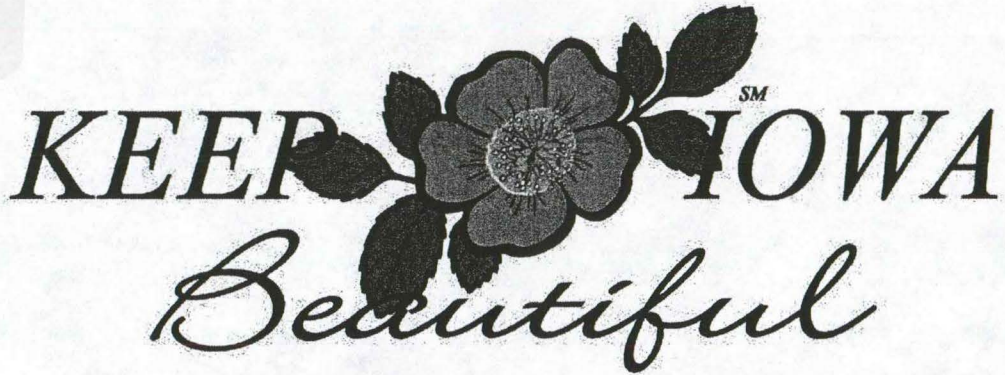


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2001 ROADSIDE LITTER CHARACTERIZATION STUDY

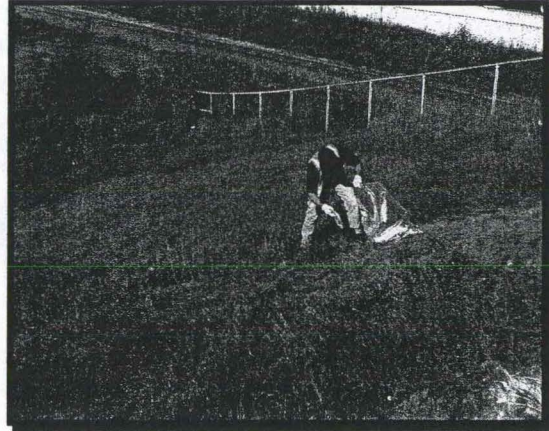
SUMMARY

BARKER LEMAR

ENGINEERING CONSULTANTS

SUMMARY

2001 ROADSIDE LITTER CHARACTERIZATION STUDY



BACKGROUND

The goal of Keep Iowa Beautiful (KIB) is to reduce the volume of environmental littering in Iowa by 50% over the next three to five years by changing the behavior of residents and visitors to Iowa.

KIB also works to assist communities and organizations in cleanup and beautification projects, conduct studies that help to understand the reasons some people litter and show a lack of respect for land and property, provide anti-littering and beautification education programs, increase public awareness of the costs of littering and encourage regional groups and communities to become Keep Iowa Beautiful affiliates.

Keep Iowa Beautiful (KIB) developed a three-part statewide comprehensive program to collect "benchmark information" for litter assessment in 2001. Components of this program included an attitudinal survey prepared by the Iowa Department of Transportation, an analysis of the cost of litter control prepared by Franklin and Associates, and the 2001 Roadside Litter Characterization Study.

During the spring of 2001, **BARKER LEMAR ENGINEERING CONSULTANTS (BARKER LEMAR)** was selected to perform the 2001 Roadside Litter Characterization Study which included development of an Internet based Geographic Information System (GIS) for KIB. The approved budget for this project included \$80,000 for the roadside litter survey and \$40,700 for the optional GIS/Internet site, for a total project cost of \$120,700

A separate *Technical Summary* has been prepared that reviews the various technological innovations implemented to collect, store, retrieve and display the 2001 Roadside Litter Characteristic Study Data. The KIB Internet/GIS site is located at www.internetgis.org/kib/default.asp or via a link at keepiowabeautiful.com.

SUMMARY OF RESULTS

- 150 roadside sites were sampled. The median width of the sites was 22.4 feet and the median length 195.3 feet long.
- The study randomly selected sites based on population, urban versus rural classification, and daily traffic count. 116 of the sites were located in incorporated places and 35 were located on rural roadways. The selection process implemented controls to disperse sites throughout the State.
- Litter was collected if it was 1/2 inch square or larger, 22,585 pieces of litter were collected over 657,401 square feet of roadside survey area.
- The study identified namebrands within each category of litter. Staff calculated and counted litter pieces count, weight, and area (in square inches). The study identified beverage containers by material type and deposit designation.
- 468 pieces of deposit designated beverage container litter was collected along Iowa roadsides; representing 2% percent of all litter collected and 44% percent of all beverage container related litter collected (1,040 total pieces). 572 pieces of non-deposit designated beverage container litter was collected along Iowa roadsides representing 2.5% of all litter collected and 54% of all beverage container related litter.
- 220 pieces of beer beverage container related litter was collected, of which 66% were identified as an Iowa deposit container. 206 pieces of soda beverage container related litter items were collected, of which 50% were identified as an Iowa deposit container.
- 50% of the deposit litter was aluminum cans 44% percent were glass, and 5% was plastic.
- The leading namebrands for a selection of subcategories included Marlboro (Cigarette Filters and Butts), Snickers (Candy and Snack Packaging), Mountain Dew (Soda Containers), Bud Light (Beer Containers), McDonald's (Paper Cups), and Burger King (Plastic Cups).
- 44.8% of the litter collected during the study was located along high volume roadside segments, although the high volume sites represented 12% of the samples. Additionally, the high volume sites generated more litter per square foot of surveyed area than medium volume, low volume, and rural sites combined. Examples of non-interstate high volume roadsides include SE 14th Street in Des Moines and Spruce Hills Drive, west of Elmore Ave., in Davenport.
- Iowa has 284 miles of high volume roadsides (counting both sides of the road). If the roadside shoulder is estimated to average 35 feet wide, and the average number of pieces per square foot sampled equaled 8.0, then an extrapolation could be calculated for the State showing 1.4 million pieces of litter per mile of high volume roadside.

ROADSIDE LITTER CHARACTERIZATION STUDY DESIGN

Litter characterization reports reviewed by **BARKER LEMAR** staff for the 2001 Roadside Litter Characterization Study included several studies completed in Nebraska, Florida and Oklahoma as well as reports and technical summaries from the Institute of Applied Research. For a complete listing of reports and technical summaries reviewed for this roadside litter report, please refer to Attachment A.

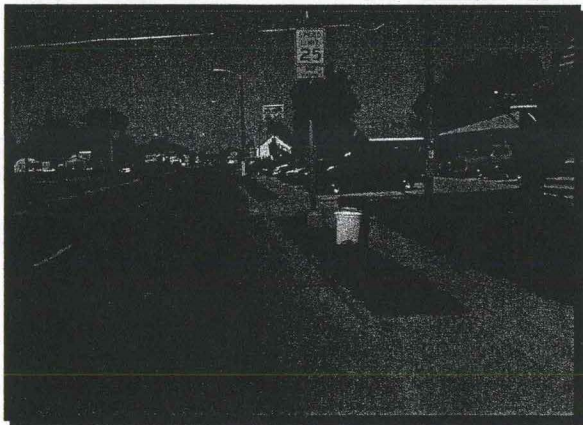
After reviewing previous litter studies, staff provided a summary of possible litter collection criteria to the KIB stakeholders including the pros and cons of each criterion.

1. Litter Collection Parameters

During the planning meetings, KIB stakeholders expressed an interest in collecting cigarette litter data. Stakeholders and staff thought cigarette related litter was "under-measured" by previous studies due to the litter size criteria of these studies. A recommendation was made, and accepted, that **BARKER LEMAR** Field Crews collect litter if it was 1/2 square inch or larger. The 1/2 square inch criterion included most cigarette filters, filter material, and butts.

Litter would only be collected if it lied within the boundaries of the delineated roadside site.

2. Selecting Primary Stratification Systems for the Study



KIB stakeholders continually asked two important questions while determining site selection criteria, these were:

- How are the site selection criteria going to influence KIB's ability to change littering behavior through education and marketing efforts?
- How well will the selection process represent the entire state?

KIB stakeholders identified key parameters affecting site selection, they were:

- The entire State of Iowa must be represented equally;
- The selection of roadside sites must attempt to minimize bias, and;
- The sites should be selected randomly.

Additional considerations in site selection involved access to data at a state level, preferably access to state level data in an electronic format.

As the site selection discussion progressed, two distinct systems to weigh site selection materialized.

3. Urban and Rural Stratification Systems

First, the KIB stakeholders asked that the state to be divided into rural and urban areas. The Stakeholders then determined that urban areas should be further divided into categories based on population.

Staff defined urban areas for this study as a roadside within the geographic boundary of incorporated places. For this study, rural place was defined as any place 2 miles from the border of any incorporated place.

The State of Iowa has 77% of the population living in incorporated places (urban sites) and 23% of the population living in unincorporated (rural) areas. Therefore, potential urban sites should total 116, and rural sites selected from rural areas should total 35.

BARKER LEMAR used 2000 US Census Bureau data to stratify urban areas according to population. Staff divided the total population of the IDOT classification by the total population. The resulting percentage was used to assign a specific number of urban roadside sites to that classification size (see Table 1).

While staff ordered cities in descending order, they assigned a number from 1 to 955 to the cities. A random number generator chose numbers within the City Classification. For example, the eight largest cities (numbered 1-8) identified as having populations over 50,001 received 39 random numbers (34% of 116 urban sites) numbered from 1-8. Table 1 provides a summary of city classification size and the number of roadside sites.

