

# Ozark Rivers Solid Waste Management District: Recycling Rate Study

Determining the Recycling Rate for the Region and Establishing a Baseline Rate

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### *Introduction to Recycling Rate Study*

Meramec Regional Planning Commission, a voluntary council of local governments serving the Meramec Region of Missouri, is working with the Ozark Rivers Solid Waste Management District to update and implement a regional solid waste management plan. The ultimate goal of this plan is to reduce by 40 percent the amount of waste landfilled.

As recycling and waste reduction programs have evolved in the region, it has become increasingly important to the district board and advisory committees to determine the recycling rate for the region. Establishing a baseline recycling rate would allow the district to periodically check the level of resource recovery and determine both the success of local recycling programs and the district's level of achieving the statewide goals of a 40 percent reduction.

At the 2010 advisory committee meeting, the group stated that the district has been promoting and providing grants for recycling to entities in the district for many years. Measures of success have been based on the state-wide figures on diversion from landfills, but the district does not have data on the recycling rate for the region. The advisory committee suggested that staff conduct a study to determine the local recycling rate. This would help any entity involved in recycling to establish goals and determine the success of their program. In order to provide a complete picture of recycling programs- both successes and areas where recycling programs can be improved - the district needs to know the region's recycling rate.

Staff applied for a USDA grant in 2010 to conduct the study but was not selected for funding. In 2011, staff applied for the USDA grant again under the umbrella of a larger project of the Missouri Department of Natural Resources (MDNR) and Lincoln University, but was still not selected for funding. At the 2012 district advisory committee meeting, the committee recommended that staff apply to the district grant program to complete the recycling rate study.

The project proposal was funded by the Ozarks Rivers Solid Waste Management District in its 2013 funding cycle and included conducting a survey to obtain the municipal solid waste recycling and disposal data necessary for calculating a standard recycling rate for the seven-county region. The project included using MDNR disposal data for waste generation figures and designing a recycling measurement system specific to the Ozark Rivers region. It was planned that the data collection tool used in the study would be based on the standard methodology established by the U.S. Environmental Protection Agency (EPA).

It was intended that once a recycling rate for the district had been calculated, entities in the region would know where they stand in relation to the state's goal of a 40 percent recycling rate. It was planned that the data collection tool be shared with entities in the district, allowing them to use this data collection tool to update their recycling rate on a regular basis, i.e. every five years, if they wish. If they have already met the state's 40 percent goal, this tool will give them an opportunity to reassess and increase their individual goals. Having a process in place for calculating recycling rates and a baseline number for comparison will be valuable tools for the district to use to determine success, design programs and promote recycling activities.

## *Recycling Rate Study Project Description*

The project goal was to determine the current recycling rate for the region and establish a baseline against which future data can be measured. This information will provide local governments and recycling programs with better information on which to base decisions about recycling and disposal programs.

The four primary objectives of the recycling rate study included the following:

- 1) To develop a standard data collection tool for the district that can be shared and used to update the recycling rate in the future – both for the district and for communities in the district who want to calculate their recycling rate on a regular basis to determine success or the need for changes.
- 2) To collect data to establish a baseline recycling rate for the district using a standard tool that will be shared with other entities in the district. The knowledge on the recycling rate will be essential for solid waste planning and to create future opportunities for recycling efforts. It also is useful information for applying for state and federal grants and for the district to use when evaluating local grant applications.
- 3) To organize a workshop to share the baseline recycling rate of the district and the data collection tool with district communities so they can update their recycling rate and compare progress. Staff can also work one-on-one with the community in sharing the data collection tool and results of the study.
- 4) To produce useful information for planning and decision making.

## *Recycling Rate Study Survey Process, Response and Results*

The project included several primary activities as described below:

**Data Collection Tool Development:** The data collection tool used to measure the amount of municipal solid waste (MSW) being recycled in the district was based on the standard methodology for measuring

recycling rate developed by the EPA (<http://www.epa.gov/epawaste/conserve/tools/recmeas/index.htm>). EPA has developed templates of three different survey forms to collect data on the amount of MSW recyclables and other types of recyclables. Each survey targets a different aspect of recycling including collectors, processors and end users (Table 1). As this project's intent was to collect data on municipal solid waste (MSW), the Survey Form 1: Collectors of Recyclables was an important resource used in drafting the survey tools for the Ozarks Rivers recycling rate study. *This sample survey is tool is included as Exhibit 1.*

**Table 1: EPA Survey Forms for Recyclables**

<b>Survey Form Title</b>	<b>Who should complete the form</b>	<b>Purpose</b>
<b>FORM 1: COLLECTORS OF RECYCLABLES</b>	<ul style="list-style-type: none"> <li>- Private recycling haulers</li> <li>- Government agencies with collection crews or contracts</li> <li>- Large generators that self-haul directly to processor or end user</li> </ul>	To collect data on the amount of MSW recyclables and other recyclables collected from residential and commercial sources in your state or locality during the current measurement year.
<b>FORM 2: PROCESSORS OF RECYCLABLES</b>	<ul style="list-style-type: none"> <li>- Materials recovery facilities (MRFs)</li> <li>- Buy- back centers</li> <li>- Drop off centers</li> <li>- Scrap metal processors</li> <li>- Paper processors</li> <li>- Glass beneficiation plants</li> <li>- Plastic processors</li> <li>- Tire processors</li> <li>- Yard trimmings processors</li> <li>- Transfer stations that recover recyclables from waste on site</li> </ul>	To collect data on the amount of MSW recyclables and other recyclables collected from residential and commercial sources in your state or locality during the current measurement year by MRFs, buy back centers, and other processors.
<b>FORM 3: END USERS OF RECYCLABLES</b>	<ul style="list-style-type: none"> <li>- Public and private composting facilities</li> <li>- Recycling plants</li> <li>- Disposal facilities that recover recyclables from waste on site</li> </ul>	To collect data on the amount of MSW recyclables and other recyclables from residential and commercial sources in your state or locality accepted during the current measurement year.

Source: US EPA website: [www.epa.gov](http://www.epa.gov)

The process for the survey development included several steps, including research on existing tools and survey strategies. The survey tool development included the following tasks:

- 1) Staff reviewed and developed a thorough understanding of EPA forms and questions on their survey templates.
- 2) Staff researched rate studies conducted in other areas/regions to determine the process used, obtain examples of survey forms including content, the data collection methods used, and project timeline.

