

Chapter 22: Kirksville

COMMUNITY PROFILE

The City of Kirksville is located in Adair County in northeast Missouri. It is part of the Northeast Solid Waste Management District (District C). Kirksville is the county seat, the largest city in the county, and is home to Truman State University. It is also a central location for industry and retail. Rye Creek Sanitary Landfill is one mile northwest of Kirksville just outside of the city limits. Kirksville is approximately 204 miles northwest of St. Louis, 253 miles northeast of Springfield, and 158 miles northeast of Kansas City.

Demographics:

	Kirksville	Adair County
Area (sq. miles)	9.82	567.63
Population (1990)	17,152	24,577
Density (per sq. mile)	1746.86	43.30
Pop. Change since 1980	-0.1%	-1.2%
Number of households	6,291	9,047
Persons per household	2.20	2.35
High school graduates	26.1%	30.6%
Median Family Income	\$25,114	\$25,447
Percent below poverty level	30.5%	24.9%

Solid Waste Collection

The City of Kirksville has contracted with Teter's Landfill in Macon, MO for residential hauling services, therefore all City of Kirksville waste goes to Macon. Most solid waste received at the Rye Creek Landfill is from rural areas.

Solid Waste Disposal

Rye Creek Sanitary Landfill accepts waste from outside the city limits of Kirksville, commercial waste from Kirksville, and from the surrounding area (Edina, Memphis, Green City, and Canton). The landfill receives approximately 12,304 tons of waste per year and the current gate tipping fee is \$6.50 per yard (there is no scale at the landfill).

Waste Reduction and Recycling Programs

There are two major drop-off centers in Kirksville: NEMO Recycling and Kirksville Recycles. NEMO accepts corrugated cardboard, clothing, paper, plastics, steel and aluminum cans, newsprint, magazines, and white goods. Working with Sheltered Workshop personnel, NEMO provides commingled curbside recycling for Kirksville and the surrounding areas. Approximately 14,460 tons of material were recycled by NEMO in 1996. There are a few drop-off centers in smaller towns and there are no household hazardous waste facilities or education programs currently in progress.

Rye Creek Sanitary Landfill Results

Information about sample size and composition are listed in tables 22-1 to 22-8.

All weights are listed in pounds and all volumes are in cubic feet.

SORT #1

Sort Conditions

The first sort was conducted March 24-25, 1997. A site adjacent near the front office was selected as the sort location. The maximum number of samples was not collected due to slow hauler traffic.

Statistics	
Estimated MSW (lbs) Collected by Site During Sampling Period	189,292
Total Sample Weight (lbs)	1844.5
Significance Test Results	.000
Number of Samples Collected	8

OTHER WASTE CATEGORIES			
Over-the-counter Medication (OTC)	23	Beauty/Hygiene Aerosol Products	2
Prescription Medication (Rx)	1	Household Cleaning Aerosol Products	0
Beauty/Hygiene Products	13	Gardening/Yard Care Products	0
Household Cleaning Products	1	Pet Groom Products	0
Sharps/Blades	1	Disposable Razors	1
Syringes	5	Alkaline Batteries	2
Hardware/Shop Products	3	Automobile Maintenance/Cleaning Products	0
Aerosol Cans	0		
Miscellaneous items: 1 set of acrylic paints.			
Total Weight (lb): 14.4			
Total Volume (cubic ft.): .75			

TABLE 22-1

RYE CREEK SANITARY LANDFILL (KIRKSVILLE)
SORT # 1

Sample #	Sample Size		Composition		Recycling Activities	Collection Location
	Weight	Volume	Res.	Comm.		
1	277.2	45	10%	90%	Curbside	Canton (business)
2	218	39.5	10%	90%	Curbside	Canton (business)
3	184.2	47.8	10%	90%	Curbside	Canton (business)
4	229	47.4	90%	10%	Drop-off	Kahoka
5	195.7	44.8	90%	10%	Drop-off	Kahoka
6	258.6	49.5	90%	10%	Drop-off	Kahoka
7	233.2	39.1	70%	30%	Drop-off	Memphis
8	248.6	49.3	70%	30%	Drop-off	Memphis
TOTALS	1844.5	362.4				
AVERAGE	230.5625	45.3	55%	45%		