TABLE 1

IDOT CITY CLASSIFICATION SIZE	NUMBER OF CITIES IN IDOT CLASSIFICATION	ROADSIDE SITES / CATEGORY (151 TOTAL)	% OF TOTAL URBAN POP.
50,001 plus	8	39	34%
25,001 - 50,000	9	15	13%
10,001 - 25,000	13	11	10%
5,001 - 10,000	39	15	13%
1 - 5,000	886	36	31%
RURAL	NA	35	NA

4. IDOT Average Daily Vehicle Count

The KIB stakeholders developed another tier of classifying urban sites. This stratification system involved selecting roadside litter collection sites based on IDOT average daily vehicle counts (traffic volume).

Year 2000 IDOT traffic volume data was used to develop three traffic volume classifications. Road segments are the geographical boundary for IDOT road volume data. A road segment is an undetermined length of road from one intersection to another intersection. Staff weighed each traffic volume classification by adding the total miles within each classification and dividing it by the total - see Table 2.

BARKER LEMAR staff used "Natural Breaks" ArcView's default classification method to determine the three daily vehicle traffic count classifications.

TABLE 2 - Traffic Volume and the Number of Roadside Sites

CARS PER DAY	KIB CLASSIFICATION	% OF IOWA ROADWAYS	# OF ROADSIDE SITES (116 TOTAL)
1- 9,070	Low Volume	67%	78
9,071 - 31,200	Medium Volume	21%	24
31,201 +	High Volume	12%	14

5. Identify Roadside Litter Categories and Subcategories

KIB stakeholders provided input regarding some key litter classification categories, and subcategories. Specifically KIB stakeholders requested that beverage containers be identified by material type and then by their designation as a deposit or no-deposit container. Staff developed other categories from research performed on other statewide litter characterization studies and the experience of the **BARKER LEMAR** staff. The litter categories and subcategories are located in Attachment B.

METHODOLOGY - 2002 ROADSIDE LITTER CHARACTERIZATION STUDY

BARKER LEMAR staff began collecting roadside litter data on Wednesday, September 19, 2001 and completed the last site on November 12, 2001. Snow was not present during any of the litter collection events.

Field workers used a measuring wheel to measure length and width of the sites. Field crews were instructed to make sites 200 feet long if possible. Site width was not pre-determined, rather staff determined width in the field based on the location of barriers and natural geographical boundaries. Sites were not to exceed 40 feet in width. One site was not sampled due to a road closure and construction activities.

- The study area sampled 5.6 linear miles of Iowa roadways. The average site length was 195.3 feet and the average site width was 22.4 feet. The study sampled 669,364 square feet.
- 22,585 pieces of litter were collected.

Litter classification included a name brand identification phase, deposit designation phase, area estimation phase, litter count phase, and litter weight phases for the represented subcategories within each of the 150 roadside sites.

After staff classified the litter, statistical analysis were performed using the classification characteristics mentioned above as well as county population, county median age, and traffic volume.

Field staff sorted litter into several pre-approved categories and subcategories with a special emphasis on beverage containers and the deposit designation of the containers. Staff recorded weight (in grams), area (in square inches), and number of pieces for each subcategory.

Field staff also collected data regarding the proximity of schools and parks, stoplights, and fast food and convenience stores to the roadside survey area.

The following pictures provide examples of the type of litter subcategories and examples of litter from roadside sites.



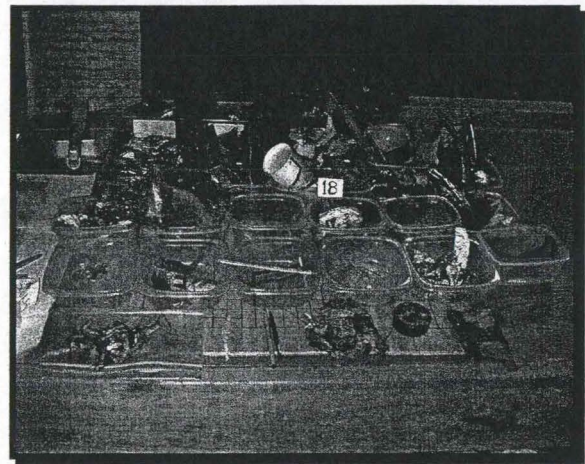
Cigar/Cigarette Packaging



Lottery Related



An Example of Litter from a Low Volume Site



An Example of Litter from a High Volume Site

RESULTS - 2002 ROADSIDE LITTER CHARACTERIZATION STUDY

1. Deposit and Non Deposit

BARKER LEMAR instructed staff to designate a beverage container as "Deposit" only if staff observed deposit language on the container. **BARKER LEMAR** thought this system would be the most objective method for determining the deposit designation. If field staff could not identify any deposit language on the container, they were to classify the beverage container litter as "Non-deposit".

- 468 pieces of deposit designated beverage container litter was collected along Iowa roadsides; representing 2.1% percent of all litter collected (22,585 total pieces) and 44.4% percent of all beverage container related litter collected (1,055 total pieces).
- 572 pieces of non-deposit designated beverage container litter was collected along Iowa roadsides representing 2.5% of all litter collected and 54.2% of all beverage container related litter.
- 220 pieces of beer beverage container related litter was collected, of which 66% were identified as an Iowa deposit container.
- 206 pieces of soda beverage container related litter items were collected, of which 50% were identified as an Iowa deposit container.
- 50% percent of the deposit litter (468 total pieces) was aluminum cans (234 total pieces), 44% percent was glass (206 total pieces), and 5.1% was plastic (24 total pieces).

2. Namebrands

The following tables identify the top Namebrands listed from those with the greatest number of pieces to the fewest.

A complete report of all Namebrands for categories and subcategories is located in Attachment C. Tables 3 - 8 provide summaries of Namebrand data by individual subcategories.

Table 3 displays the total number of selected namebrands for Cigar/Cigarette Filters and Butts and the percent of these namebrands compared to the 22,585 littered items collected during the study. 5,548 filters and butts could not be identified by a namebrand.

Table 3

NAMEBRAND	PERCENT OF TOTAL	COUNT
Marlboro	6.27%	1,436
GPC	0.50%	116
Winston	0.29%	68
Salem	0.24%	55
Basic	0.22%	50
Camel	0.21%	48

Table 3 - continued

Parliament	0.20%	47
Merit	0.19%	44
Pall Mall	0.11%	25
Old Gold Lights	0.10%	24
Newport	0.10%	23
Doral	0.10%	22
Virginia Slims	0.07%	15

NOTE: 5,801 (25.1%) cigarette filters and butts were identified as having no namebrand.

Table 4 displays the total number of selected namebrands for Candy/Snack Packaging

Table 4

NAMEBRAND	PERCENT OF TOTAL	COUNT
Snickers	0.26%	59
Tootsie Rolls	0.16%	33
Brach's Star Brites	0.08%	18
Twix	0.08%	18
Lifesaver Crème Saver	0.07%	17
Reeses	0.08%	17
Starburst	0.07%	16
Life Savers	0.06%	15
Nestle	0.06%	14
Slim Jim	0.06%	14
Trident	0.06%	14
Winterfresh	0.06%	13
Jolly Rancher	0.05%	12

Table 5 displays the total number of selected namebrands for Beverage Containers

Table 5

NAMEBRAND - BEER	PERCENT OF TOTAL	COUNT
Bud Light	0.19%	43
Busch Light	0.17%	39
Budweiser	0.12%	27
Miller Light	0.06%	14
Busch	0.05%	11
Ice House	0.02%	5
Natural Light	0.02%	5
Coors Light	0.02%	4
Old Milwaukee	0.01%	3
Pabst Blue Ribbon Light	0.01%	3
NAMEBRAND - SODA	PERCENT OF TOTAL	COUNT
Mountain Dew	0.26%	59
Pepsi	0.18%	41

Table 5 continued

Coke, Coca-Cola Classic	0.13%	30
Sprite	0.03%	7
Sunkist	0.02%	5
Diet Coke	0.02%	4
Dr. Pepper	0.02%	4
A&W Cream Soda	0.01%	2
Diet Pepsi	0.01%	2
7-UP	0.00%	1
<u>NAMEBRAND – JUICE, MILK, SPORTS, TEA, VEGETABLE/HEALTH, WATER</u>	<u>PERCENT OF TOTAL</u>	<u>COUNT</u>
Sunny Delight Juice	0.02%	4
Blue Bunny Milk	0.02%	4
Anderson Erickson Milk	0.01%	3
Nestle Quik	0.01%	3

Table 6 displays the total number of selected namebrands for Paper Cups

Table 6

<u>NAMEBRAND</u>	<u>PERCENT OF TOTAL</u>	<u>COUNT</u>
McDonalds	0.24%	55
Burger King	0.12%	28
Taco Johns	0.05%	12
Wendy's	0.03%	8
Subway	0.03%	7
Hardee's and KFC (Pepsi)	0.03%	6

Table 7 displays the total number of selected namebrands for Plastic Cups

Table 7

<u>NAMEBRAND</u>	<u>PERCENT OF TOTAL</u>	<u>COUNT</u>
Burger King	0.04%	9
McDonalds	0.02%	5
Steak and Shake	0.02%	4
Casey's	0.01%	3
Kum & Go	0.01%	3

Table 8 displays the total number of selected namebrands for Fast Food Wrappers and Bags

Table 8

<u>NAMEBRAND</u>	<u>PERCENT OF TOTAL</u>	<u>COUNT</u>
McDonalds	0.08%	18
Subway	0.07%	16
Burger King	0.05%	12
Hardees	0.03%	7
Taco Bell	0.03%	7

3. Leading Categories by Count

The top five categories from the greatest number of pieces to the fewest are provided in Table 9. Total count from all litter collected totaled 22,585. A complete list of all categories and subcategories ordered from heaviest to lightest is located at the KIB GIS based Internet site - www.internetgis.org/kib/default.asp.