- 3) Based on research and review of resources for rate studies combined with MRPC staff knowledge of the solid waste and recycling system in the region, two draft surveys were developed for two distinct segments: 1) Solid waste collection and disposal companies; and 2) Recycling facilities, organizations and businesses.
- 4) As part of the survey development process, specific types of materials were identified for tracking. These included those materials typically recycled as part of household waste such as #1 and #2 plastics, glass, aluminum cans, steel/tin cans, office and mixed paper, newsprint, magazines, and cardboard.
- 5) During the survey planning process, it was determined that this study provided an opportunity to attempt to collect information on materials recycled in the region in addition to the typical household materials. Materials including household hazardous waste, household appliances, electronic waste, used motor oil, other metals, lead-acid batteries, and tires were identified as important for tracking. *The list of materials to be included in the study is included in Exhibit 2.*
- 6) The draft surveys and list of materials to be tracked were shared with the Ozarks Rivers Solid Waste Management District's full council, the District's Advisory Committee, and community recycling representatives selected to provide input into the survey design and process at a recycling rate study meeting held on June 5, 2014.
- 7) Following this meeting, the draft surveys and materials lists were finalized. *Exhibit 3 includes the final survey used for solid waste collection and disposal companies in the District and Exhibit 4 includes the final survey used for recycling facilities, organizations and businesses.*
- 8) Cover letters were also developed for these two groups that explained the study, the process to be used and requested participation of the cities, companies, facilities, organizations and businesses. *These cover letters are included in Exhibit 5 and Exhibit 6.*
- 9) Using various sources, information was obtained on solid waste collection and disposal companies, recycling facilities and organizations and businesses offering or involved in recycling the materials to be tracked within the Ozarks Rivers Solid Waste Management District. A comprehensive mailing list was developed from this research. It is important to note that district members were asked to assist in identifying the businesses and organizations in their communities that were involved in recycling.
- 10) Letters with surveys were mailed throughout the month of January 2015 with a request for a response by Feb. 9, 2015. A total of 135 letters were mailed with an initial response rate of less than seven percent. Over 11 percent of the letters mailed were returned as not deliverable. This was a fairly high percentage and unanticipated at the time of the first mailing.
- 11) Additional research on company addresses was completed for those surveys returned and six of the 135 were businesses that had closed and were no longer in business.
- 12) The surveys and cover letters for both groups were slightly revised and re-mailed. A total of 113 letters/surveys were mailed in March 2015 with a request for response by April 15, 2015. *A copy of the revised letters and surveys are included in Exhibits 7 – 10.*
- 13) This second mailing resulted in a less than five percent response rate with another nine percent returned as not deliverable. Those returned as not deliverable were to businesses that were determined to no longer be operating.

- 14) During April and May 2015, direct contact by telephone was made to over 100 cities, agencies, businesses and organizations in an attempt to obtain participation in the recycling rate study. It is important to note that phone calls were also made to all companies regardless if the initial mailing had been returned as not deliverable if a telephone number was available.

The survey response rate achieved for the total businesses surveyed was over 91 percent. As shown in Table 2, this response rate was due primarily to the phone contacts – over 88 percent of the response rate was achieved by direct phone calls made to businesses. Almost 15 percent of the businesses surveyed did not respond to the phone/email/mailings contacts made. Of the total businesses surveyed, staff was not able to contact eight percent. The cities with no recycling offered represented over 12 percent of the businesses surveyed. Over 66 percent of the cities located in the Ozark Rivers Solid Waste Management District currently do not offer recycling opportunities to their residents.

**Table 2: Survey Response**

	# Responding	Response Rate
Total Businesses Surveyed	135	
Contacts Made	124	91.8%
Responses to Mailed Survey	16	11.8%
Response to Phone Contacts	108	88.2%
Declined Participation	5	3.7%
No Response (Contact Made by Phone or Email But Survey Response Not Returned)	20	14.8%
Not Able to Contact (Mail Returned and Phone Number not Available or No Longer in Service)	11	8.2%
No Longer Recycle	2	1.5%
No Materials Recycled	11	8.2%
Cities With No Recycling Offered	20	12.6%
Closed/Closing Business	3	2.2%

*Source: MRPC Recycling Study Worksheet*

Table 3 includes information on the materials accepted by the businesses/cities located in the Ozarks Rivers Solid Waste Management District. A total of 62 of the 135 businesses surveyed do accept recyclables. There are more opportunities for recycling of certain materials, including cardboard, lead acid batteries, newsprint, tires, used motor oil and aluminum in the Ozark Rivers Solid Waste Management District. There are limited opportunities in the district for recycling materials including electronics, household hazardous waste, glass, steel cans, and plastics. It is assumed that regulations regarding disposal of certain materials including motor oil, lead acid batteries and tires has influenced the opportunities for recycling of

these materials. The other factor that results in more recycling opportunities in the district is the market for recycled materials, including aluminum and cardboard.

**Table 3: Recycling Opportunities in ORSWMD**

Materials Recycled	Number	% of Total Recycling	% of Total Surveyed
Some Form of Recycling Offered	62	100.0%	45.9%
Aluminum	17	27.4%	12.6%
Cardboard	22	35.5%	16.3%
Electronics	4	6.5%	3.0%
Glass	5	8.1%	3.7%
Household Hazardous Waste	3	4.8%	2.2%
Lead Acid Batteries	24	38.7%	17.8%
Magazines	5	8.1%	3.7%
Metals – Ferrous and Non-Ferrous	10	16.1%	7.4%
Mixed Household	1	1.6%	0.7%
Office Paper/Mixed Paper	8	12.9%	5.9%
Newsprint	14	22.6%	10.4%
#1 and #2 Plastics	8	12.9%	5.9%
Plastic Bags	6	9.7%	4.4%
Steel Cans	9	14.5%	6.7%
Tires	20	32.3%	14.8%
Used Motor Oil	25	40.3%	18.5%

Source: MRPC Recycling Study Worksheet

## Recycling Rate Study Project Results

The recycling rate of the Ozark Rivers Solid Waste Management District was determined based on a combination of federal, state and local data. In order to calculate the recycling rate, two sets of data were used: the total amount of MSW materials generated and the amount of MSW materials recycled. The

survey results were used to compare and provide a local perspective to a 2008 waste characterization study for the state of Missouri and a 2013 U.S. EPA materials management study. The recycling rate included determining major waste sectors, waste generation in the district and current recycling rates.

**Major Waste Sectors/Waste Composition:** A waste characterization study was completed by the Midwest Assistance Program (MAP) on behalf of MDNR in 2008. According to this study, Municipal Solid Waste (MSW) accounts for 58.3 percent of the total solid waste stream in Missouri. This closely mirrors EPA waste composition national numbers. The composition of the waste in Missouri is shown in Table 4.

**Table 4: Major Waste Sectors & Percent of Total Waste Stream - Missouri, 2008.**

Major Waste Sectors	% of Total Waste Stream
Municipal Solid Waste (MSW): paper, glass, metal, plastic, organics, inorganic, special waste	58.3
Construction: wood, dry wall, masonry, metal, plastic, cardboard, other	1.6
Demolition: wood, drywall, roofing, masonry, metal, carpet, other	13.2
Industrial: cardboard, paper, food, metal, wood, plastic, textile, rubber, other	10.7
Other: sludge, tree trunk	2.5
Special: bulky, contaminated soil, asbestos, tritium, e-scrap	13.5

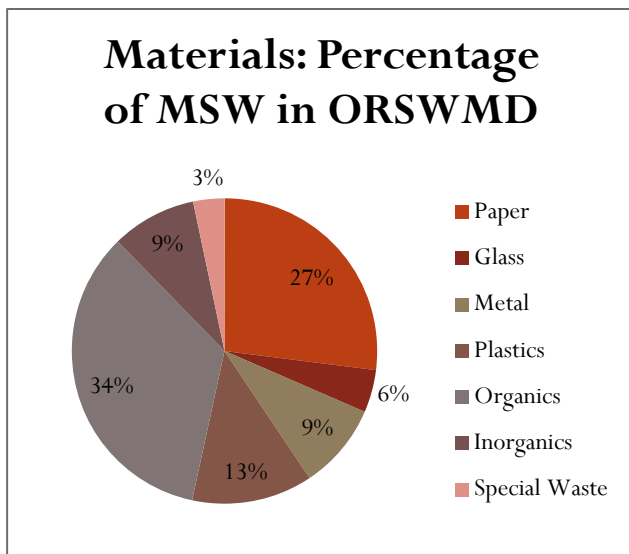
*Source: 2008 Waste Characterization Study Missouri Department of Natural Resources*

The composition of the waste stream is further broken down by materials included in Municipal Solid Waste, including paper, glass, metals, plastics, inorganics, organics and special waste. The 2008 Missouri Waste Composition study identified a statewide average percentage of all waste for each material in the state.