TABLE 22-1

RYE CREEK SANITARY LANDFILL (KIRKSVILLE) SORT # 1

CATEGORY	TOTALS		AVERAGE		PERCENTAGE	
	wt.	vol.	wt.	vol.	Pct. by wt.	Pct. by vol.
Cardboard	127.3	36.2	15.9	4.5	6.90%	9.99%
Newsprint	102.6	16.5	12.8	2.1	5.56%	4.55%
Magazines	72.4	8.9	9.1	1.1	3.93%	2.46%
High Grade	53.6	13.3	6.7	1.7	2.91%	3.67%
Mixed	278.9	64.9	34.9	8.1	15.12%	17.91%
PAPER TOTALS	634.8	139.8	79.4	17.5	34.42%	38.58%
Clear	41.8	3.8	5.2	0.5	2.27%	1.05%
Brown	24.4	2.5	3.1	0.3	1.32%	0.69%
Green	3.6	0.3	0.5	0.0	0.20%	0.08%
Other	12.7	1.2	1.6	0.2	0.69%	0.33%
GLASS TOTALS	82.5	7.8	10.3	1.0	4.47%	2.15%
Alum. Cans	21.5	7.5	2.7	0.9	1.17%	2.07%
Other Alum	14.7	2.6	1.8	0.3	0.80%	0.72%
Non ferrous	3.3	0.5	0.4	0.1	0.18%	0.14%
Food Cans	61.7	11.9	7.7	1.5	3.35%	3.28%
Ferrous	12.2	3.4	1.5	0.4	0.66%	0.94%
Oil Filters	5.8	0.4	0.7	0.1	0.31%	0.11%
METAL TOTALS	119.2	26.3	14.9	3.3	6.46%	7.26%
PET # 1	32.2	12.2	4.0	1.5	1.75%	3.37%
HDPE # 2	35.0	13.5	4.4	1.7	1.90%	3.73%
Film	73.7	37.0	9.2	4.6	4.00%	10.21%
Other Plastic	121.1	43.2	15.1	5.4	6.57%	11.92%
PLASTIC TOTALS	262.0	105.9	32.8	13.2	14.20%	29.23%
Food Waste	373.6	33.0	46.7	4.1	20.25%	9.11%
Wood Waste	6.0	1.1	0.8	0.1	0.33%	0.30%
Textiles	60.1	9.7	7.5	1.2	3.26%	2.68%
Diapers	110.6	11.7	13.8	1.5	6.00%	3.23%
Other Organics	90.8	15.8	11.4	2.0	4.92%	4.36%
ORGANIC TOTALS	641.1	71.3	80.1	8.9	34.76%	19.68%
Fines	75.6	8.5	9.5	1.1	4.10%	2.35%
Other Inorganics	14.9	2.0	1.9	0.3	0.81%	0.55%
INORGANIC TOTALS	90.5	10.5	11.3	1.3	4.91%	2.90%
OTHER WASTE	14.4	0.7	1.8	0.1	0.78%	0.21%
GRAND TOTAL	1844.5	362.3	230.6	45.3	100.00%	100.00%

TABLE 22-2

SORT #2

Sort Conditions

The second sort was conducted June 16-17, 1997. The same location was used for sort activities as the previous sort. The weather was mild and rainy. The maximum number of samples were not collected due to slow hauler traffic.

Statistics	
Estimated MSW (lbs) Collected by Site During Sampling Period	189,292
Total Sample Weight (lbs)	1598.9
Significance Test Results	.000
Number of Samples Collected	5

OTHER WASTE CATEGORIES			
Over-the-counter Medication (OTC)	1	Beauty/Hygiene Aerosol Products	3
Prescription Medication (Rx)	0	Household Cleaning Aerosol Products	0
Beauty/Hygiene Products	2	Gardening/Yard Care Products	0
Household Cleaning Products	0	Pet Groom Products	0
Sharps/Blades	5	Disposable Razors	6
Syringes	2	Alkaline Batteries	15
Hardware/Shop Products	0	Automobile Maintenance/Cleaning Products	0
Aerosol Cans	0		
Miscellaneous items: None.			
Total Weight (lb): 10.2			
Total Volume (cubic ft.): 0.3			