Table 9

<u>CATEGORY</u>	<u>PERCENT OF TOTAL</u>	<u>COUNT</u>
Tobacco	36.6%	8,270
Other Plastic	15.3%	3,462
Other Paper	12.8%	2,883
Packaging	11.6%	2,628
Cup Related	5.3%	1,203
Beverage Container	4.6%	1,040

4. Leading Categories by Weight

The top five categories from heaviest to lightest are provided in Table 10. A complete list of all categories and subcategories ordered from heaviest to lightest is located at the KIB GIS based Internet site. Total grams from all litter collected totaled 91,599 (313.14 pounds). The total grams were converted to pounds by dividing by 454.

Table 10

<u>CATEGORY</u>	<u>PERCENT OF TOTAL</u>	<u>WEIGHT (POUNDS)</u>	<u>WEIGHT (GRAMS)</u>
Construction Debris	18.65%	58.4	26,510.39
Tires	17.06%	53.4	24,256.70
Other Metal	15.41%	48.3	21,908.17
Beverage Container	12.87%	40.3	18,296.05
Other Plastic	5.84%	18.3	8,299.41
Miscellaneous	5.74%	18.0	8,153.53

5. Leading Categories by Area

The top five categories from greatest area to least area are provided in Table 11. A complete list of all categories and subcategories ordered from heaviest to lightest is located at the KIB GIS based Internet site. Total square inches from all the litter collected totaled 142,165 square inches (636.10 square feet). The total square inches were converted to square feet by dividing by 144.

Table 11

<u>CATEGORY</u>	<u>PERCENT OF TOTAL</u>	<u>AREA (SQUARE FOOT)</u>	<u>AREA (SQUARE INCHES)</u>
Other Plastic	41.00%	95.4	13,735.70
Other Paper	19.00%	86.6	12,477.20
Candy and Snack Packaging	6.50%	85.8	12,355.10
Bags	5.40%	52.6	7,579.00
Beverage Container	5.00%	48.2	6,938.50

INTRODUCTION TO STATISTICS

Statistical methods provide a summary of conclusions that can be drawn from an experiment but also provide a reliable prediction of information that can be gained from a proposed experiment.

For this report **BARKER LEMAR** analyzed several independent variables, comparing traffic volume, median county age, and county population, to the total number of litter pieces, litter weight, and litter area within the litter research subcategories.

The searches for statistically significant relationships may assist KIB answer the questions, "Do the statistical correlations provide a framework from which we can develop systems to change littering behavior through education and marketing efforts?"

SUMMARY OF STATISTICAL RESULTS

Cigar/Cigarette Filters and Butts, Candy and Snack Packaging, and Beer and Soda Containers show a similar trend, which is: as traffic volume increases the variability between population, age and traffic volume decreases. This means that traffic volume is a primary independent variable that affects litter. However 40% to 60% of the variability is still not accounted for, other demographic or geographic variables are likely influencing the variability and are not accounted for in these results. Other variables might be median income, median education, pedestrian traffic, speed of vehicles, etc.

Using the Multiple Regression Package designed for KIB and simultaneously comparing the effect of county population, county median age and traffic volume, an R^2 near 0.6 can be calculated by adjusting traffic to high volume, including all county ages, and using only the counties medium or high populations. An R^2 means 60% of the variability can be explained with the selected variables. For field-tests an R^2 above 0.6 is thought to be a strong correlation considering all the possible outside influences (variables) not taken into consideration

CONCLUSIONS DRAWN FROM 2001 ROADSIDE LITTER CHARACTERIZATION RESULTS

The State of Iowa has approximately 112,619 miles of roadways, of which 142 miles are high volume roads segments, 1,631 miles are medium volume road segments, and 110,845 miles are low volume road segments. Note: all of the rural sites were low volume traffic sites. In this section, the site selection is considered random, unbiased, and therefore representative of the road segments and counties in Iowa.

1. Extrapolation of Traffic Volume Data and Litter Count

44.84% of the litter collected during the study was located along high volume roadside segments, although the high volume sites represented 12% of the samples.

Additionally, the high volume sites generated more litter per square foot of surveyed area than medium volume, low volume, and rural sites combined (see Table 12).

TABLE 12 - Traffic Volume and Litter Count

TRAFFIC VOLUME	% OF IA ROADWAYS	TOTAL PIECES	PIECES AS A % OF TOTAL	TOTAL AREA SURVEYED (SQ. FT.)	AVG. SIZE OF SURVEYED AREA (SQ. FT.)	AVG. # OF PIECES PER SQ. FT.
High	12%	10,127	44.9%	81,108	5,793.4	8.0
Medium	21%	6,317	28.0%	114,238	4,759.9	1.4
Low*	67%	6,141	27.2%	462,055	6,000.7	0.4
TOTAL	100%	22,585	100%	657,401	NA	NA

*Rural sites and low volume sites are combined.

Consequently, if Iowa has 284 miles of high volume roadsides (counting both sides of the road) and the roadside shoulder is estimated to average 35 feet wide, then an extrapolation could be calculated for the State showing 1,480,248 pieces of litter per mile of high volume roadside.

Note: Calculations use 5,280 feet per mile. Average roadside shoulder width is only an estimate used for these calculations.

If Iowa has 3,262 miles of medium volume roadsides (counting both sides of the road), and the roadside shoulder is estimated to average 25 feet wide, then an extrapolation could be calculated for the State showing 180,841 pieces of litter per mile of medium volume roadside.

If Iowa has 110,845 miles of low volume roadsides (counting both sides of the road), and the roadside shoulder is estimated to average 20 feet wide, then an extrapolation could

be calculated for the State showing 41,184 pieces of litter per mile of low volume roadside.

2. Results of the 2002 Iowa Roadside Litter Characteristic Study Compared to Recent Studies Completed for the States of Nebraska and Florida

- **Nebraska**

The 1996 Statewide Litter Survey, prepared for the Nebraska Department of Environmental Quality, was to measure the effectiveness of the litter reduction and recycling grant program. This report collected data from 154 roadside/recreation land sites. The Nebraska report lists accumulated litter for interstates at 2,020.7 items per mile. The 2002 Iowa study determined accumulated litter to be 21,098 items per mile of high volume roadway (including interstates).

Table 13 compares the percent of total littered items as identified for Nebraska and Iowa.

Table 13

<u>CATEGORY</u>	<u>IOWA PERCENT OF TOTAL</u>		<u>NEBRASKA PERCENT OF TOTAL</u>	
	Count % Of Total	Area % Of Total	Count % Of Total	Area % Of Total
Beer Containers	.97%	1.17%	3.85%	5.94%
Soft Drink Containers	.92%	1.90%	4.70%	8.97%
Juice, Wine, Liquor and Other Bev. Containers	.21%	.60%	1.34%	1.94%
Tobacco Products, Packaging, Etc.	36.6%	4.75%	33.51%	6.05%
Candy, Snack	11.6%	8.69%	11.36%	6.04%
Cups, Lids, Straws	5.3%	4.05%	7.26%	8.47%

- **Florida**

The 1997 Florida Litter Study, conducted by the Florida Center for Solid and Hazardous Waste Management, lists specific sub categories and the percent each represents of the total amount of large litter collected. Direct comparisons of Florida data and Iowa data are difficult because of Florida's separation of their Small Litter category and Large Litter category. Florida did not use traffic volume data as an independent variable. Large litter was defined as all items greater than 4 square inches. Small Litter included among

other items: bottle caps, candy wrappers, cigarette butts, glass/metal/paper/plastic pieces, and straws.

Florida did identify cigarette butts as the most numerous single small litter item.

Florida did evaluate the effects of various site characteristics to determine their relationship to the amount of small litter. Characteristics for which significant differences were found included: proximity to a traffic signal, number of lanes, and height of grass.

3. Results of the 2002 Iowa Roadside Litter Characteristic Study Compared to Results of Roadside Litter Characteristic Studies and Related Work Performed by the Institute for Applied Research

- **Multiple and Single Correlation Coefficients**

The Institute for Applied Research (Institute) provided linear regression coefficients for Average Daily Vehicle Traffic, accumulated litter rates and road type in Report S-8.16. In this report the Institute said "... for highways, roads, and freeways, the county population size and the average daily vehicle traffic have the highest simple correlation coefficients".

The Institute also prepared the following remarks in the same report, "The average R squared coefficient from multiple regression for highways, roads and freeways is .373 indicating that only 37% of the variability of litter rates in those locales is associated with variability of the independent variables. The rest of the variability is probably associated with other unmeasured variables such as trappage, slope, heavy prior rainfall, maintenance frequency, vehicle speed, average age of drivers and pedestrians, etc."

According to the Institute, adding independent variables increased the R squared coefficients increases the accuracy of the results.

The 2001 Iowa Roadside Litter Characteristic Study generated R squared coefficients for specific subcategories using high volume road data, medium or high county population data and item count. Cigarette Filter and Butts generated an R squared coefficient of .41, Candy Wrappers and Snack Packaging generated an R squared coefficient of .34, and Beer and Soda Containers generated an R squared coefficient of .53.