Paper makes up 33.6 percent of the MSW waste stream in Missouri. This includes cardboard, newsprint, magazines, high grade paper, and mixed paper. Glass makes up 5.5 percent of the MSW waste stream including clear, brown, green and other glass. Metals including aluminum cans, other aluminum, non-ferrous metals, food cans, ferrous metals, and oil filters are 6 percent of the total MSW. Plastics including PET #1, HDPE #2, plastic film and other plastics contribute 17.3 percent of the total MSW. Organics including food waste, wood waste, textiles, diapers, and other organics make up 31.6 percent of the total MSW. Inorganics represent 4.1 percent of the MSW stream and special wastes including household hazardous waste and electronic waste contribute 1.9 percent of the total MSW.

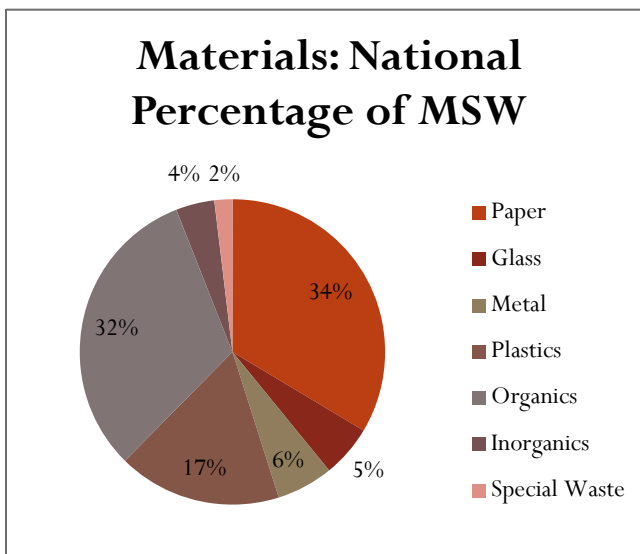
Chart 1 titled *Materials: Percentage of MSW* illustrates the composition of municipal solid waste in the Ozarks Rivers Solid Waste Management District. The accompanying Chart 2 illustrates the national composition of municipal solid waste.

**Chart 1: Composition of MSW in Ozark Rivers SWMD**



Source: Missouri Dept. of Natural Resource 2008 Waste Composition Study

**Chart 2: National Composition of MSW in U.S.**



Source: U.S. EPA 2013 Materials Management Study

To further breakdown the composition of waste by material, the 2008 waste characterization study for Missouri further broke down the composition of the waste stream and provided information on percentages of all waste.

This information was used to compute the percentage of municipal solid waste for each different material type. Table 5 titled *Materials Included in Municipal Solid Waste* provides the percentages of all materials present in municipal solid waste.

Two of the materials that contribute a significant percent of the total waste include food at 10.4 percent and other plastics at 4.7 percent. Both of these materials have limited recycling options currently. The other two significant materials in the waste stream – cardboard and mixed paper, are currently accepted at most recycling collections sites.

**Table 5: Materials Included in Municipal Solid Waste**

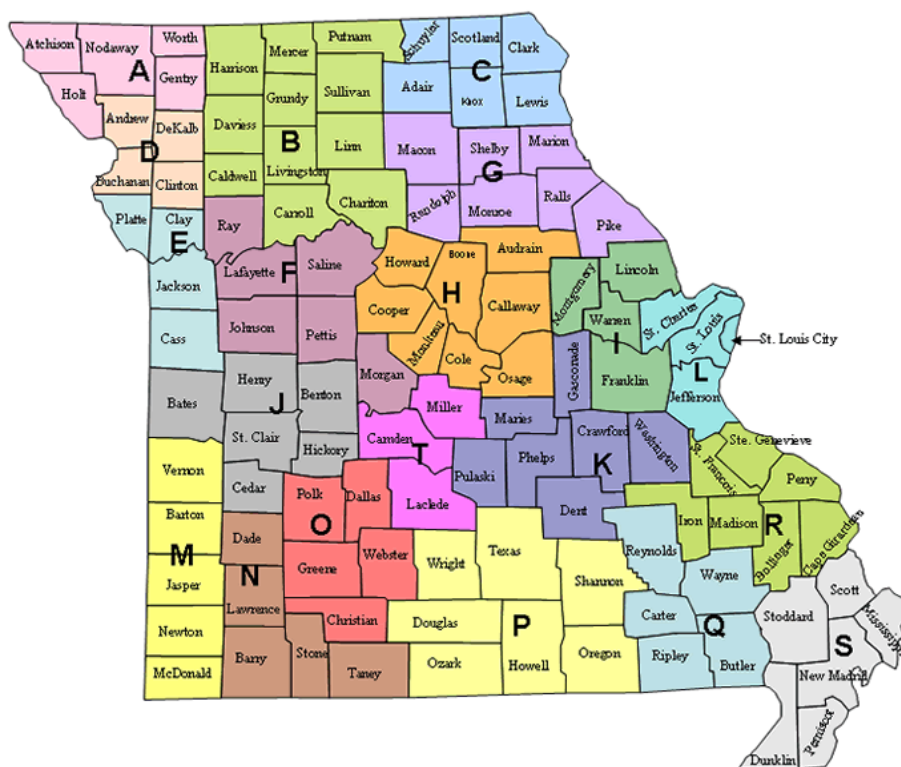
MSW Components	Percentage of All Waste	Percentage of MSW
<b>All MSW</b>	<b>58.3</b>	
Cardboard	4.78	8.20
Newsprint	3.01	5.16
Magazines	2.14	3.67
High Grade Paper	3.73	6.40
Mixed Paper	5.95	10.21
<b>TOTAL PAPER</b>	<b>19.6</b>	<b>33.62</b>
Clear Glass	1.58	2.71
Brown Glass	1.03	1.77
Green Glass	0.37	0.63
Other Glass	0.19	0.33
<b>TOTAL GLASS</b>	<b>3.17</b>	<b>5.44</b>
Aluminum Cans	0.93	1.60
Other Aluminum	0.2	0.34
Non Ferrous	0.12	0.21
Food Cans	1.71	2.93
Ferrous	0.51	0.87
Oil Filters	0.05	0.09
<b>TOTAL METALS</b>	<b>3.52</b>	<b>6.04</b>
PET #1	1.48	2.54
HDPE #2	1.11	1.90
Plastic Film	2.81	4.82
Other Plastic	4.66	7.99
<b>TOTAL PLASTIC</b>	<b>10.06</b>	<b>17.26</b>
Food Waste	10.04	17.22
Wood Waste	0.69	1.18
Textiles	2.76	4.73
Diapers	3.2	5.49
Other Organics	1.73	2.97
<b>TOTAL ORGANICS</b>	<b>18.42</b>	<b>31.60</b>
Fines	0.54	0.93
Other Inorganics	1.87	3.21
<b>TOTAL INORGANICS</b>	<b>2.41</b>	<b>4.13</b>
HHW	0.54	0.93
Electronic Waste	0.57	0.98
<b>TOTAL SPECIAL WASTE</b>	<b>1.11</b>	<b>1.90</b>
<i>Source: 2008 Missouri DNR Waste Composition Study</i>		

**Waste Materials Generated:** According to the 2008 Missouri DNR Waste Composition Study, an estimated 6,364,557 tons of solid waste was generated by the state's population of 5,595,211. However, MSW only accounts for 58.3 percent of that total, or 3,710,536.7 tons. As most recycling programs target MSW, our data collection focus was on MSW. (Note: Data on other categories of waste was also included in the study (such as motor oil) but with very limited results.)

