	0%	25%	50%	100%	100%
0%	0%	0%	0%	50%	50%	0%	50%	33%	67%	0%	67%
32%	52%	65%	77%	23%	54%	53%	81%	31%	60%	46%	78%

*E = Electronic Waste * F = Furniture * LB = Limbs and Brush*
CD = Construction and Demolition Debris

TABLE 7.4
PERCENTAGE OF SAMPLED COMMERCIAL LOADS IN WHICH ITEMS FROM FOUR CLASSIFICATIONS WERE SIGHTED

Sites	Fall 2007				Winter 2008			
	E	F	LB	CD	E	F	LB	CD
Omaha	33%	71%	38%	100%	33%	81%	24%	71%
Lincoln	22%	67%	11%	44%	22%	83%	17%	67%
Norfolk	40%	40%	0%	80%	25%	0%	0%	75%
Lexington	0%	50%	0%	100%	0%	100%	0%	100%
Hastings	20%	80%	60%	100%	17%	83%	0%	83%
Sidney	67%	33%	67%	100%	25%	75%	0%	75%
Chadron	0%	0%	0%	0%	0%	0%	0%	0%
Valentine	0%	0%	0%	0%	0%	0%	0%	0%
All Commercial Loads Sampled	30%	65%	28%	81%	25%	73%	14%	70%

*E = Electronic Waste * F = Furniture * LB = Limbs and Brush*
CD = Construction and Demolition Debris

TABLE 7.4 (continued)
PERCENTAGE OF SAMPLED COMMERCIAL LOADS IN WHICH ITEMS FROM FOUR CLASSIFICATIONS WERE SIGHTED

Spring 2008				Summer 2008				Total			
E	F	LB	CD	E	F	LB	CD	E	F	LB	CD
41%	71%	53%	76%	25%	54%	42%	58%	33%	69%	38%	77%
31%	62%	46%	69%	24%	41%	38%	59%	25%	60%	31%	60%
0%	0%	0%	50%	75%	75%	50%	25%	40%	33%	13%	60%
0%	0%	0%	0%	75%	25%	25%	50%	43%	43%	14%	71%
50%	100%	0%	100%	100%	0%	0%	100%	29%	79%	21%	93%
17%	50%	50%	83%	0%	50%	50%	50%	27%	53%	40%	80%
0%	0%	0%	0%	0%	100%	0%	100%	0%	100%	0%	100%
0%	0%	0%	0%	50%	100%	50%	100%	50%	100%	50%	100%
32%	62%	45%	74%	31%	49%	39%	58%	30%	62%	32%	71%

*E = Electronic Waste * F = Furniture * LB = Limbs and Brush*
CD = Construction and Demolition Debris

TABLE 7.5
PERCENTAGE OF SAMPLED MIXED WASTE LOADS IN WHICH ITEMS FROM FOUR CLASSIFICATIONS WERE SIGHTED

Sites	Fall 2007				Winter 2008			
	E	F	LB	CD	E	F	LB	CD
Omaha	0%	0%	0%	0%	0%	0%	0%	0%
Lincoln	0%	0%	0%	0%	0%	0%	0%	0%
Norfolk	54%	46%	54%	69%	17%	67%	0%	67%
Lexington	36%	73%	55%	100%	50%	67%	0%	100%
Hastings	100%	100%	0%	100%	0%	100%	0%	100%
Sidney	67%	100%	67%	100%	0%	100%	0%	100%
Chadron	0%	75%	100%	100%	56%	67%	33%	89%
Valentine	50%	100%	0%	100%	0%	100%	0%	100%
All Mixed Waste Loads Sampled	43%	66%	54%	86%	38%	71%	13%	88%

*E = Electronic Waste * F = Furniture * LB = Limbs and Brush*
CD = Construction and Demolition Debris