**RYE CREEK SANITARY LANDFILL
SORT # 2**

Sample #	Sample Size		Composition		Recycling Activities	Collection Location
	Weight	Volume	Res.	Comm.		
1	325.6	59.8	80%	20%	Drop-off	Memphis and Kahoka
2	290.5	61.9	90%	10%	Drop-off	Memphis
3	346.9	67.7	80%	20%	Drop-off	Memphis and Kahoka
4	334.2	55.6	50%	50%	Drop-off	Memphis
5	301.5	58.4	50%	50%	Drop-off	Memphis
TOTALS	1598.9	303.2				
AVERAGE	319.78	60.6	70%	30%		

TABLE 22-3

RYE CREEK SANITARY LANDFILL (KIRKSVILLE) SORT # 2

CATEGORY	TOTALS		AVERAGE		PERCENTAGE	
	wt.	vol.	wt.	vol.	Pct. by wt.	Pct. by vol.
Cardboard	123.7	34.2	24.7	6.8	7.74%	11.28%
Newsprint	88.9	13.0	17.8	2.6	5.56%	4.29%
Magazines	31.7	5.3	6.3	1.1	1.98%	1.75%
High Grade	68.4	11.0	13.7	2.2	4.28%	3.63%
Mixed	248.6	47.3	49.7	9.5	15.55%	15.60%
PAPER TOTALS	561.3	110.8	112.3	22.2	35.11%	36.54%
Clear	48.0	4.6	9.6	0.9	3.00%	1.52%
Brown	23.8	2.5	4.8	0.5	1.49%	0.82%
Green	9.8	0.8	2.0	0.2	0.61%	0.26%
Other	8.6	0.7	1.7	0.1	0.54%	0.23%
GLASS TOTALS	90.2	8.6	18.0	1.7	5.64%	2.84%
Alum. Cans	25.8	10.0	5.2	2.0	1.61%	3.30%
Other Alum	9.6	3.0	1.9	0.6	0.60%	0.99%
Non ferrous	6.0	0.6	1.2	0.1	0.38%	0.20%
Food Cans	41.0	8.5	8.2	1.7	2.56%	2.80%
Ferrous	22.8	2.8	4.6	0.6	1.43%	0.92%
Oil Filters	5.4	0.4	1.1	0.1	0.34%	0.13%
METAL TOTALS	110.6	25.3	22.1	5.1	6.92%	8.34%
PET # 1	27.3	12.0	5.5	2.4	1.71%	3.96%
HDPE # 2	35.8	17.0	7.2	3.4	2.24%	5.61%
Film	94.3	25.0	18.9	5.0	5.90%	8.25%
Other Plastic	101.7	40.0	20.3	8.0	6.36%	13.19%
PLASTIC TOTALS	259.1	94.0	51.8	18.8	16.20%	31.00%
Food Waste	200.4	16.5	40.1	3.3	12.53%	5.44%
Wood Waste	17.3	1.8	3.5	0.4	1.08%	0.59%
Textiles	83.6	13.5	16.7	2.7	5.23%	4.45%
Diapers	98.4	9.3	19.7	1.9	6.15%	3.07%
Other Organics	59.6	10.6	11.9	2.1	3.73%	3.50%
ORGANIC TOTALS	459.3	51.7	91.9	10.3	28.73%	17.05%
Fines	52.2	8.0	10.4	1.6	3.26%	2.64%
Other Inorganics	56.0	4.5	11.2	0.9	3.50%	1.48%
INORGANIC TOTALS	108.2	12.5	21.6	2.5	6.77%	4.12%
OTHER WASTE	10.2	0.3	2.0	0.1	0.64%	0.10%
GRAND TOTAL	1598.9	303.2	319.8	60.6	100.00%	100.00%

TABLE 22-4

SORT #3

Sort Conditions

The third sort was conducted September 8-10, 1997. The same location was used for sort activities as the previous sort. The weather was sunny and mild.