A waste characterization study was completed by the Midwest Assistance Program (MAP) on behalf of MDNR in 2008. That study included estimated waste generation rates for the state of Missouri. Waste generation rates for the region were extrapolated from that study as exact waste generation rates for the ORSWMD would be very difficult to obtain for the following reasons:

- 1) The landfills and transfer stations keep track of waste haulers, but they do not keep records on where trash comes from;
- 2) Waste haulers haul trash from communities located both inside and outside the ORSWMD boundaries; and
- 3) Not all trash generated within the district's boundaries is disposed of within the district – some is trucked out of the region for disposal.

This project used the waste generation rate established by the Missouri Department of Natural Resources (MDNR). By dividing the 3,710,536.7 MSW tonnage figure with the total population of the state (5,595,211), the statewide generation rate for MSW would be .663 tons of trash per person per year – or 3.63 lbs. per person per day. The total population of the district (including all of Sullivan and Richland) is  $193,372 \times .663 = 128,205.63$  tons of MSW generated in the ORSWMD per year. The Ozark Rivers Solid Waste Management District is shown below as Region K – highlighted in the darker blue color on the statewide solid waste management district map.



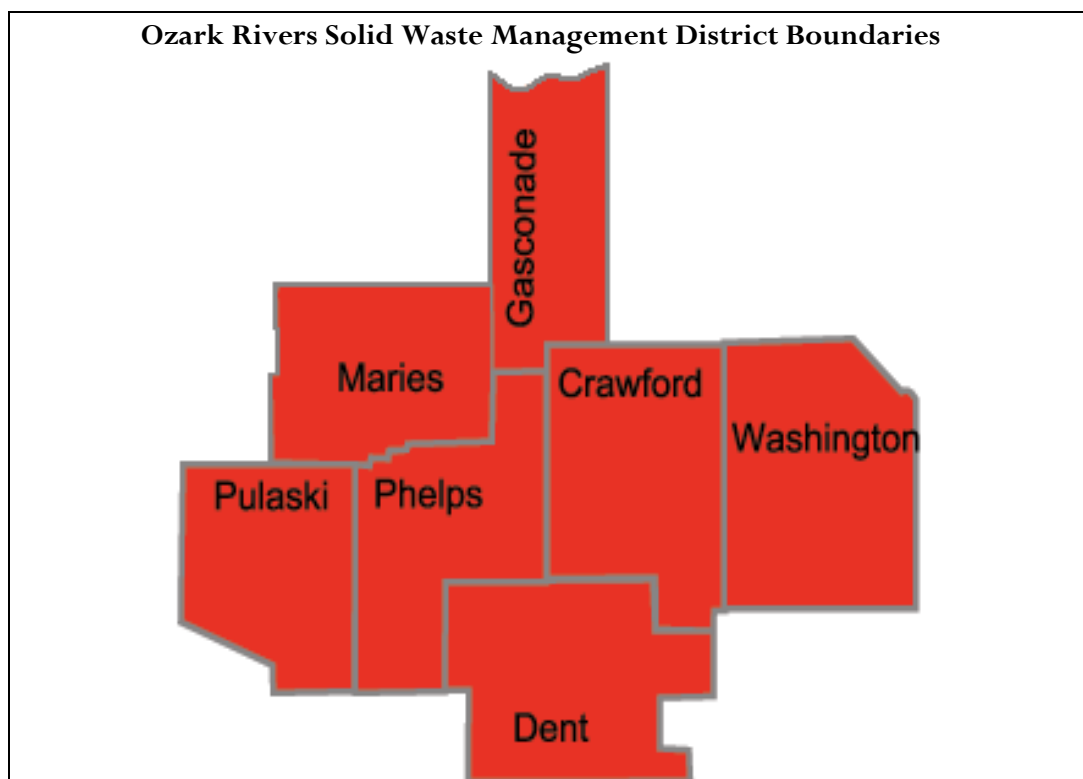
Waste generation in the district is further broken down by major waste sector with paper contributing the most to the waste stream – over 33 percent of the total. Organic waste – which includes food waste – represents makes up almost 32 percent of the total waste. Special waste, inorganics, glass, and metals contribute the least to the waste stream. Table 6 breaks down the total annual tonnage generated annually in the District.

**Table 6: Municipal Solid Waste Generation in the Ozarks Rivers Solid Waste Management District**

<b>MUNICIPAL SOLID WASTE GENERATION IN THE REGION</b>			
<b>MSW Components</b>	<b>Percentage of All Waste</b>	<b>Percentage of MSW</b>	<b>Total Annual Tonnage Generated</b>
<b>All MSW</b>	58.3		<b>128,206</b>
<b>Paper</b>	19.6	33.6	<b>43,077</b>
<b>Glass</b>	3.2	5.5	<b>7,051</b>
<b>Metal</b>	3.5	6	<b>7,692</b>
<b>Plastics</b>	10.1	17.3	<b>22,179</b>
<b>Organics</b>	18.4	31.6	<b>40,513</b>
<b>Inorganics</b>	2.4	4.1	<b>5,256</b>
<b>Special Waste</b>	1.1	1.9	<b>2,436</b>

*Source: 2008 Missouri DNR Waste Composition Study*

The total tonnage for the Ozarks Rivers Solid Waste Management District (District boundaries shown below) of the primary components of the waste stream is further broken down by the counties and cities located within the Ozark Rivers Solid Waste Management District in Table 7.



A per person generation rate of .663 tons per year was used along with the most recent population estimate for the local government. [Due to rounding, total MSW tonnage on Table7 varies slightly from Table 6.]