TABLE 7.5 (continued)
PERCENTAGE OF SAMPLED MIXED WASTE LOADS IN WHICH ITEMS FROM FOUR CLASSIFICATIONS WERE SIGHTED

Spring 2008				Summer 2008				Total			
E	F	LB	CD	E	F	LB	CD	E	F	LB	CD
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
33%	50%	50%	83%	25%	75%	25%	75%	37%	54%	40%	74%
0%	75%	50%	100%	9%	36%	36%	55%	28%	66%	41%	93%
0%	0%	0%	0%	0%	100%	0%	100%	33%	100%	0%	100%
0%	0%	0%	0%	33%	67%	67%	100%	38%	75%	50%	88%
38%	75%	100%	88%	38%	38%	88%	100%	38%	62%	76%	93%
100%	100%	100%	100%	0%	0%	0%	0%	50%	100%	25%	100%
32%	64%	68%	88%	24%	52%	56%	84%	35%	63%	49%	86%

*E = Electronic Waste * F = Furniture * LB = Limbs and Brush*
CD = Construction and Demolition Debris

Residential Waste Stream: The previous tables reveal that e-waste was sighted in 26% of all the residential loads sampled in Fall 2007; 43% of the loads sampled in Winter 2008; 32% of the loads sampled in Spring 2008; and 23% of the loads sampled in Summer 2008. Items listed in the previously defined e-waste classification were sighted in 31% of all the 284 residential loads sampled for this project.

Furniture was sighted in 68% of the residential loads sampled in Fall 2007; 66% of the loads sampled in Winter 2008; 52% of the loads sampled in Spring 2008; and 54% of the loads sampled in Summer 2008. Items listed in the furniture classification were sighted in 60% of all the 284 residential loads sampled for this study.

Limbs and brush were sighted in 38% of the residential loads in Fall 2007; 26% of the loads sampled in Winter 2008; 65% of the loads sampled in Spring 2008; and 53% of the loads sampled in Summer 2008. Limbs and brush were sighted in 46% of all the 284 residential loads sampled for this study.

Construction and demolition debris was sighted in 82% of the residential loads sampled in Fall 2007; 73% of the loads sampled in Winter 2008; 77% of the loads sampled in Spring 2008; and 81% of the loads in Summer 2008. Items listed in the construction and demolition debris classification were sighted in 78% of all the 284 residential loads sampled for this project.

When assessing the residential waste stream developed for this project, the results of this analysis indicate that opportunities for significant waste reduction exist for those items listed in the furniture classification and items listed in the construction and demolition debris classification.

Commercial Waste Stream: E-waste was sighted in 30% of all the commercial loads sampled in Fall 2007; 25% of the loads sampled in Winter 2008; 32% of the loads sampled in Spring 2008; and 31% of the loads sampled in Summer 2008. Items listed in the previously defined e-waste classification were sighted in 30% of all the 231 commercial loads sampled for this project.

Furniture was sighted in 65% of the commercial loads sampled in Fall 2007; 73% of the loads sampled in Winter 2008; 62% of the loads sampled in Spring 2008; and 49% of the loads sampled in Summer 2008. Items listed in the furniture classification were sighted in 62% of all the 231 commercial loads sampled for this study.

Limbs and brush were sighted in 28% of the commercial loads in Fall 2007; 14% of the loads sampled in Winter 2008; 45% of the loads sampled in Spring 2008; and 39% of the loads sampled in Summer 2008. Limbs and brush were sighted in 32% of all the 231 commercial loads sampled for this study.

Construction and demolition debris was sighted in 81% of the commercial loads sampled in Fall 2007; 70% of the loads sampled in Winter 2008; 74% of the loads sampled in Spring 2008; and 58% of the loads in Summer 2008. Items listed in the construction and demolition debris classification were sighted in 71% of all the 231 commercial loads sampled for this project.

When assessing the commercial waste stream developed for this project, the results of this analysis indicate that opportunities for waste reduction exist for those items listed in the furniture classification and the construction and demolition debris classification. It is likely that most of the furniture waste sighted in the commercial waste stream was generated by individuals who reside in multi-family (apartments) dwellings.

Mixed Waste Stream: E-waste was sighted in 43% of all the mixed waste loads sampled in Fall 2007; 38% of the loads sampled in Winter 2008; 32% of the loads sampled in Spring 2008; and 24% of the loads sampled in Summer 2008. Items listed in the previously defined e-waste classification were sighted in 35% of all the 109 mixed waste loads sampled for this project.