Statistics	
Estimated MSW (lbs) Collected by Site During Sampling Period	189,292
Total Sample Weight (lbs)	2095.3
Significance Test Results	.000
Number of Samples Collected	11

OTHER WASTE CATEGORIES			
Over-the-counter Medication (OTC)	0	Beauty/Hygiene Aerosol Products	0
Prescription Medication (Rx)	0	Household Cleaning Aerosol Products	1
Beauty/Hygiene Products	3	Gardening/Yard Care Products	0
Household Cleaning Products	0	Pet Groom Products	0
Sharps/Blades	2	Disposable Razors	11
Syringes	13	Alkaline Batteries	27
Hardware/Shop Products	2	Automobile Maintenance/Cleaning Products	0
Aerosol Cans	2		
Miscellaneous items: 1 compressed fire detector.			
Total Weight (lb): 8.2			
Total Volume (cubic ft.): 0.3			

**RYE CREEK SANITARY LANDFILL
SORT # 3**

Sample #	Sample Size		Composition		Recycling Activities	Collection Location
	Weight	Volume	Res.	Comm.		
1	189	44.7	20%	80%	Curbside	Canton
2	176.2	32.8	70%	30%	Drop-off	Green City
3	177.4	43.9	70%	30%	Curbside	Canton
4	185.9	38.9	70%	30%	Drop-off	Memphis and Kahoka
5	178.3	35.8	70%	30%	Drop-off	Memphis
6	154.5	43.6	100%	0%	Drop-off	Adair County (trailers, rural areas)
7	208.3	48	100%	0%	Drop-off	Adair County (trailers, rural areas)
8	189.4	49.5	100%	0%	Drop-off	Adair County (trailers, rural areas)
9	173.3	45	70%	30%	Curbside	Edina
10	209.5	55	70%	30%	Curbside	Edina.
11	254	46.7	70%	30%	Curbside	Edina
TOTALS	2095.3	484.2				
AVERAGE	190.4818	44.0	74%	26%		

TABLE 22-5

RYE CREEK SANITARY LANDFILL (KIRKSVILLE) SORT # 3

CATEGORY	TOTALS		AVERAGE		PERCENTAGE	
	wt.	vol.	wt.	vol.	Pct. by wt.	Pct. by vol.
Cardboard	130.0	59.0	11.8	5.4	6.20%	12.18%
Newsprint	232.6	32.3	21.1	2.9	11.10%	6.67%
Magazines	132.6	10.8	12.1	1.0	6.33%	2.23%
High Grade	55.7	13.9	5.1	1.3	2.66%	2.87%
Mixed	312.7	90.0	28.4	8.2	14.92%	18.58%
PAPER TOTALS	863.6	206.0	78.5	18.7	41.22%	42.52%
Clear	66.4	4.6	6.0	0.4	3.17%	0.95%
Brown	21.9	2.3	2.0	0.2	1.05%	0.47%
Green	3.0	0.4	0.3	0.0	0.14%	0.08%
Other	7.2	2.9	0.7	0.3	0.34%	0.60%
GLASS TOTALS	98.5	10.2	9.0	0.9	4.70%	2.11%
Alum. Cans	24.3	12.3	2.2	1.1	1.16%	2.54%
Other Alum	13.5	7.2	1.2	0.7	0.64%	1.49%
Non ferrous	1.0	0.1	0.1	0.0	0.05%	0.02%
Food Cans	44.8	9.8	4.1	0.9	2.14%	2.02%
Ferrous	15.9	2.5	1.4	0.2	0.76%	0.52%
Oil Filters	1.2	0.1	0.1	0.0	0.06%	0.02%
METAL TOTALS	100.7	32.0	9.2	2.9	4.81%	6.61%
PET # 1	24.6	15.7	2.2	1.4	1.17%	3.24%
HDPE # 2	54.2	33.0	4.9	3.0	2.59%	6.81%
Film	76.0	47.0	6.9	4.3	3.63%	9.70%
Other Plastic	131.8	65.3	12.0	5.9	6.29%	13.48%
PLASTIC TOTALS	286.6	161.0	26.1	14.6	13.68%	33.23%
Food Waste	418.7	33.5	38.1	3.0	19.98%	6.92%
Wood Waste	7.5	1.8	0.7	0.2	0.36%	0.37%
Textiles	73.8	12.6	6.7	1.1	3.52%	2.60%
Diapers	71.3	7.4	6.5	0.7	3.40%	1.53%
Other Organics	49.0	5.5	4.5	0.5	2.34%	1.14%
ORGANIC TOTALS	620.3	60.8	56.4	5.5	29.61%	12.55%
Fines	62.0	8.1	5.6	0.7	2.96%	1.66%
Other Inorganics	55.3	6.1	5.0	0.6	2.64%	1.26%
INORGANIC TOTALS	117.3	14.2	10.7	1.3	5.60%	2.92%
OTHER WASTE	8.3	.03	0.8	0.03	0.39%	0.06%
GRAND TOTAL	2095.3	484.4	190.5	44.0	100.00%	100.00%