The 2001 Iowa study did not see R squared coefficients greater than .3) for subcategories using low volume road data, item count, and lower median county populations.

If littering behavior is to be changed, a theory could be developed that litter is not necessarily age specific, rather traffic volume specific.

RECOMMENDATIONS (INFORMATION TO GUIDE POLICY)

1. A Fresh Litter Study

The 2001 Roadside Litter Characteristic Study measured only accumulated litter; because this is a baseline study, staff did not perform a "fresh litter study" which is the rate at which litter is re-charging. **BARKER LEMAR** recommends a 2002 fresh litter study on the high volume roadways, the medium volume roadways, and a statistical sample of low volume roadways. A total of 24 medium volume sites and 14 high volume sites should be sampled, in addition to a random sample of 25% of the 112 low volume/rural sites (or 28 sites). A random sample of low volume/rural sites should provide an adequate measurement of fresh litter for these locations. 66 roadside litter sites would be re-sampled for fresh litter study in 2002. Researchers will collect litter from the same survey areas identify survey areas using the GIS program and field notes from the 2001 survey.

The 2002 study should begin in September and staff should complete the fieldwork by the end of October to coincide with the 2001 study. This study will use the same criteria and tools to measure litter size, area, and weight. The final report will calculate the amount of fresh litter deposited per year for categories, subcategories, and roadway type.

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2. Targeted Anti Litter Campaign

Targeting specific litter types and specific namebrands

A targeted litter reduction education and promotional system should involve the leading sub-category data and the leading name brand data.

Targeting Specific Road Segments and Geographic Areas

Educational and promotional campaigns should also consider focusing on road segments that met the "high traffic volume" criteria (greater than 31,201 vehicles per day).

If littering behavior is to be changed, a theory could be developed that litter is not necessarily age specific, rather traffic volume and population specific. Educational information might be concentrated in the areas of heaviest traffic volume within counties of medium to high populations.

Targeting Specific City Sizes

Based on field observations and objective data collected in the field, the amount of litter in rural areas, communities less than 5,000, and low volume road segments could be classified as very little to moderate. Staff had a few conversations with individuals, including mayors, of small towns (less than 5,000) when performing the litter characteristic fieldwork. A primary concern of these smaller communities was not litter, rather junk cars and other debris on private property and old buildings requiring demolition and disposal.

Medium sized communities of 5,001 - 10,000 also appeared to have very little to moderate levels of litter.

Larger communities (greater than 10,000) have mixes of low litter to heavily littered areas. A key predictor of the amount of litter was traffic volume and commercial development. Some high traffic volume road segments (including interstate sites and non-interstate sites) could be classified as moderately to heavily littered. Although some sites did not generate as much litter as a medium traffic road segment, the high traffic road segments appear to consistently generate more litter

2. Modifying the KAB Litter Index

The KAB Litter Index may require adjustments if this tool is applied toward rural areas and incorporated areas less than 5,000 people. Staff scored small towns with a score of "1" consistently using the current KAB system. Staff recommends a review of the 1-4 scoring system for small urban areas making the scores more conservative.

BARKER LEMAR experimented with the Internet/GIS/Tablet PC technology to track and digitally record Litter Index routes and scores. This field test showed how a state might collect electronic Litter Index Data from local affiliates and send information, including routes, over the web to parent organizations creating a management tool that can compare data within states and among states.

3. Targeting Specific Namebrand Demographics/Sales Data

Another interesting study might involve collecting sales data and calculate if the total number of name brand litter pieces identified in this litter study correlated with overall sales. If some of the leading littered name brands did not correlate with sales, then what other factors might influence their litter rate. Could it be the targeted demographic of the product, (e.g. are older or younger individuals littering)?

DIRECTIONS TO ENTER THE GIS/INTERNET SITE

BARKER LEMAR developed an Internet based GIS for KIB. The KIB Internet/GIS site is located at www.internetgis.org/kib/default.asp or via a link at keepiowabeautiful.com.

CONCLUDING REMARKS

BARKER LEMAR staff would like to thank the KIB Review Group that assisted with the development of the 2001 Roadside Litter Characterization Study.

- Keep Iowa Beautiful
- The Iowa Dept. of Natural Resources
- The Iowa Department of Transportation
- Carroll Co. Solid Waste Management Commission
- Iowa Recycling Association
- Story County Engineer's Office
- Iowa League of Cities
- Iowa Beverage Systems, Inc.
- Iowa Wholesale Beer Dist. Assoc.
- Iowa Grocery Industry Assoc.
- Casey's General Stores, Inc.
- Iowa Farm Bureau Federation
- Iowa Assoc. of Co. Conservation Board

The authors would like to personally thank Field Staff for their enthusiasm and professionalism during the collection and classifying phases. The authors would also like to thank the IT staff that listened to ideas and then transformed those ideas into working databases, reports, Internet compatible programs, statistical programs, and various other technical pieces.

ATTACHMENT A

List of Litter Characterization Reports

List of Litter Characterization Reports Reviewed for the KIB 2001 Roadside Litter Characterization Reports

- *Nebraska Litter 1980. A Baseline Survey of Street, Roadside and Recreation Area Litter.*
- *Nebraska Litter 1982. A Baseline Survey for the NE Dept. of Env. Quality.*
- *Nebraska Litter 1985. A Survey of Litter Reduction Trends Since 1980.*
- *Nebraska Litter 1991. A Baseline Survey for the NE Dept. of Env. Quality.*
- *Nebraska Litter 1996.*
- *The Florida Litter Study: 1994.*
- *The Florida Litter Study: 1996, Report #S97-1.*
- *The Florida Litter Study: 1997, Report #S97-14.*
- *The Florida Litter Study. Interim Report. January 13, 1999.*
- *The 1998 Update: Oklahoma Visual Litter Survey and Analysis.*

Staff also reviewed the following reports and summaries from the Institute for Applied Research:

- *Problems with Full Scale Survey, February 6, 1997.*
- *Analysis of Variables Affecting Litter Rates, Preliminary Draft January 1988.*
- *Summary of Litter Research Findings, S-1 rev 1995.*
- *Litter Rate Ranking of States and Provinces Surveyed, Report S-11.*
- *Summary of Visible Litter Composition, Rev 8/31/99.*
- *Using Observations of Persons Littering To Target Advertising, Excerpt S-7.5 From PA99 Final Report.*
- *Summary of Litter Results from Institute Surveys, Excerpt S-15.1; Rev 1998.*
- *Summary of Litter Research Findings, S-1 Rev 1995.*
- *Summary of Visible Litter Composition, Rev 8/31/99.*
- *Summary of Problems Encountered in Litter Surveys, Summary S-13; February 5, 1997.*
- *Litter Control Program Options, S-4.6, Rev 7/28/98.*
- *The Pros and Cons of Various Methods of Litter Measurement, Report S-9.4, Revised April, 1998.*
- *Analysis of Variables Affecting Litter Rates. S-8.16, Preliminary Draft Jan. 1988.*

ATTACHMENT B

Litter Categories, Material Type, and Subcategories

Litter Categories, Material Type, and Subcategories

Category	Material Type	SubCategory	Deposit
Beverage Container	Aluminum/Glass/Plastic	Beer	Yes or No
Beverage Container	Aluminum/Glass/Plastic	Wine/liquor	Yes or No
Beverage Container	Aluminum/Glass/Plastic	Soda	Yes or No
Beverage Container	Aluminum/Glass/Plastic	Juice	
Beverage Container	Aluminum/Glass/Plastic	Milk	
Beverage Container	Aluminum/Glass/Plastic	Sports	
Beverage Container	Aluminum/Glass/Plastic	Tea	
Beverage Container	Aluminum/Glass/Plastic	Water	
Beverage Container	Aluminum/Glass/Plastic	Vegetable/health	
Beverage Container	Aluminum/Glass/Plastic	Broken plastic beverage container	
Beverage Container	Aluminum/Glass/Plastic	Broken metal beverage container	
Beverage Container	Aluminum/Glass/Plastic	Broken glass beverage container	
Cup Related		Plastic cups	
Cup Related		Polystyrene foam cups	
Cup Related		Paper	
Cup Related		Plastic lids	
Cup Related		Straws	
Bags		Plastic and paper bags	
Containers/Boxes		Corrugated cardboard boxes	
Containers Boxes		Paperboard boxes	
Containers/Boxes		Paper beverage casing	
Containers/Boxes		Polystyrene foam clam shell	
Containers/Boxes		Plastic clam shell	
Containers/Boxes		Jars/bottles/boxes	
Containers/Boxes		Cans	
Containers/Boxes		Aerosols/pump	
Containers/Boxes		Lids	
Packaging		Candy wrappers/snacks (paper/plastic)	
Packaging		Plastic	
Packaging		Paper	
Packaging		Plastic/paper/foil/combo	
Packaging		Foil	

Litter Categories, Material Type, and Subcategories - Continued

Category	Material Type	SubCategory	Deposit
Tobacco		Cigar/Cigarette filters/butts	
Tobacco		Packaging	
Tobacco		Dip/chew/snuff	
Fast Food Extras		Condiment packages	
Fast Food Extras		Utensils	
Fast Food Extras		Straw related packaging plastic/paper	
Fast Food Extras		Fast food wrappers/bags	
Organics		Miscellaneous	
Biohazardous/Medical		Miscellaneous	
Other Plastic		Bottle lid/cap	
Other Plastic		Plastic plate	
Other Plastic		Stretch/shrink style industrial film	
Other Plastic		Small pieces of undetermined source	
Other Plastic		Foamed Packaging	
Other Rubber not Tires		Miscellaneous	
Other Metal		Metal/Foil/Aluminum Pieces	
Other Paper		Towel/napkin	
Other Paper		Lottery	
Other Paper		Plate/tray	
Other Paper		Food wrap	
Other Paper		Small pieces of undetermined source	
Demolition/Construction Related		Miscellaneous	
Vehicle		Vehicle related not tires	
Tires		Inner tubes/retreads/rims/caps	
Textiles		Miscellaneous	
Miscellaneous		Miscellaneous	