**Table 7: Municipal Solid Waste Generation in ORSWMD by Material**

County/City	County Pop. 2014 (Est.)	Place Pop. 2014 (Est.)	Annual Tons MSW	Paper 33.6%	Glass 5.5%	Metal 6%	Plastics 17.3%	Organics 31.6%	In-Organics 4.1%	Special Waste 1.9%
<b>Crawford County</b>	24,650	16,000	10,608.0	3,564.2	583.4	636.4	1,835.1	3,352.1	434.9	201.5
Bourbon		1,627	1,078.7	362.4	59.3	64.7	186.6	340.8	44.2	20.4
Cuba		3,383	2,242.9	753.6	123.3	134.5	388.0	708.7	91.9	42.6
Leasburg		336	222.7	74.8	12.2	13.3	38.5	70.3	9.1	4.2
Steelville		1,709	1,133.0	380.6	62.3	67.9	196.0	358.0	46.4	21.5
Sullivan (all)*		7,054	4,676.8	1,571.1	257.2	280.6	809.8	1,477.8	191.7	88.8
West Sullivan		119	78.8	26.4	4.3	4.7	13.6	24.9	3.2	1.4
<b>Dent County</b>	15,655	10,650	7,060.9	2,372.4	388.3	423.6	1,221.5	2,231.2	289.4	134.1
Salem		5,005	3,318.3	1,114.9	182.5	199.0	574.0	1,048.5	136.0	63.0
<b>Gasconade County</b>	14,866	8,580	5,688.5	1,911.3	312.8	341.3	984.1	1,797.5	233.2	108.0
Bland		523	346.7	116.4	19.0	20.8	59.9	109.5	14.2	6.5
Gasconade		215	142.5	47.8	7.8	8.5	24.6	45.0	5.8	2.7
Hermann		2,378	1,576.6	529.7	86.7	94.5	272.7	498.2	64.6	29.9
Morrison		137	90.8	30.5	4.9	5.4	15.7	28.6	3.7	1.7
Owensville		2,626	1,741.0	584.9	95.7	104.4	301.1	550.1	71.3	33.0
Rosebud		407	269.8	90.6	14.8	16.1	46.6	85.2	11.0	5.1
<b>Maries County</b>	9,013	7,083	4,696.0	1,577.8	258.2	281.7	812.4	1,483.9	192.5	89.2
Belle (all)*		1,535	1,017.7	341.9	55.9	61.0	176.0	321.5	41.7	19.3
Vienna		599	397.1	133.4	21.8	23.8	68.6	125.4	16.2	7.5
<b>Phelps County</b>	44,847	19,499	12,927.8	4,343.7	711.0	775.6	2,236.5	4,085.1	530.0	245.6
Doolittle		610	404.4	135.8	22.2	24.2	69.9	127.7	16.5	7.6
Edgar Springs		204	135.2	45.4	7.4	8.1	23.3	42.7	5.5	2.5
Newburg		455	301.6	101.3	16.5	18.0	52.1	95.3	12.3	5.7
Rolla		19,926	13,210.9	4,438.8	726.5	792.6	2,285.4	4,174.6	541.6	251.0
St. James		4,153	2,753.4	925.1	151.4	165.2	476.3	870.0	112.8	52.3
<b>Pulaski County</b>	53,436	38,140	25,286.8	8,496.3	1,390.7	1,517.2	4,374.6	7,990.6	1,036.7	480.4
Crocker		1,081	716.7	240.8	39.4	43.0	123.9	226.4	29.3	13.6
Dixon		1,514	1,003.7	337.2	55.2	60.2	173.6	317.1	41.1	19.0
Richland		1,839	1,219.2	409.6	67.0	73.1	210.9	385.2	49.9	23.1
St. Robert		5,747	3,810.2	1,280.2	209.5	228.6	659.1	1,204.0	156.2	72.3
Waynesville		5,365	3,556.9	1,195.1	195.6	213.4	615.3	1,123.9	145.8	67.5
<b>Washington County</b>	25,077	21,477	14,239.2	4,784.3	783.1	854.3	2,463.3	4,499.5	583.8	270.5
Caledonia		131	86.8	29.1	4.7	5.2	15.0	27.4	3.5	1.6
Irondale		449	297.6	99.9	16.3	17.8	51.4	94.0	12.2	5.6
Mineral Point		351	232.7	78.1	12.7	13.9	40.2	73.5	9.5	4.4
Potosi		2,669	1,769.5	594.5	97.3	106.1	306.1	559.1	72.5	33.6
<b>Totals</b>	<b>187,554</b>	<b>193,576*</b>	<b>128,339.4</b>	<b>43,119.9</b>	<b>7,056.9</b>	<b>7,698.7</b>	<b>22,200.9</b>	<b>40,553.3</b>	<b>5,260.2</b>	<b>2,436.7</b>

Source: U.S. Census Bureau, Population Division; 2008 Missouri DNR Waste Composition Study

\*Due to the inclusion of the entire populations of Sullivan, Belle and Richland there are discrepancies between County Population and Place Population totals. Tonnage is based on Place Populations.

**Waste Materials Recycled:** According to a 2013 report prepared by U.S. EPA, Americans generated about 254 million tons of trash and recycled and composted over 87 million tons of this material in 2013 – the equivalent of a 34.3 percent recycling rate. On average, Americans recycled and composted 1.51 pounds out of our individual waste generation rate of 4.4 pounds per person per day. In 2013, Americans recovered over 64.7 million tons of MSW through recycling, and over 22 million tons through composting. National statistics show that recycling rates, excluding composting, currently average 1.12 pounds per person per day / .204 tons per person per year. With the .663 tons municipal solid waste generated per person per year and .204 tons recycled per person per year, the national recycling rate is 27.3 percent.

The paper and paperboard recycling rate in 2013 was 63.3 percent, down from the 2012 rate of 64.6 percent. The glass recycling rate also fell slightly, coming in at 27.3 percent in 2013 after reaching 27.7 percent in 2012. The plastics recycling rate, at 8.8 percent in 2012, rose to 9.2 percent during the most recently reported year.

The survey process that was included in this study was designed around collecting data that would assist in determining a meaningful recycling rate for the ORSWMD. Data was collected through a combination of site visits, telephone interviews and mailed surveys and included questions on the following types of recyclables being collected by recycling programs to include the following materials:

- Commingled materials
- Glass containers: clear, amber, green, mixed glass, other glass
- Lead acid batteries
- Metals: aluminum cans, tin/steel cans, major appliances, other ferrous, other non-ferrous, other metal
- Paper: magazines, newspaper, corrugated container, office paper, telephone directory, mixed paper, other paper
- Plastic: PETE, HDPE, PVC, LDPE, PP, PS, mixed plastic, other plastic
- Tires
- Wood: wood packaging, other wood
- Electronics
- Household Hazardous Waste
- Used Motor Oil
- Tires
- Other recyclables

It was hoped that the surveys would be the primary source of data for this ORSWMD recycling rate study and would provide good local information to use to validate, support and enhance national and state estimates. This proved to be incorrect due in part to the following reasons:

- 1) The majority of cities offering recycling opportunities do not capture volumes of materials recycled by material;
- 2) Recycling centers including the Rolla Recycling Center and the St. Robert Transfer

Station do track overall volumes of materials accepted but don't track or have limited information broken down by political subdivision. This is due in part to the hours that the recycling centers are open to the public;

- 3) The majority of businesses that accept recyclables don't record volumes collected;
- 4) For those cities and businesses that do track volumes, there are inconsistencies in the volumes that make it difficult to convert to a common number (e.g..quantity in numbers versus weight of certain materials);
- 5) Businesses accepting recyclables don't distinguish volumes collected by place; and
- 6) For those cities and businesses that do track volumes, there is a lack of consistency between cities in tracking by material. For example, data for plastics in some cases is for #1 and #2 plastics combined without breaking down further. This was found to be especially the case with paper data – terms used varied between collectors and data captured varied. This makes it impossible to combine data in a meaningful way to develop district wide numbers – and prohibits being able to do comparisons from community to community on materials collection for recycling.

The waste characterization study completed by the Midwest Assistance Program (MAP) on behalf of MDNR in 2008 included estimated waste diversion and recycling rates that closely followed national statistics. Because state numbers closely mirrored national numbers and the 2008 study is somewhat dated, this recycling rate study used the most recent information available in the EPA 2013 Materials Management Study. This study's 27.3 percent recycling rate was used for determining district numbers.

Using the recycling rates established by the EPA in the agency's Materials Management Study, the total annual tonnage recycled in the ORSWMD should total 35,036 tons per year if the district is recycling at the national average. This is based the total municipal waste generation for the district of 128,339 tons/year x .273 = 35,036 tons of materials recycled in the ORSWMD per year.

Table 8 breaks down the estimated amount of materials currently being recycled in the District based on the national recycling rate of 27.3 by all cities and counties located in the Ozarks Rivers Solid Waste Management District.