SORT SUMMARY

Seasonal variations

- The percentage of cardboard was a high. The types of cardboard usually consisted of pizza boxes and cereal boxes (common in a college town).
- Food waste decreased in the second round. This was probably the result of college students leaving for the summer.
- Hauler traffic at this particular site was extremely slow. The slowest time was during the second round.

Sort results

- Chart 22-1 graphically compares the three seasonal sort results and shows the average waste composition, by major category, for Kirksville.
- The sample data for all Kirksville waste sorts are listed on Table 22-7.
- The sort results for Kirksville are listed on Table 22-8.
- The summary of statistical relevance for the Kirksville sorts is located on page 356.
- The total for all “other wastes” found during the Kirksville sorts is on page 356.

All weights are in pounds and volumes are listed in cubic feet.

Comparisons of the Kirksville’s waste stream to previous studies and other communities can be found in Chapter 24.

KIRKSVILLE RESULTS BY WEIGHT

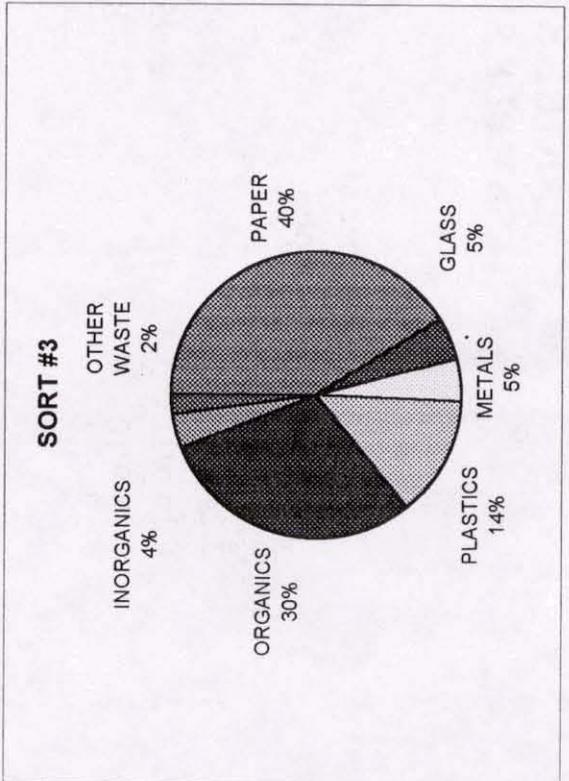
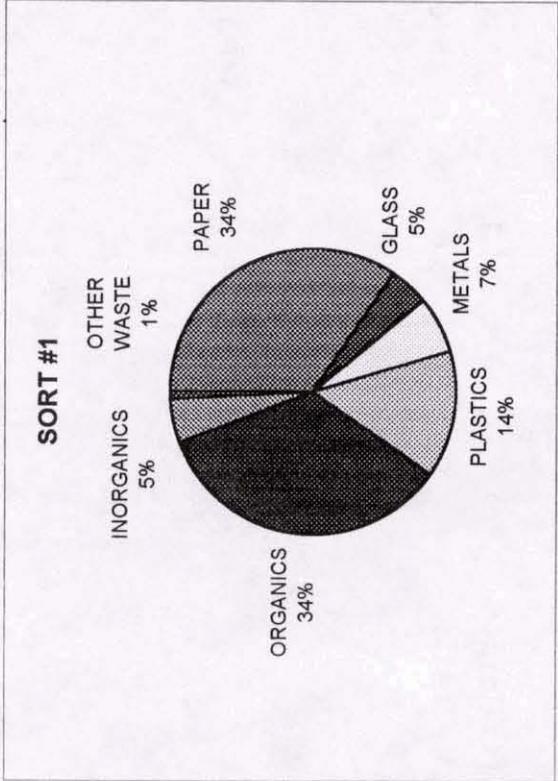
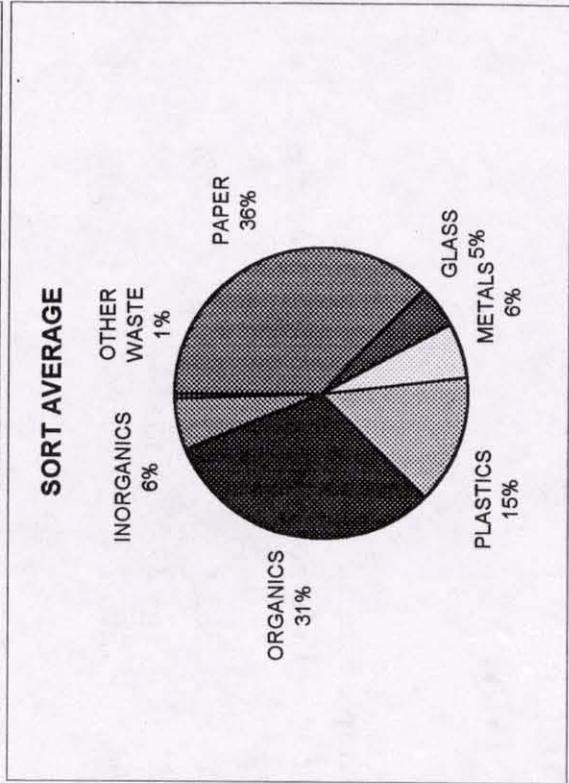
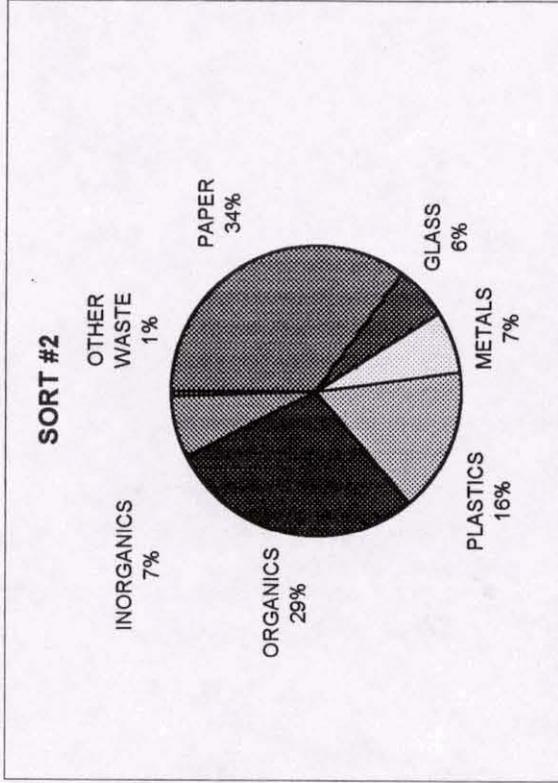