Furniture was sighted in 66% of the mixed waste loads sampled in Fall 2007; 71% of the loads sampled in Winter 2008; 64% of the loads sampled in Spring 2008; and 52% of the loads sampled in Summer 2008. Items listed in the furniture classification were sighted in 63% of all the 109 mixed waste loads sampled for this study.

Limbs and brush were sighted in 54% of the mixed waste loads in Fall 2007; 13% of the loads sampled in Winter 2008; 68% of the loads sampled in Spring 2008; and 56% of the loads sampled in Summer 2008. Limbs and brush were sighted in 49% of all the 109 mixed waste loads sampled for this study.

Construction and demolition debris was sighted in 86% of the mixed waste loads sampled in Fall 2007; 88% of the loads sampled in Winter 2008; 88% of the loads sampled in Spring 2008; and 84% of the loads in Summer 2008. Items listed in the construction and demolition debris classification were sighted in 86% of all the 109 mixed waste loads sampled for this project.

When assessing the mixed waste stream developed for this project along with the four previously defined classifications, it is noteworthy that the percentage of mixed waste loads containing items from these four classifications was more than noted in either the residential or commercial waste stream. This is likely explained by the very nature of mixed waste loads and that most of the mixed waste loads contained waste generated in rural areas where recycling is not as readily available and collection restrictions may not be as strict as in more urban areas.

8. OBSERVATIONS AND RECOMMENDATIONS

Using the data base developed through this project, a characterization of Nebraska's municipal waste stream was established and is presented in Table 8.1. Using these established characteristics of Nebraska's municipal waste stream, the amount of any of the waste-material components and categories as identified in Table 8.1 can be determined. For example, the total amount of solid waste disposed in Nebraska from July 1, 2007 to June 30, 2008 was approximately 2,200,000 tons. Using the latest U.S. Environmental Protection Agency information (*Municipal Solid Waste in the United States: 2007 Facts and Figures* published November 2008, see http://www.epa.gov/osw/nonhaz/index.htm), Nebraska's municipal waste stream is estimated to be 61% of the total amount of solid waste disposed in the state. Utilizing this information, the total amount of municipal solid waste generated in Nebraska from July 1, 2007, to June 30, 2008, is 1,342,000 tons. This information was then used to develop Table 8.2, which presents the amount of each of the listed materials generated in Nebraska from July 1, 2007, through June 30, 2008.

TABLE 8.1
PERCENTAGE OF SELECTED CATEGORIES AND COMPONENTS OF NEBRASKA'S MUNICIPAL, RESIDENTIAL, AND COMMERCIAL WASTE STREAMS

Category/Component	% of Municipal Waste Stream	% of Residential Waste Stream	% of Commercial Waste Stream
Cardboard	8.04%	2.00%	14.42%
Office Paper	4.37%	3.16%	5.95%
Newsprint	4.96%	6.11%	3.79%
Magazines	3.85%	4.48%	2.96%
Paperboard/Liner Board	5.30%	5.98%	4.31%
Mixed Paper	14.62%	13.61%	16.49%
TOTAL PAPER FIBERS	**41.15%**	**35.33%**	**47.93%**
PET #1	3.44%	3.17%	3.43%
HDPE #2	1.62%	1.86%	1.31%
Other Numbered Containers	2.68%	2.44%	2.96%
Plastic Film/Wrap/Bags	6.95%	6.92%	7.45%
Other Plastics	4.44%	4.87%	4.34%
TOTAL PLASTICS	**19.13%**	**19.27%**	**19.49%**
Clear Glass Containers	2.60%	3.36%	1.66%
Brown Glass Containers	1.65%	1.92%	1.20%
Green Glass Containers	0.47%	0.67%	0.27%
Blue Glass Containers	0.03%	0.04%	0.02%
Other Glass	0.17%	0.22%	0.11%
TOTAL GLASS	**4.91%**	**6.20%**	**3.26%**
Aluminum Cans	1.20%	1.33%	0.99%
Tin Cans	1.64%	1.89%	1.19%
Other Aluminum	0.31%	0.36%	0.28%
Other Tin	0.18%	0.16%	0.23%
Other Mixed Metals	0.30%	0.28%	0.37%
TOTAL METALS	**3.64%**	**4.02%**	**3.07%**
Food Waste	16.64%	17.22%	15.86%
Diapers	3.96%	5.13%	2.19%
Textiles/Rubber/Leather	5.00%	6.29%	3.53%
Yard Waste	2.83%	3.59%	1.87%