ATTACHMENT C

Namebrand Report by Category and Subcategory



Other Plastic	Quantity	Area	Weight
	3,462.00	13,735.70	8,299.41

Bottle lid/cap			
NONE	156.00	202.17	366.08
Budweiser	1.00	6.00	7.00
pepsi	3.00	6.00	12.98
Atlantic Coca-Cola Bottlers	1.00	2.50	3.50
Pepsi Cola General Bottlers	1.00	1.50	2.25
Wis-Pak, Inc.	1.00	1.33	3.33

Foamed Packaging			
NONE	255.00	3,050.00	1,412.43

Plastic plate			
NONE	8.00	149.50	28.00

Small pieces of undetermined source			
NONE	943.00	9,859.83	6,144.48
ea	86.00	336.00	231.10
Petco Card	1.00	1.88	0.89
Old Navy	1.00	1.00	0.16

Stretch/shrink style industrial film			
NONE	5.00	118.00	87.20

Other Paper	Quantity	Area	Weight
	2,883.00	12,477.20	6,520.50

Lottery			
Iowa Lottery	34.00	130.00	25.03
NONE	15.00	89.60	30.53

Plate/tray			
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NONE	1.00	34.00	14.40
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Small pieces of undetermined source			
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NONE	420.00	10,139.50	5,563.79
QuikTrip	1.00	4.50	2.00

Towel/napkin			
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NONE	412.00	2,079.60	884.75
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Packaging

Quantity	Area	Weight
2,628.00	12,355.10	3,235.71

Candy wrappers/Snacks (paper or plastic)			
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NONE	447.00	1,907.19	304.54
snickers	59.00	337.41	36.58
Tootsie Rolls	33.00	110.56	12.78
Life Savers	15.00	102.62	13.21
Kit Kat	11.00	94.09	9.69
Little Debbie's	11.00	94.02	17.81
Slim Jim	14.00	89.30	15.10
Reeses	17.00	89.25	16.57
Twix	18.00	86.93	15.44
Rice Krispies Treat	8.00	81.81	13.06
brachs star brites	18.00	78.14	10.56
Doritos	6.00	69.24	15.05
Jolly Rancher	12.00	69.21	7.88
Milky Way	8.00	65.08	10.87
Three Musketeers	10.00	64.66	7.01
Starburst	16.00	63.84	10.75
trident	14.00	63.80	6.68
M&Ms	10.00	61.04	8.56

Wrigles Winterfresh	11.00	60.01	9.07
Frito Lay	4.00	49.43	4.76
Chee-tos	4.00	49.31	4.69
Nestle	14.00	48.71	11.36
Lifesaver Creme Saver	17.00	47.39	8.20
Laffy Taffy	10.00	47.15	4.90
winterfresh	13.00	41.12	4.60
Wrigley's Doublemint	11.00	39.54	3.49
Sterling's	1.00	39.00	11.50
Butterfinger	10.00	36.59	7.81
Sun Belt	6.00	34.15	6.55
babay ruth	3.00	33.39	4.83
Wrigley's Juicy Fruit	8.00	33.21	4.07
dentyne ice	5.00	31.59	5.41
Big Red	9.00	29.91	4.62
Bubble Yum	6.00	29.25	7.31
soft & Chewy	2.00	28.63	2.71
Jack Link Beef Snack	5.00	28.49	5.48
Lays Potato Chips	6.00	27.91	8.03
Kellog's	6.00	27.24	4.34
Hostess Cup	4.00	27.15	7.53
almond joy	8.00	26.27	4.15
Wrigley's Extra	8.00	26.11	5.95
twizzler	4.00	26.05	4.78
Hershey	6.00	25.84	3.92
PayDay	5.00	25.07	4.04
wonka	7.00	24.61	4.52
Tootsie Pop	5.00	23.43	1.86
Dum Dums	7.00	23.13	2.85

Quaker Oats	4.00	22.59	1.99
warheads	5.00	22.25	3.51
A&W Cream Soda	7.00	22.19	1.34
Brach's Milk Maid	3.00	21.47	3.73
Bit-O-Honey	2.00	21.11	1.94
Chex Mix	3.00	20.94	2.13
Sun Belt chocolate chip chewy gra	5.00	20.54	2.89
Air Head	3.00	19.68	2.58
Nestle Icescreamers	3.00	19.44	2.10
mars creamy chews	4.00	19.19	1.53
nutterbutter	4.00	18.72	3.98
M&M's	5.00	18.35	2.28
Fruit Creams	2.00	18.17	2.14
Super Bubble	7.00	17.99	2.60
Planter's	3.00	17.72	2.64
Fruit Roll-Ups	2.00	17.13	2.25
Keebler Cheese and Peanut Butter C	4.00	16.66	1.83
Brachs	3.00	16.33	1.56
walgreens menthol	3.00	16.15	2.20
starlight mint	2.00	15.27	1.00
Muskateers	4.00	14.93	4.36
Quaker Oats chewy granola	4.00	14.90	2.74
Ice Breakers	3.00	14.83	2.50
little debbie fudge brownie	2.00	14.75	1.15
Mountain Dew	2.00	14.44	3.62
Good Humor Cookie Sandwich	1.00	14.40	1.12
Rold Gold chocolate pretzel	4.00	14.40	0.96
Snack Club Pistachios	1.00	14.40	1.12

chuckles	1.00	14.32	1.35
J-Higgs	1.00	14.32	1.35
spashers	1.00	14.32	1.35
sunbeldt	1.00	14.32	1.35
Snackums	1.00	13.93	2.06
Arby's	2.00	13.42	1.64
Hostess Honey Bun	1.00	13.21	2.16
Tillamook Country Smoke	1.00	13.21	2.16
Hot Wheels Fruit Snacks	1.00	13.00	7.70
Keebler Soft Batch Cookies	2.00	12.96	1.40
Reeses Outrageous	2.00	12.96	1.40
Wrigley's Spearmint	5.00	12.86	2.76
Hershey's Whatchamacallit	3.00	12.50	0.94
Pringle's	4.00	12.31	3.27
Baby Ruth	1.00	12.27	1.20
Fluffy Snuff Cotton Candy	1.00	12.27	1.20
Hostess Ding Dong	1.00	12.27	1.20
KELLOGGS NUTRI GRAIN	1.00	12.27	1.20
KELLOGGS POP TART	1.00	12.27	1.20
KRAFT CARAMEL	1.00	12.27	1.20
Nestle Drum Stick	1.00	12.27	1.20
Russel Stover Pecan Delight	1.00	12.27	1.20
blow pops	4.00	12.12	1.40
whoppers	1.00	12.00	1.00
Deli Express	2.00	11.68	1.94
goetzes	2.00	11.64	0.70
Combos	2.00	11.52	1.77
Eclipse Gum	2.00	11.52	1.77
Blue Bunny	3.00	11.52	2.84

Break Cake	1.00	11.37	3.79
Grandma's	1.00	11.37	3.79
Nutri Grain	1.00	11.37	3.79
Ruffles	1.00	11.37	3.79
Home Run Pie	2.00	11.00	2.20
Tic Tac	2.00	10.98	1.76
Skittles	3.00	10.86	2.14
Ritz Crackers	3.00	10.86	1.95
7-UP	1.00	10.75	1.14
Blue Bunny Sundae Crunch Bar	1.00	10.75	1.14
Eagle	1.00	10.75	1.14
Everest Gum	1.00	10.75	1.14
Smoky Valley Teriyaki	1.00	10.75	1.14
Robitusion	1.00	10.67	2.77
Certs	3.00	10.42	1.30
Salted Nut Roll	2.00	10.13	2.12
Ameristar Casino-hotel	2.00	10.08	2.14
Aquafina	2.00	9.71	1.07
Gatorade energy bar	2.00	9.40	0.78
Pearson's Mints	3.00	9.23	1.09
Mounds	3.00	9.15	1.43
Fla-vor-ice	1.00	9.00	1.03
Hawian Punch	1.00	9.00	2.08
Hostess Golden Cup cakes	1.00	9.00	1.03
Lean Pocket	1.00	9.00	3.25
Ritz Bits	1.00	9.00	1.03
Frito lay Rustler Spicy Stick	2.00	8.64	1.74
Bubblicious	3.00	8.63	1.60