**Table 8: Material Recycled in ORSWMD By Place Based on National Recycling Rate**

County/City	County Pop. 2014 (Est.)	Place Pop. 2014 (Est.)	Annual Tons MSW	Annual Tons Recycled
<b>Crawford County</b>	24,650	16,000	10,608.0	2,895.9
Bourbon		1,627	1,078.7	294.4
Cuba		3,383	2,242.9	612.3
Leasburg		336	222.7	60.7
Steelville		1,709	1,133.0	309.3
Sullivan (all)*		7,054	4,676.8	1,276.7
West Sullivan		119	78.8	21.5
<b>Dent County</b>	15,655	10,650	7,060.9	1,927.6
Salem		5,005	3,318.3	905.8
<b>Gasconade County</b>	14,866	8,580	5,688.5	1,552.9
Bland		523	346.7	94.6
Gasconade		215	142.5	38.9
Hermann		2,378	1,576.6	430.4
Morrison		137	90.8	24.7
Owensville		2,626	1,741.0	475.2
Rosebud		407	269.8	73.6
<b>Maries County</b>	9,013	7,083	4,696.0	1,282.0
Belle (all)*		1,535	1,017.7	277.8
Vienna		599	397.1	108.4
<b>Phelps County</b>	44,847	19,499	12,927.8	3,529.2
Doolittle		610	404.4	110.4
Edgar Springs		204	135.2	36.9
Newburg		455	301.6	82.3
Rolla		19,926	13,210.9	3606.5
St. James		4,153	2,753.4	751.6
<b>Pulaski County</b>	53,436	38,140	25,286.8	6,903.2
Crocker		1,081	716.7	195.6
Dixon		1,514	1,003.7	274.0
Richland (all)*		1,839	1,219.2	332.8
St. Robert		5,747	3,810.2	1,040.1
Waynesville		5,365	3,556.9	971.0
<b>Washington County</b>	25,077	21,477	14,239.2	3,887.3
Caledonia		131	86.8	23.6
Irondale		449	297.6	81.2
Mineral Point		351	232.7	63.5
Potosi		2,669	1,769.5	483.0
<b>Totals</b>	<b>187,554</b>	<b>193,576*</b>	<b>128,339.4</b>	<b>33,944.9</b>

Source: U.S. Census Bureau, Population Division; 2008 Missouri DNR Waste Composition Study, EPA Materials Management Study

\*Due to the inclusion of the entire populations of Sullivan, Belle and Richland there are discrepancies between County Population and Place Population totals. Tonnage is based on Place Population.

The limited data collected through the survey process demonstrates a much lower recycling rate from the national average – an average of less than eight percent. Table 9 shows the local recycling information provided through surveys and compares current recycling tonnage to tonnage of recyclables based on the national rate of .204 tons per person per year and the national recycling rate of 27.3.

**Table 9: Local Recycling Rates**

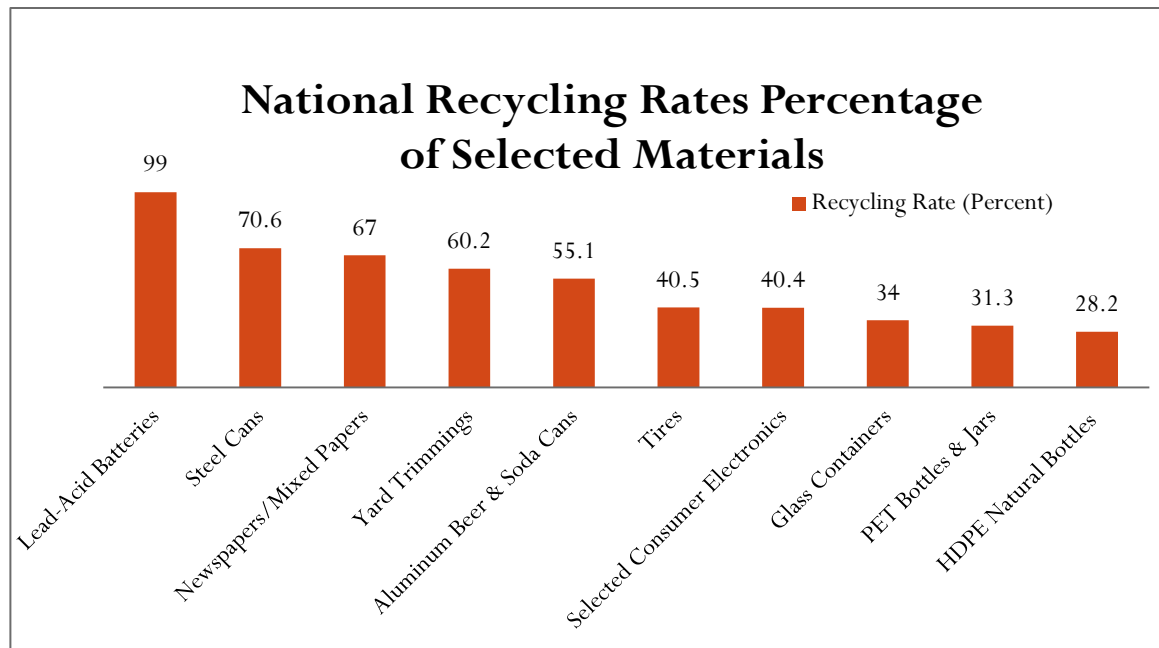
Municipality	Population	Annual Waste Generation by Tons	Tonnage Recycled: National Rate	Tonnage Recycling: Local Data	Local Recycling Rate %
Dixon	1,514	1,003.7	274.0	52.31	5.21%
Hermann	2,378	1,576.6	430.4	142.25	9.02%
Potosi	2,669	1,769.5	483.0	354.00	20.00%
St. James	4,153	2,753.4	751.6	60.00	2.17%
Rolla	19,926	13,210.9	3,606.5	2,583.00	19.55%
St. Robert	5,747	3,810.2	1,040.1	93.32	2.44%
Waynesville	5,365	3,556.9	971.0	9.5	0.26%
<b>TOTAL</b>	<b>41,752</b>	<b>27,681.2</b>	<b>3,950.1</b>	<b>3,294.38</b>	<b>11.9 Avg. %</b>

Source: MRPC Recycling Study Surveys

The 2013 EPA Materials Management Study further breaks down the recycling rates of selected materials. In 2013, the rate of lead-acid battery recovery was about 99 percent and based on the survey results, this rate would most likely be the same for the ORSWMD. The 2013 EPA rate of newspapers/mixed papers recovery was about 67 percent, and over 60 percent of yard trimmings were recovered.

Three materials whose recycling rates are rising including yard trimmings, selected consumer electronics and food. According to the EPA study, in 2013, the rate of yard trimmings composting was 60.2 percent, up from 57.7 percent. This translates to 130 pounds per person per year of yard trimmings composted. The rate of selected consumer electronics recovery was 40.4 percent, up from 30.6 percent. This translates to eight pounds per person per year recovered. The rate of food recovery was 5.0 percent, up from 4.8 percent. This translates to 12 pounds per person per year composted. Chart 3: Recycling Rates of Selected Products illustrates the various recycling rates for different materials as determined in the 2013 EPA Materials Management Study.

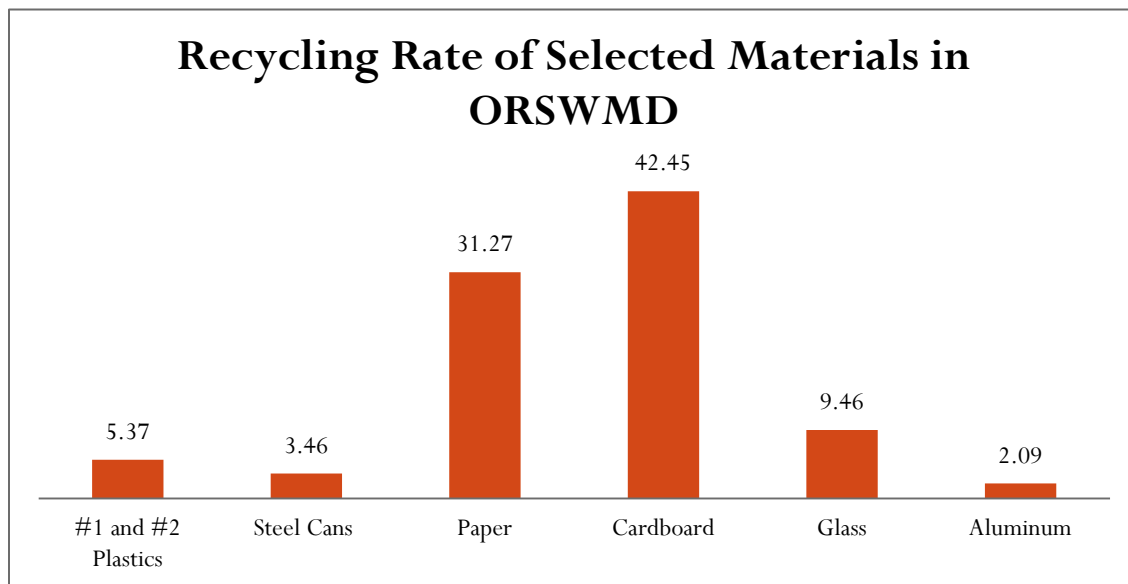
**Chart 3: National Recycling Rates of Selected Products: 2013**