TABLE 8.2
PERCENTAGE AND TOTAL WEIGHT OF SELECTED CATEGORIES AND COMPONENTS OF NEBRASKA'S MUNICIPAL WASTE STREAM

Category/Component	% of Municipal Waste Stream	Total Weight (Tons)
Cardboard	8.04%	107,897
Office Paper	4.37%	58,645
Newsprint	4.96%	66,563
Magazines	3.85%	51,667
Paperboard/Liner Board	5.30%	71,126
Mixed Paper	14.62%	196,200
TOTAL PAPER FIBERS	**41.15%**	**552,233**
PET #1	3.44%	46,165
HDPE #2	1.62%	21,740
Other Numbered Containers	2.68%	35,966
Plastic Film/Wrap/Bags	6.95%	93,269
Other Plastics	4.44%	59,585
TOTAL PLASTICS	**19.13%**	**256,725**
Clear Glass Containers	2.60%	34,892
Brown Glass Containers	1.65%	22,143
Green Glass Containers	0.47%	6,307
Blue Glass Containers	0.03%	403
Other Glass	0.17%	2,281
TOTAL GLASS	**4.91%**	**65,892**
Aluminum Cans	1.20%	16,104
Tin Cans	1.64%	22,009
Other Aluminum	0.31%	4,160
Other Tin	0.18%	2,416
Other Mixed Metals	0.30%	4,026
TOTAL METALS	**3.64%**	**48,849**
Food Waste	16.64%	223,309
Diapers	3.96%	53,143
Textiles/Rubber/Leather	5.00%	67,100
Yard Waste	2.83%	37,979

It is important to note that although the data in Table 8.1 and Table 8.2 presents the characterization of Nebraska's municipal waste stream, this data should not be used to linearly extrapolate information for any specific location or facility within the state. As was detailed in Section 4, the waste stream at each of the eight participating facilities contained characteristics unique to that site. Utilizing the percentages in Table 8.1 without making adjustments related to the demographic, geographic, and unique aspects of the location, would result in an inaccurate characterization of the waste stream for that location or facility.

8.1 OBSERVATIONS

The following observations are based on a review of all the data generated for this study and the field activities undertaken as a part of this project. These observations are provided to further expand the information provided in this report.

- Yard waste comprises 2.83% of Nebraska's municipal waste stream. The yard waste ban appears to be very successful in reducing the amount of yard waste disposed in Nebraska's solid waste facilities.
- The paper fibers component comprises 41.15% of Nebraska's municipal waste stream. More than 50% of this component is easily recyclable.
- The mixed paper portion of the paper fibers component is relatively easy to recover; however, it has limited value in the recycling market.
- The plastics component comprises 19.13% of Nebraska's municipal waste stream. Approximately 27% of the component is easily recyclable – specifically, PET #1 and HDPE #2.
- The two largest categories of the plastics component – film/wrap/bags and other plastics - comprise over 55% of the component. These two materials are not easily recycled and the market for these materials is relatively limited.
- The glass component comprises 4.91% of Nebraska's municipal waste stream. This material is limited in its value within the recycling market; however, there are a number of uses if the material is ground or cleaned for reuse.
- The metals component comprises 3.64% of Nebraska's municipal waste stream. This component is dominated by aluminum and tin cans, which when combined comprise more than 75% of this component. These materials are easily recycled and, under the right conditions, can be rather valuable.

- Food comprises 16.64% of Nebraska's municipal waste stream. This material can be recovered and utilized in composting; however, recovery can be expensive and require vehicles that are exclusively utilized for food waste collection.

- Food waste is one of the major contaminants of the paper fibers and plastics found in the waste stream.