Halls	4.00	8.63	1.51
Charms	3.00	7.97	1.15
caramello	1.00	7.64	0.50
Honey bun	1.00	7.64	0.50
Little debbie Fudge Round	1.00	7.64	0.50
Little Debbie Star crunch	1.00	7.64	0.50
pearson's nut roll	1.00	7.64	0.50
Reeses Stick	1.00	7.64	0.50
stick free peppermint gum	1.00	7.64	0.50
TGI Friday's Potato Skins	1.00	7.64	0.50
Tillamook Country Smoked cashew	1.00	7.64	0.50
whatchmacallit	1.00	7.64	0.50
Nature Valley	1.00	7.42	1.00
Brach's Ice Blue	2.00	7.25	1.31
Sherwood Cows	1.00	7.22	1.81
Windmill Cookies	1.00	7.22	1.81
Block and Barrel Chips	1.00	7.11	0.65
cool fruit	1.00	7.11	0.65
Genisoy protien bar	1.00	7.11	0.65
Posada	1.00	7.11	0.65
Spree	1.00	7.11	0.65
baker's treat cereal bar	2.00	7.11	0.93
Halls Eucalyptus Drop	3.00	6.96	1.21
Backon-ets	1.00	6.71	0.82
Celestial Seasonings Soothers	1.00	6.71	0.82
dasani	1.00	6.71	0.82
Hostess Fruit Pie	1.00	6.71	0.82
Little Debbie Nutty Bar	1.00	6.71	0.82
Little Debbie Swiss Cake Roll	1.00	6.71	0.82

Mrs. Fisher's Peanuts	1.00	6.71	0.82
Star Brite	1.00	6.71	0.82
Sunshine Harvest Mill Wheat Crack	1.00	6.71	0.82
Tums EX	1.00	6.71	0.82
Wonka Laffy Taffy	1.00	6.71	0.82
Health Valley Cereal Bar	1.00	6.48	0.70
Nabisco	1.00	6.48	0.70
reese sticks	1.00	6.48	0.70
sunflower kernals	1.00	6.48	0.70
Capri	2.00	6.15	0.73
Now and Later	2.00	6.11	1.43
Tootsie Roll Fruit Smoothie	1.00	6.00	0.30
Wether's	2.00	5.98	1.06
Sargentino String Cheese	2.00	5.87	0.83
Bacon Puff	1.00	5.60	1.64
Brach's Twisters	1.00	5.50	0.40
extra	2.00	5.19	0.87
Callard & Browser	2.00	5.13	0.41
nestea	1.00	5.09	1.05
Fritos	1.00	5.04	1.07
Hershey's Taste Tations	1.00	5.04	1.07
Hostess Fruit & Grain	1.00	5.04	1.07
Mr. Goodbar	1.00	5.04	1.07
Ring Pop	1.00	5.04	1.07
Schwan's	1.00	5.04	1.07
Sharkbites	1.00	5.04	1.07
Sixlets	1.00	5.04	1.07
Tombstone	1.00	5.04	1.07

Wrigley's Freedent	1.00	5.04	1.07
willy wonka runs	2.00	5.01	0.67
Storck Mamba	1.00	5.00	0.55
Bubble Gum Pop	1.00	4.86	0.53
Fisher sunflower seeds	1.00	4.86	0.53
Sweethearts Tarts	2.00	4.68	0.91
pepsi	1.00	4.38	0.59
bud light	1.00	4.32	0.87
Reeses Nutrageous	1.00	4.32	0.87
Scooby Doo Fruit Snack	1.00	4.32	0.87
Willy Wonka Nerds	1.00	4.32	0.87
Fat Freddie	1.00	4.27	0.65
pemmican beef stick	1.00	4.27	0.94
lands toasty crackers	1.00	4.20	0.50
Crunch	1.00	4.00	0.20
Chick-O-Stick	1.00	3.87	0.29
All Sport	1.00	3.45	0.27
Mini Donuts	1.00	3.45	0.27
Skor	1.00	3.45	0.27
Country time taffy	1.00	3.42	0.65
Donut Gems	1.00	3.42	0.65
Reeses nut	1.00	3.42	0.65
Beer Nuts	1.00	3.00	0.71
Jaw Breaker	1.00	3.00	0.71
Sunbelt Chocolate	1.00	3.00	0.71
PowerBar ProteinPlus	1.00	2.93	0.45
baby lucas	1.00	2.89	0.22
york	1.00	2.89	0.22
Nerds	2.00	2.72	0.18

Boston Baked Beans	1.00	2.68	0.78
Carefree Koolerz	1.00	2.68	0.78
Farley's Nickelodeon	1.00	2.68	0.78
Hershey's Krackel	1.00	2.68	0.78
Riessen	1.00	2.68	0.78
Trail's Best Teriyaki Stick	1.00	2.68	0.78
Yahoo	1.00	2.68	0.78
baskins robbins	1.00	2.48	0.11
canel's gum	1.00	2.48	0.11
Hershey classic Carmel	1.00	2.48	0.11
Brachs Rainbow	1.00	2.45	0.62
Sweet Spot Gummy Hot Dogs	1.00	2.45	0.62
The Flintstones	1.00	2.45	0.62
Beechies spearmint	1.00	2.33	1.10
Breakers	1.00	2.25	0.19
pelon	1.00	2.25	0.19
Fruit by the Loop	1.00	2.13	1.55
Brach's A&W Rootbeer	1.00	1.80	0.06
tattoos gum	1.00	1.77	0.22
Brach's Special Treasures	1.00	1.62	0.39
Flavor Roll	1.00	1.60	0.12
Brach's Hi-C Fruit Slices	1.00	1.50	0.17
Saf-T-Pops	1.00	1.50	0.17
string cheese	1.00	1.41	0.43
Nips	1.00	1.17	0.20

Foil			
NONE	73.00	113.75	44.60

Paper			
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NONE	59.00	1,098.93	823.25
Miller Light	9.00	117.82	47.70
Pringle's	2.00	55.33	62.97
Wendy's	3.00	44.75	10.65
Car-Freshener	1.00	21.00	7.70
BURGER KING	1.00	20.00	6.20
DuTrac Comm Credit Union	1.00	14.92	3.55
Liberty Bank	1.00	14.92	3.55
Newport 100's	2.00	7.33	1.35
taco Johns	1.00	6.00	1.24
Wrigley's Doublemint	1.00	3.50	0.30

Plastic

NONE	328.00	2,819.74	772.86
Sports Heat	1.00	37.00	3.40
Deli Express	2.00	32.71	8.16
crews	1.00	32.00	1.50
Old Dutch	1.00	21.60	3.42
Pella	1.00	15.71	23.53
Soft & Gentle	1.00	15.71	23.53
Wearever Brake Fluid	1.00	15.71	23.53
pepsi	3.00	13.00	0.75
dasani	1.00	12.17	1.07
Oscar Mayer	1.00	11.11	4.74
Gatorade	1.00	8.00	2.22
Heinz	1.00	7.00	4.90
A&W Cream Soda	1.00	6.60	1.56
Dole	1.00	6.60	1.56
Minute Maid	1.00	5.00	0.10
blow pops	1.00	4.50	1.13

Sour Blast	1.00	4.50	1.13
tradewinds	1.00	4.50	1.13
Coke	1.00	2.43	0.24

Plastic/paper/foil/combo			
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NONE	852.00	1,494.38	381.94
Carmex	1.00	21.00	5.50
carefree	6.00	8.57	5.57
pop-tarts	1.00	6.00	1.88
reese sticks	1.00	6.00	1.88
Tic Tac	2.00	3.81	0.56
Pringle's	2.00	3.21	0.49
Big Red	1.00	2.11	0.18
Doritos	1.00	1.90	0.28
Wrigley's Doublemint	1.00	1.60	0.22
Nicorette Gum	1.00	1.20	0.18
sudafed	1.00	1.07	0.30
Lifestyles condom	1.00	0.64	0.14

Bags

Quantity Area Weight
139.00 7,579.00 2,316.50

Plastic and Paper Bags			
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NONE	110.00	5,893.06	1,958.11
Messerschmitt Ice Service	3.00	471.00	50.00
Walmart	8.00	303.22	88.11
Hy vee Ice	1.00	86.67	16.23
Krieg Boys Ice	1.00	86.67	16.23
Cub foods	1.00	55.00	1.10
Artic Glacier Ice	1.00	51.88	10.28

Coleman	1.00	51.88	10.28
Ginseng Energy Now	1.00	51.88	10.28
Hefty	1.00	51.88	10.28
Menard's	1.00	51.88	10.28
Moore	1.00	51.88	10.28
Pure Ice	1.00	51.88	10.28
Scott's Turf Builder	1.00	51.88	10.28
Kum & Go	1.00	51.00	8.70
savers	1.00	39.33	11.90
America Online	1.00	37.50	26.40
Super Value	1.00	37.50	26.40
maurices	1.00	37.00	3.10
True Value	1.00	36.00	17.75
BURGER KING	1.00	30.00	10.20

	Quantity	Area	Weight
Beverage Container	1,040.00	6,938.50	18,296.05

Beer			
Busch Light	37.00	337.55	1,061.04
bud light	42.00	310.82	657.74
Budweiser	27.00	209.81	1,904.21
NONE	60.00	209.10	786.96
Miller Light	14.00	149.22	609.29
Busch	11.00	136.15	154.53
Natural Light	5.00	64.50	98.92
coors light	4.00	52.00	63.40
Old Milwaukee	3.00	32.10	38.60
Pabst Blue Ribbon Light	3.00	31.00	80.25
Miller	2.00	27.80	33.52

Old Style	1.00	17.50	15.15
b	1.00	17.00	193.60
Keystone Light	1.00	15.00	25.25
Mickey's Beer	1.00	15.00	211.50
Ice House	5.00	12.00	207.50
Bud Ice	1.00	9.00	50.30
Milwaukee's Best	1.00	8.10	8.50
Miller Genuine Draft	1.00	5.86	11.55