Source: US EPA Materials Recovery Report 2013

Using local data gathered from the surveys, the recycling rates of certain materials was collected. It is important to note that local data was limited – the following rates were based on information provided from six municipalities including Dixon, Hermann, Potosi, Rolla, St. James, St. Robert and Waynesville.

**Chart 4: Recycling Rates of Selected Materials in ORSWMD**



Source: MRPC Recycling Study Surveys 2015

Comparing local data with national data, paper/cardboard local rates are closest to the national rates. 2013 rates for paper/cardboard were 63.3 percent and district local rate for these materials was 73.7 percent. Although local data wasn't available to document other materials, the survey process did provide other local information regarding some materials. It is assumed that the rate of recycling of lead-acid batteries mirrors the national average of 99 percent, based on surveys of businesses in the region. This appears to be almost a closed-loop material. The recycling of tires is also estimated to follow national rates of 40.5. The low rate of aluminum recycling is influenced by the existing market for aluminum. It is assumed that the district's rate of recycling of aluminum would also follow national rates if the district was able to obtain volumes from recycling companies that pay for aluminum.

Using the 2013 Materials Management publication produced by EPA that includes recycling rates of selected materials, the following table provides information on the quantity of recycled materials that would be available if recycling rates in the district followed national rates.

**Table 10: Annual Tonnage of Materials Recycled in ORSWMD Assuming 2013 National Recycling Rates**

MSW Components	Percentage of All Waste	Percentage of MSW	Tonnage Generated by Material	Recovery Rate as % of Generation	Annual Tonnage Materials Recycled
<b>All MSW</b>	<b>58.30</b>		<b>128,339.4</b>		
Paper	19.60	33.62	43,147.7	63.3	27,312.4
Glass	3.17	5.44	6,981.6	27.3	1,905.9
Aluminum	0.93	1.94	2,489.7	2.8	69.7
Non Ferrous	0.12	0.21	269.5	68.2	183.7
Steel	1.71	2.93	3,760.3	33.0	1,240.8
Plastics	10.06	17.26	22,151.3	9.2	2,037.9
Food Waste	10.04	17.22	22,100.0	5.0	1,105.0
Wood Waste	0.69	1.18	1,514.4	15.7	237.7
Textiles	2.76	4.73	6,070.4	15.2	922.7

Source: US EPA Materials Recovery Report 2013

It was difficult to determine a recycling rate for the ORSWMD as a whole as the district was unable to collect complete data on quantities from the surveys completed. For the purposes of illustration, the national rate of 27.3 percent of total tons municipal solid waste generated has been used to determine the current rate of recycling. However, using the limited data captured, the actual rate in the ORSWMD is more likely less than half the national rate. The information that was available showed a recycling rate of 11.9 percent. Table 11 shows the totals by place of the total municipal waste generated; the total materials available for recycling; the total annual tons recycled based on the national rate of 27.3; the total annual tons recycled based on the estimated district rate of 11.9; and the cost to landfill the materials that could be recycled but are currently being landfilled.

It is important to note that this information is provided as an illustration, primarily as the local data by place was in many cases not available or not complete enough to determine a solid recycling rate for those cities that do offer recycling programs. Also, many of the cities in the district have very limited or no recycling opportunities and in these cases it is likely that the actual recycling rate is lower to much lower than even the estimated district rate of 11.9. It should also be noted that the 11.9 estimated district recycling rate has been applied to all communities in the region for the sake of illustration, including those communities whose recycling rates may differ based on survey data (see Table 9).

Comparisons were also made between the national and ORSWMD recycling rates of selected materials, identifying the lost revenues for materials currently being landfilled in the District. For the purposes of illustration, materials including glass, plastics, paper, steel, textiles and wood were included. The rates for the different materials are based on national and District data (See Charts 3 and 4).

Table 11 uses the figure of 67.31 percent for materials available for recycling based on estimated percentages of paper, glass, plastic, ferrous and non-ferrous, textiles and wood waste. This figure does not include food waste (17.22 percent of the waste stream) due to composting of food waste is not currently feasible in the region based on a study conducted by the City of Rolla and experiments done on food waste composting on Fort Leonard Wood. The 53.44 percent figure used for determining how many recyclables in the region are being landfilled is established by subtracting the estimated regional recycling rate of 11.9 percent from the 67.31 percent.

The following assumptions can be made based on the extrapolations from Table 11:

- If the estimated recycling rate of 11.9 percent is applied region wide, approximately 19,331 tons of materials are being recovered from the MSW stream.
- There are at least 71,000 tons of materials (excluding food waste) currently being landfilled in the region that could be recovered.
- By recovering all or part of this recyclable material, the region could save as much as \$3,484,435 in landfill costs.

**Table 11: Annual Tonnage of Materials Recycled/Landfilled in ORSWMD**

County/City	Annual Tons MSW	Materials Available to Recycle by Tons (67.31%)	National Avg. Annual Tons Recycled	Current Annual Tons Recycled (11.9%)	Recyclable Materials Landfilled by Ton (55.41%)	Annual Cost to Landfill Recyclables /\$49 Ton
Crawford County	10,608	7,140.2	2,895.9	1,262.3	5,877.8	\$288,012
Bourbon	1,078.7	726.0	294.4	128.3	597.7	\$29,287
Cuba	2,242.9	1,509.6	612.3	266.9	1,242.7	\$60,892
Leasburg	222.7	149.8	60.7	26.5	123.3	\$6,042
Steelville	1,133.0	762.6	309.3	134.8	627.7	\$30,757
Sullivan (all)	4,676.8	3,147.9	1,276.7	556.5	2,591.4	\$126,979
West Sullivan	78.8	53.0	21.5	9.3	43.6	\$2,136
Dent County	7,060.9	4,752.6	1,927.6	840.2	3,912.4	\$191,708
Salem	3,318.3	2,233.5	905.8	394.8	1,838.6	\$90,091
Gasconade County	5,688.5	3,828.9	1,552.9	676.9	3,151.9	\$154,443
Bland	346.7	233.3	94.6	41.2	192.1	\$9,413
Gasconade (city)	142.5	95.9	38.9	16.9	78.9	\$3,866
Hermann	1,576.6	1,061.2	430.4	187.6	873.5	\$42,802
Morrison	90.8	61.1	24.7	10.8	50.3	\$2,465
Owensville	1,741.0	1,171.8	475.2	207.1	964.6	\$47,265
Rosebud	269.8	181.6	73.6	32.1	149.4	\$7,321
Maries County	4,696.0	3,160.8	1,282.0	558.8	2,602.0	\$127,498
Belle (all)	1,017.7	685.0	277.8	121.1	563.9	\$27,631
Vienna	397.1	267.2	108.4	47.2	220.0	\$10,780
Phelps County	12,927.8	8,701.7	3,529.2	1,538.4	7,163.2	\$350,997
Doolittle	404.4	272.2	110.4	48.1	224.0	\$10,976
Edgar Springs	135.2	91.0	36.9	16.0	74.9	\$3,670
Newburg	301.6	203.0	82.3	35.8	167.1	\$8,188
Rolla	13,210.9	8,892.2	3,606.5	1,572.0	7,320.1	\$358,685
St. James	2,753.4	1,853.3	751.6	327.6	1,525.6	\$74,754
Pulaski County	25,286.8	17,020.5	6,903.2	3,009.1	14,011.4	\$686,559
Crocker	716.7	482.4	195.6	85.2	397.1	\$19,458
Dixon	1,003.7	675.5	274.0	119.4	556.1	\$27,249
Richland (all)	1,219.2	820.6	332.8	145.0	675.5	\$33,100
St. Robert	3,810.2	2,564.6	1,040.1	453.4	2,111.2	\$103,449
Waynesville	3,556.9	2,394.1	971.0	423.2	1,970.8	\$96,569
Washington County	14,239.2	9,584.4	3,887.3	1,694.4	7,889.9	\$386,605
Caledonia	86.8	58.4	23.6	10.3	48.0	\$2,352
Irondale	297.6	200.3	81.2	35.4	164.9	\$8,080
Mineral Point	232.7	156.6	63.5	27.6	128.9	\$6,316
Potosi	1,769.5	1,191.0	483.0	210.5	980.4	\$48,040
<b>TOTAL</b>	<b>128,339.4</b>	<b>86,383.8</b>	<b>33,944.9</b>	<b>19,331.5</b>	<b>71,110.9</b>	<b>\$3,484,435</b>