- Food waste is valuable in the compaction of waste at transfer stations and in landfills. This waste and other liquids provide the cohesion necessary to compact the solid waste. Without this cohesion, the compaction level desired in collection trucks, transfer trucks, and landfills could become more difficult to achieve.

- The diapers category comprises 3.96% of Nebraska's municipal waste stream. The majority of this category appears to be adult diapers.

- The textiles/rubber/leather category comprises 5.00% of Nebraska's municipal waste stream. The largest portions of this category appear to be clothing (textiles) and shoes.

- Electronic waste was sighted in more than 30% of the sampled loads. This waste ranged from CPUs and computer peripherals to televisions and stereos.

- Furniture was sighted in more than 60% of the sampled loads. Mattresses, wood furniture, sofas, and easy chairs were the predominant items sighted in this classification.

- Limbs and brush were sighted in more than 40% of the samples loads. The greatest portion of this material was limbs.

- Construction and demolition debris was sighted in more than 75% of the sampled loads. Lumber, insulation, drywall, and plumbing fixtures were the predominant items sighted in this classification.

- Only 17% of the 624 loads captured and sampled for this study contained mixed waste. However, mixed waste loads were captured and sampled at six of the eight participating facilities.

- Mixed waste loads dominated the loads sampled at three of the sites – Norfolk, Lexington, and Chadron – where more than 50% of all the loads sampled contained mixed waste. No mixed waste loads were sampled at the Omaha facility; only one mixed waste load was sampled at the Lincoln facility; less than 25% of the loads sampled at the Sidney and Hastings facilities contained mixed waste; and slightly less than 50% of the loads sampled at the Valentine facility contained mixed waste.

8.2 RECOMMENDATIONS

The success of any waste characterization study is in the use of the data and the information generated. The following recommendations provide some ideas on how this data and information could be utilized to benefit the State of Nebraska.

1. A program should be developed that provides a relationship among the eight participating facilities – and the counties they serve – and all of the other counties in Nebraska. This program should be based on at least ten criteria that establish these relationships. These criteria could include: (a) population; (b) location; (c) demographics such as population age, education level, income, and size of household; (d) type of solid waste collection; and (e) level of recycling or waste reduction efforts.

2. An on-going training program that provides guidance and direction in the use of the data provided in this report should be established. This training could focus on various aspects of the study data including: (a) various materials in the waste stream; (b) possible materials to target for waste reduction efforts; and (c) waste stream materials that impact the collection, transfer, and disposal of solid wastes. The training program could be prepared for community, county, or regional use and could be integrated into on-going conferences or seminars held throughout in the state.

3. The implementation of waste audit programs and data from this study could be of exceptional benefit to solid waste planners throughout the state. Waste audits should be conducted to complement the baseline data developed in this study and to monitor waste stream changes. Waste audit program training could be as varied and extensive as learning to conduct detailed site inspections to simple walk around procedures and visual inspections. The training should encompass on-site activities, methods for recording data, and methods to relate the waste audit data to the baseline data in the waste characterization study.

4. More focused waste sorts should be considered for particular areas in the state. For example, the impacts of recreational facilities in and around Valentine were significant. Further study of this phenomenon could assist in developing more progressive recycling and waste reduction program for these areas. Another example would be to establish a clearer picture of the amount of electronic waste being discarded in Lincoln, Norfolk, and Hastings. Electronic waste at these sites was found in as many as 40% of the sampled loads.

5. A follow-up waste characterization study of Nebraska's municipal waste stream should be conducted in 2013, or no later than 2016. If waste reduction efforts and recycling are accelerated, funding for these efforts is increased, unique changes in the waste stream are occurring, and/or fluctuations in the waste stream are difficult to explain, it is possible the next waste characterization study would need to occur before 2013. It is also possible that subsequent waste characterization studies could include the collection of data throughout two seasons instead of all four seasons. If this approach is employed, our recommendation would be to conduct field sorting activities during the spring and fall seasons. Additionally, our recommendation would be to conduct field sorting activities at the same facilities used to develop the data for this study or very similarly located and sized facilities.