Broken/Undesignated Glass Beverage Container			
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NONE	426.00	559.50	3,504.80
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Broken/Undesignated Metal Beverage Container			
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NONE	62.00	302.42	368.48
sunkist	6.00	26.84	31.93
Coke	5.00	22.37	26.61
pepsi	3.00	13.42	15.96
Mountain Dew	2.00	7.47	10.72
Natural Light	1.00	4.47	5.32
Busch	3.00	3.00	4.29
bud light	2.00	2.00	2.86

Broken/Undesignated Plastic Beverage Container			
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NONE	55.00	770.00	772.50
nestea	1.00	4.00	6.60

Juice			
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Sunny Delight	4.00	49.50	83.20
Minute Maid	2.00	44.00	15.60
Anderson Erickson OJ	1.00	30.00	40.40
squeezit	2.00	24.00	21.60
Snapple	1.00	16.00	242.90

Bug Juice	1.00	12.00	23.70
NONE	1.00	9.00	1.00

Milk

nestle quik	3.00	71.00	118.21
Robert's	2.00	37.00	49.40
NONE	1.00	36.00	64.90
Anderson Erickson	3.00	32.50	33.00
Blue Bunny	4.00	24.00	6.24
Prairie Farms	1.00	23.00	69.80
Land O Lakes	1.00	17.00	23.50
Meadow Gold Viva	1.00	15.00	33.60
A&E	1.00	10.00	15.50
Nestle	1.00	6.00	1.56

Soda

Mountain Dew	58.00	740.48	1,024.45
NONE	47.00	676.55	733.45
pepsi	40.00	527.34	1,328.47
Coke	23.00	231.21	367.56
Sprite	7.00	127.59	168.50
Coca-Cola Classic	7.00	107.60	731.86
Dr. Pepper	4.00	57.40	188.26
A&W Cream Soda	2.00	38.00	60.00
sunkist	5.00	37.00	48.88
Diet Pepsi	2.00	33.80	46.54
Diet Coke	4.00	27.80	32.79
Squirt	1.00	20.00	13.40
slice	1.00	19.00	148.70
A&W root beer	1.00	17.00	13.90

7-UP	1.00	16.00	15.40
Clover Valley	1.00	12.40	16.98
mr. pibb	1.00	12.33	25.85
HyVee	1.00	12.00	20.50

Sports

Gatorade	2.00	62.50	89.90
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Tea

Lipton	2.00	40.00	378.70
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Vegetable/Health

NONE	4.00	80.00	91.30
Aquafina	1.00	45.00	41.30
Gatorade	1.00	35.00	46.60
power ade	1.00	21.00	45.50
Avalon Spring Water	1.00	19.00	26.70
equate health shake	1.00	15.00	72.50
Ice Mountain	1.00	11.50	23.60

Water

Aquafina	2.00	38.00	62.30
NONE	1.00	15.00	430.30

Wine/Liquor

Smirnoff	1.00	12.00	195.90
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Tobacco

Quantity	Area	Weight
8,270.00	6,746.50	3,596.14

Cigar/Cigarette Filter and Butts

NONE	548.00	3,182.01	1,900.79
Marlboro	1, 436.00	723.14	388.05
GPC	116.00	58.44	30.72

Winston	68.00	34.06	17.98
Salem	55.00	27.83	16.18
Basic	50.00	25.31	14.17
Parliament	47.00	23.60	13.09
Merit	44.00	22.40	10.43
Camel	35.00	17.57	9.80
Pall Mall	25.00	12.67	7.98
Old Gold Lights	24.00	12.13	5.63
Newport	23.00	11.47	6.61
Doral	22.00	10.61	6.50
mar	17.00	8.50	8.32
virginia slims	15.00	7.52	3.81
Cambridge	13.00	6.55	3.77
Now	12.00	6.03	3.73
Kool	10.00	5.04	2.37
Viceroy	8.00	4.14	2.21
Benson & Hedges	8.00	3.98	1.96
Capri	6.00	3.09	2.00
Star	6.00	3.08	1.47
Vantage	6.00	3.00	1.80
Monte Clair	6.00	2.99	1.78
Misty	6.00	2.98	2.24
kent	4.00	1.90	0.95
Carlton	3.00	1.51	0.80
malibu	2.00	1.00	0.61
par	2.00	1.00	0.50
select	2.00	1.00	0.53
Ultra Buy	2.00	0.99	0.50

Kamel	2.00	0.98	0.75
Monarch	2.00	0.97	1.02
Lucky Strike	1.00	0.50	0.25
Moore	1.00	0.50	0.25
Maverick	1.00	0.50	0.24
NDW	1.00	0.50	0.25
Newport 100's	1.00	0.50	0.21
Old Gold	1.00	0.50	0.23
players light	1.00	0.50	0.23
seneca	1.00	0.50	0.27
Shield	1.00	0.50	0.30
usa	1.00	0.50	0.23
vanity	1.00	0.50	0.27
Winchester	1.00	0.50	0.23
Espirit	1.00	0.49	0.26
Roger	1.00	0.49	0.26

Dip/chew/snuff			
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Kodiak	1.00	6.00	12.60
Scoal	1.00	5.00	6.90
Red seal	1.00	4.00	2.60
NONE	1.00	1.50	0.70

Packaging			
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NONE	373.00	1,350.11	466.73
Marlboro	130.00	536.85	277.44
Camel	30.00	152.59	60.18
Winston	13.00	53.57	25.48
GPC	4.00	34.65	23.77
Salem	6.00	31.51	17.05

Liggett Select	5.00	28.87	13.09
Newport	6.00	26.00	18.65
Doral	8.00	22.03	9.40
Newport 100's	4.00	20.57	7.41
USA Gold Light 100s	2.00	20.00	20.00
Old Gold Lights	2.00	19.50	9.41
Swisher Sweets	5.00	16.75	9.28
Kool	2.00	13.10	7.76
Skool	3.00	11.67	16.63
Best Buy	1.00	10.50	14.30
Capri	2.00	9.00	2.94
kent	1.00	9.00	6.40
Shield	1.00	9.00	3.20
seneca	1.00	8.00	6.20
Pall Mall	1.00	7.60	7.72
non	3.00	6.75	1.00
Copennhagen	2.00	6.67	13.03
Kodiak	2.00	6.67	13.03
Redman	1.00	6.40	3.30
Parliament	1.00	6.25	3.85
Scoal	1.00	6.00	8.80
Donut Gems	1.00	5.00	1.48
Chesterfield	1.00	4.86	1.33
smoking joes	1.00	4.67	4.70
Marlin	1.00	4.55	2.17
Ultra Buy	1.00	4.44	1.54
Bronson	1.00	4.44	2.68
usa	1.00	4.44	2.68
Vantage	1.00	4.44	2.68

Native	1.00	4.08	3.55
Full Flavor	1.00	3.86	1.09
Middleton's	1.00	3.86	1.09
Backwoods	1.00	3.60	2.06
Middleton's Gold & Mild	1.00	3.60	2.06
USA Gold	1.00	3.50	0.31
Tareyton	1.00	3.00	4.47
Garcia Vega	1.00	2.43	0.47
Viceroy	1.00	1.13	0.40

Containers/Cardboard Boxes	Quantity 608.00	Area 6,397.65	Weight 5,285.31
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Aerosols/Pump			
NONE	2.00	33.00	161.90
off	1.00	19.00	28.80
Siloo White Grease	1.00	18.00	105.70

Cans			
NONE	3.00	31.00	95.20

Corrugated cardboard boxes			
NONE	413.00	3,242.15	2,439.61

Jars/bottles/boxes			
NONE	41.00	181.50	608.95
havoline	1.00	18.50	46.75
HyVee	1.00	16.00	68.20
Heet	1.00	15.00	38.30
quaker state	2.00	10.00	9.50
Dove	1.00	8.00	9.30

Lids

NONE	13.00	61.00	74.90
Busch Light	1.00	1.00	2.10

Paper beverage casing

Country Time	9.00	451.38	220.98
NONE	3.00	150.46	73.66
Budweiser	2.00	95.00	115.10
pepsi	1.00	50.15	24.55

Paperboard boxes

NONE	74.00	608.57	319.77
Busch	2.00	436.00	354.27
Old Style	1.00	218.00	177.13
Busch Light	1.00	144.00	86.50
Wilson's Golf Balls	3.00	34.71	15.13
Baker's Treat Peanut Butter Wafers	1.00	24.29	16.10
Champion	1.00	24.29	16.10
Good Sense ibuprofen tablets	1.00	24.29	16.10
No Doz	1.00	24.29	16.10
Family Dollar Ibuprofen	2.00	23.00	13.46
Neoral capsules	1.00	11.57	5.04
Winchester	1.00	8.00	4.30
diamond	1.00	6.00	1.90
TrueCare ibuprofen	1.00	6.00	10.40

Plastic clam shell

NONE	11.00	268.50	90.70
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Polystyrene foam clam shell

NONE	10.00	135.00	18.80
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Construction Debris	Quantity 423.00	Area 5,907.50	Weight 26,510.39
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Demolition/Construction Related
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NONE	Quantity 423.00	Area 5,907.50	Weight 26,510.39
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Cup Related	Quantity 1,203.00	Area 5,764.75	Weight 3,007.57
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Paper