CHART 22-1

KIRKSVILLE SAMPLE SUMMARY

Sort #	Dates	Number of Samples	Sample Size		Composition	
			Weight	Volume	Residential	Commercial
1	3/24-3/25	8	1844.5	362.4	55%	45%
2	6/16-6/17	11	2095.3	484.2	74%	26%
3	9/18-9/10	5	1598.9	303.2	70%	30%
TOTALS		24.0	5538.7	1149.8		
AVERAGE		8.0	1846.2	383.3	66%	34%

TABLE 22-7

CATEGORY	KIRKSVILLE						SUMMARY	
	SORT # 1		SORT # 2		SORT # 3		AVERAGE	
	WT.	VOL.	WT.	VOL.	WT.	VOL.	WT.	VOL.
Cardboard	6.9%	10.0%	7.7%	11.3%	6.2%	12.2%	6.9%	11.3%
Newsprint	5.6%	4.6%	5.6%	4.3%	11.1%	6.7%	7.7%	5.4%
Magazines	3.9%	2.5%	2.0%	1.7%	6.3%	2.2%	4.3%	2.2%
High Grade	2.9%	3.7%	4.3%	3.6%	2.7%	2.9%	3.2%	3.3%
Mixed	15.1%	17.9%	15.5%	15.6%	14.9%	18.6%	15.2%	17.6%
PAPER TOTALS	34.4%	38.6%	35.1%	36.5%	41.2%	42.5%	37.2%	39.7%
Clear	2.3%	1.0%	3.0%	1.5%	3.2%	0.9%	2.8%	1.1%
Brown	1.3%	0.7%	1.5%	0.8%	1.0%	0.5%	1.3%	0.6%
Green	0.2%	0.1%	0.6%	0.3%	0.1%	0.1%	0.3%	0.1%
Other	0.7%	0.3%	0.5%	0.2%	0.3%	0.6%	0.5%	0.4%
GLASS TOTALS	4.5%	2.2%	5.6%	2.8%	4.7%	2.1%	4.9%	2.3%
Alum. Cans	1.2%	2.1%	1.6%	3.3%	1.2%	2.5%	1.3%	2.6%
Other Alum	0.8%	0.7%	0.6%	1.0%	0.6%	1.5%	0.7%	1.1%
Non ferrous	0.2%	0.1%	0.4%	0.2%	0.0%	0.0%	0.2%	0.1%
Food Cans	3.3%	3.3%	2.6%	2.8%	2.1%	2.0%	2.7%	2.6%
Ferrous	0.7%	0.9%	1.4%	0.9%	0.8%	0.5%	0.9%	0.8%
Oil Filters	0.3%	0.1%	0.3%	0.1%	0.1%	0.0%	0.2%	0.1%
METAL TOTALS	6.5%	7.3%	6.9%	8.3%	4.8%	6.6%	6.0%	7.3%
PET # 1	1.7%	3.4%	1.7%	4.0%	1.2%	3.2%	1.5%	3.5%
HDPE # 2	1.9%	3.7%	2.2%	5.6%	2.6%	6.8%	2.3%	5.5%
Film	4.0%	10.2%	5.9%	8.2%	3.6%	9.7%	4.4%	9.5%
Other Plastic	6.6%	11.9%	6.4%	13.2%	6.3%	13.5%	6.4%	12.9%
PLASTIC TOTALS	14.2%	29.2%	16.2%	31.0%	13.7%	33.2%	14.6%	31.4%
Food Waste	20.3%	9.1%	12.5%	5.4%	20.0%	6.9%	17.9%	7.2%
Wood Waste	0.3%	0.3%	1.1%	0.6%	0.4%	0.4%	0.6%	0.4%
Textiles	3.3%	2.7%	5.2%	4.5%	3.5%	2.6%	3.9%	3.1%
Diapers	6.0%	3.2%	6.2%	3.1%	3.4%	1.5%	5.1%	2.5%
Other Organics	4.9%	4.4%	3.7%	3.5%	2.3%	1.1%	3.6%	2.8%
ORGANIC TOTALS	34.7%	19.7%	28.7%	17.1%	29.6%	12.6%	31.1%	16.0%
Fines	4.1%	2.3%	3.3%	2.6%	3.0%	1.7%	3.4%	2.1%
Other Inorganics	0.8%	0.6%	3.5%	1.5%	2.6%	1.3%	2.3%	1.1%
INORGANIC TOTALS	4.9%	2.9%	6.8%	4.1%	5.6%	2.9%	5.7%	3.2%
OTHER WASTE	0.8%	0.2%	0.6%	0.1%	2.1%	0.4%	0.6%	0.1%
SORT TOTALS	100%							

TABLE 22-8

Kirksville Statistical Summary	
Estimated MSW (lbs) Collected by Site During Sampling Period	567,877
Total Sample Weight (lbs)	5538.7
Significance Test Results	.000
Number of Samples Collected	38
Mean Sample (lbs) and Confidence Interval (95%)	240.09 (+/-) 29.05

Kirksville "Other Waste" Summary			
Over-the-counter Medication (OTC)	24	Beauty/Hygiene Aerosol Products	5
Prescription Medication (Rx)	1	Household Cleaning Aerosol Products	1
Beauty/Hygiene Products	18	Gardening/Yard Care Products	0
Household Cleaning Products	1	Pet Groom Products	0
Sharps/Blades	8	Disposable Razors	18
Syringes	20	Alkaline Batteries	44
Hardware/Shop Products	5	Automobile Maintenance/Cleaning Products	0
Aerosol Cans	2		
Miscellaneous items: 1 set of acrylic paints, 1 compressed fire detector.			
Total Weight (lb): 22.6			
Total Volume (cubic ft.): 1.35			