NONE	Quantity 69.00	Area 571.33	Weight 328.53
McDonalds	Quantity 55.00	Area 474.68	Weight 220.69
BURGER KING	Quantity 28.00	Area 167.55	Weight 65.87
Hardees	Quantity 6.00	Area 81.33	Weight 55.13
KFC Pepsi	Quantity 6.00	Area 80.70	Weight 127.49
Arby's	Quantity 4.00	Area 80.00	Weight 53.15
Subway	Quantity 7.00	Area 73.28	Weight 35.15
Dairy Queen	Quantity 5.00	Area 70.30	Weight 37.04
Wendy's	Quantity 8.00	Area 48.50	Weight 24.50
taco Johns	Quantity 12.00	Area 42.67	Weight 23.27
Amoco	Quantity 1.00	Area 28.00	Weight 77.60
Runza	Quantity 2.00	Area 28.00	Weight 15.13
Casey's	Quantity 1.00	Area 21.00	Weight 16.50
Kum & Go	Quantity 1.00	Area 20.00	Weight 16.85
pepsi	Quantity 2.00	Area 19.00	Weight 12.13
Taco Bell	Quantity 1.00	Area 19.00	Weight 11.70
Coke	Quantity 1.00	Area 6.33	Weight 1.63
Dr. Pepper	Quantity 1.00	Area 6.33	Weight 1.63
KFC	Quantity 1.00	Area 6.00	Weight 1.50

Plastic Cups

NONE	197.00	897.51	622.18
BURGER KING	9.00	107.02	51.98
Casey's	3.00	93.00	106.95
Hardees	2.00	61.00	42.75
Taco Bell	2.00	52.00	64.55
McDonalds	5.00	48.70	50.96
KFC	2.00	40.67	18.93
Kum & Go	3.00	37.85	50.35
Chubby's	1.00	30.00	26.20
Steak & Shake	4.00	14.00	4.66
Eddy's	1.00	8.57	14.98
Sam's Club	1.00	8.57	14.98
B-Bops	1.00	7.67	5.63
pepsi	1.00	7.67	5.63
Kwik-Shop	3.00	7.50	5.58

Plastic lids			
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NONE	148.00	552.41	207.36
Sweetheart	4.00	28.48	9.29
McDonalds	4.00	24.80	6.45
Dairy Queen	8.00	24.33	6.38
BURGER KING	5.00	23.85	5.16
Solo	2.00	16.33	3.93
Hardees	3.00	9.30	2.49
Dixie	1.00	8.00	2.40
Dr. Pepper	2.00	1.00	2.80

Polystyrene foam cups			
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NONE	352.00	1,348.05	360.02
Casey's	2.00	25.00	10.20

Pilot	2.00	22.68	7.43
HyVee	2.00	22.00	8.90
McDonalds	3.00	20.47	6.59
KFC	1.00	16.00	4.60
Burgie's cafe	1.00	15.00	7.20
Nordy's	1.00	8.18	2.18
Amaco	14.00	8.00	0.80
Coke	2.00	6.00	0.49
Breakplace	1.00	4.80	0.97
Hardees	1.00	4.50	1.16
Kum & Go	1.00	4.50	1.16
Ronnoco Specialty Coffee	1.00	4.00	0.68
Texaco	1.00	1.82	0.32

Straws			
NONE	195.00	299.50	136.80

Miscellaneous	Quantity	Area	Weight
	535.00	2,846.30	8,153.53

Miscellaneous			
NONE	534.00	2,845.30	8,129.53
Duracell	1.00	1.00	24.00

Textiles	Quantity	Area	Weight
	154.00	2,823.00	4,654.75

Textiles			
NONE	152.00	2,776.00	4,583.10
Best Gloves	2.00	47.00	71.65

Fast Food Extras

Quantity	Area	Weight
310.00	2,210.25	714.94

Condiment packages			
NONE	37.00	124.35	44.68
Heinz Ketchup	12.00	39.80	6.49
Hardees	7.00	27.36	6.04
BURGER KING	3.00	18.75	2.61
Taco Bell	5.00	17.86	4.42
McDonalds	6.00	17.46	4.78
Taco Bell BORDER SAUCE	3.00	9.21	1.29
taco Johns	2.00	9.00	1.10
Wendy's	2.00	9.00	1.90
Heinz mustard	3.00	8.42	1.80
Arby's	2.00	5.83	1.43
Sweetheart	2.00	5.71	3.17
KFC Hot Sauce	1.00	4.50	0.45
Tace Bell hot sauce	1.00	4.50	2.20
Coffe Mate	2.00	4.42	2.20
Heinz Sweet Relish	1.00	4.00	1.27
Heinz	1.00	3.50	0.38
McDonalds Sweet and Sour sauce	1.00	3.00	0.53
Smucker's	1.00	3.00	0.57
McDonalds Half and Half	1.00	2.92	0.50
Wendy's bar b que sauce lid	1.00	2.92	0.50
Promise	1.00	1.50	0.10

NONE	37.00	124.35	44.68
Heinz Ketchup	12.00	39.80	6.49
Hardees	7.00	27.36	6.04
BURGER KING	3.00	18.75	2.61
Taco Bell	5.00	17.86	4.42
McDonalds	6.00	17.46	4.78
Taco Bell BORDER SAUCE	3.00	9.21	1.29
taco Johns	2.00	9.00	1.10
Wendy's	2.00	9.00	1.90
Heinz mustard	3.00	8.42	1.80
Arby's	2.00	5.83	1.43
Sweetheart	2.00	5.71	3.17
KFC Hot Sauce	1.00	4.50	0.45
Tace Bell hot sauce	1.00	4.50	2.20
Coffe Mate	2.00	4.42	2.20
Heinz Sweet Relish	1.00	4.00	1.27
Heinz	1.00	3.50	0.38
McDonalds Sweet and Sour sauce	1.00	3.00	0.53
Smucker's	1.00	3.00	0.57
McDonalds Half and Half	1.00	2.92	0.50
Wendy's bar b que sauce lid	1.00	2.92	0.50
Promise	1.00	1.50	0.10

Fast Food Wrappers/Bags			
NONE	37.00	306.45	112.68
McDonalds	18.00	303.06	88.78

NONE	37.00	306.45	112.68
McDonalds	18.00	303.06	88.78

BURGER KING	12.00	233.71	78.54
Subway	16.00	170.62	19.45
Hardees	7.00	133.50	30.63
Taco Bell	7.00	124.07	37.89
Arby's	5.00	103.50	35.29
Steak & Shake	1.00	47.00	21.40
Now	3.00	45.50	35.35
Krispy Kreme	1.00	35.00	10.98
Bruggers	1.00	27.50	2.25
Hotzi Breakfast Burrito	1.00	27.00	6.35
B-Bops	2.00	24.00	9.40
Deli to Go	1.00	20.95	8.18
Sonic	1.00	20.95	8.18
Wimmer's	1.00	20.95	8.18
Dairy Queen	3.00	19.32	12.18
McDonalds Baked Pie	1.00	17.50	20.70
Wendy's	5.00	15.40	2.13
Hot Stuff Pizza	1.00	15.17	11.78
taco Johns	1.00	9.33	0.53

Straw related / Plastic / Paper			
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NONE	50.00	86.24	14.65
Burger King	6.00	6.29	0.45
Wendy's	4.00	5.96	0.30
Sweetheart	1.00	3.00	0.20

Utensils			
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NONE	26.00	55.75	44.80
Dairy Queen	1.00	3.50	2.60
Wendy's	2.00	2.00	2.70

Other Metal

Quantity Area Weight
364.00 2,201.55 21,908.17

Bottle caps/tabs

NONE	64.00	76.15	105.43
bud light	11.00	13.00	23.42
michelob light	3.00	4.10	7.26
Busch Light	4.00	4.00	8.60
Tropicanna	2.00	3.50	6.34
Budweiser	2.00	2.00	4.30
Busch	2.00	2.00	4.20
Miller Light	2.00	2.00	4.40
Snapple	1.00	2.00	4.90
Lipton	1.00	1.75	4.40
Grippin Go Milk	1.00	1.50	0.20
Bud Ice	1.00	1.00	2.10
Buddy's	1.00	1.00	2.10
Miller Genuine Draft	1.00	1.00	2.15
Smirnoff	1.00	1.00	2.15
Mountain Dew	1.00	0.50	2.20

Metal pieces

NONE	266.00	2,085.05	21,724.03
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Tires

Quantity Area Weight
149.00 2,172.00 24,256.70

Inner tubes/retreads/rims/caps

NONE	148.00	2,164.00	24,228.27
Goodyear	1.00	8.00	28.43

Vehicle	Quantity 321.00	Area 1,097.50	Weight 4,149.91
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Vehicle related not tires

NONE	317.00	1,078.83	4,097.11
Goodyear	1.00	6.00	2.25
Pennzoil	1.00	5.33	20.87
Valvoline	1.00	5.33	20.87
Ford	1.00	2.00	8.80

Other Rubber not Tires	Quantity 38.00	Area 165.00	Weight 681.50
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Other rubber not tires

NONE	38.00	165.00	681.50
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Biohazardous/Medical	Quantity 30.00	Area 125.00	Weight 327.04
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Miscellaneous

NONE	19.00	90.00	294.31
Halls	3.00	9.00	0.45
Arizona Memory Herbal Tonic	1.00	5.00	15.73
Advil	1.00	3.50	0.50
Band Aid	1.00	3.50	0.50
Curad	1.00	3.00	3.10
Tylenol	1.00	3.00	0.45
Viagra	1.00	3.00	1.00
confirm	1.00	2.50	9.40
Respond	1.00	2.50	1.60

Organics

Quantity	Area	Weight
28.00	56.50	251.30

Misc

NONE	28.00	56.50	251.30
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22,585.00	142,165.42	91,599.00
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STATE LIBRARY OF IOWA



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