Source: MRPC Recycling Rate Survey and US EPA Materials Recovery Report 2013

Table 12 shows the estimated revenue for specific materials based on the total volume of the material in the waste stream, as well as the estimated revenue potential for materials collected at the national recycling rate (27.3 percent) and the estimated district recycling rate (11.9 percent). The materials selected to highlight include plastic, paper, glass, metal and textiles. This table clearly shows the potential for growth of recycling programs in the region and the estimated income that could be generated by marketable recovered materials. The potential revenue if all of these materials could be recovered is in excess of \$3.6 million.

**Table 12: Revenue for Recycled Materials in ORSWMD**

Material	Plastic	Paper	Glass	Metal	Textiles
Estimated % of MSW	17.26	33.62	5.44	6.04	4.73
Estimated Price for Recovered Material	\$.02 Per Pound	\$.005 Per Pound	\$1.56 Per Ton	\$.00975 Per Pound	\$.07 Per Pound
Total Est. Annual Tonnage Generated in ORSWMD	22,151.3	43,147.7	6,981.6	8,213.7	6,070.4
Annual Revenue Potential	\$886,052	\$1,725,908	\$10,891	\$160,167	\$849,856
Annual Tonnage Recycled at National Recycling Rate 27.3%	6,047.3	11,779.3	1,905.9	2,242.3	1,657.2
Annual Revenue Potential	\$241,892	\$117,793	\$2,973	\$43,725	\$232,008
Annual Tonnage ORSWMD Recycling Rate 11.9%	2,636.0	5,134.5	830.8	977.4	722.3
Annual Revenue Potential	\$105,440	\$51,345	\$1,296	\$19,059	\$101,122

Source: US EPA Materials Recovery Report 2013, 2008 Missouri DNR Waste Composition Study and MRPC Recycling Rate Survey

## Project Evaluation

The project was to be evaluated based on the completion of the report and distribution to member cities and counties and ORSWMD full council members, which was accomplished in October 2015. In reviewing the project, staff expressed regret that the final report was limited by the poor response to requests for information. Staff contacted other solid waste districts that had attempted similar studies, and found that they all reported the same frustration. Although good data was generally available from public sources, private entities either did not track the needed information or refused to share it. Although the study was constrained by these factors, it is believed that this report contains information that is useful for a number of planning applications and will be used for the Assessment Inventory and solid waste plan update.

## *Exhibits*

**Exhibit 1: EPA Collectors of Recyclables Sample Survey**

**Exhibit 2: List of Materials Included in Recycling Rate Study**

**Exhibit 3: Initial Survey of Solid Waste Collection and Disposal Companies; cities, Recycling Facilities, Organizations and Businesses**

**Exhibit 4: Cover Letter to Solid Waste Collection and Disposal Companies**

**Exhibit 5: Cover Letter to Recycling Facilities, Organizations and Businesses**

**Exhibit 6: Cover Letter to Cities**

**Exhibit 7: Revised Survey of Solid Waste Collection and Disposal Companies (to Include Cities)**

**Exhibit 8: Follow-up Cover Letter to Solid Waste Collection and Disposal Companies**

**Exhibit 9: Follow-up Cover Letter to Recycling Facilities, Organizations and Businesses**

**Exhibit 10: Follow-up Cover Letter to Cities**

**Exhibit 11: Recycling Study Worksheet**

## Exhibit 1: EPA Collectors of Recyclables Sample Survey

SURVEY FORM

1

# About This Form

## Collectors of Recyclables

*Use this form to collect information on the amount of recyclables collected from residential and commercial sources in your state or locality during the previous year.*

### Who Should Fill Out This Form:

- Private Recycling Haulers.
- Government Agencies with Collection Crews or Collection Contracts.
- Large Generators (e.g., Grocery Stores, Retail Chains, Government Facilities) that Self-Haul Directly to a Processor or End User.

### Important Tips:

1. Send a cover letter with the survey form explaining the purpose of the form and how to fill it out. Remember to specify which sections of the form you want respondents to complete and which sections are optional. Use the sample cover letters provided as guides for developing your own.
2. Send the glossary and standard volume-to-weight conversion factors to all respondents.
3. Before mailing the form and cover letter to respondents, write in the name of your state or locality, reporting period, due date, and return address in the spaces provided at the top of the form.
4. Fill in the name of your state or locality throughout the form where indicated.

Recycling Measurement

8/11/97

## Collectors of Recyclables

### To Be Completed by the Surveyor:

State or Locality: \_\_\_\_\_

Reporting Period: \_\_\_\_\_ to \_\_\_\_\_

Return This Form to: \_\_\_\_\_

Return This Form by: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

Direct All Questions to: Name \_\_\_\_\_ Telephone ( ) \_\_\_\_\_

### Respondent Information (please type or print clearly):

Name of Company or Government Agency: \_\_\_\_\_

Address: Street \_\_\_\_\_

City \_\_\_\_\_ Zip \_\_\_\_\_

Telephone: ( ) \_\_\_\_\_ FAX: ( ) \_\_\_\_\_

Name of Contact: \_\_\_\_\_

Title: \_\_\_\_\_

Are You a: ☐ Private Hauler ☐ Large Generator

☐ Government Agency With a Collection Crew or a Collection Contract

### Certification

I certify that, to the best of my knowledge, the information reported in this form is accurate and truthful.

\_\_\_\_\_  
Name and Title

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

1

SURVEY FORM

Recycling Measurement

2

8/11/97

## 1. Instructions

- ✓ Refer to the attached glossary for clarification of the terms used in this form.
- ✓ Report all quantities in tons (1 ton=2,000 pounds). Use the attached volume-to-weight conversion factors to convert your data from cubic yards (or other unit of measure) to tons. If you used these conversion factors to convert your data, indicate "yes" in the appropriate column. If you used other conversion factors, please identify the source in the comments section.
- ✓ Estimate the breakdown of residential and commercial materials to the best of your ability.
- ✓ Report any recyclables that were generated as a result of a natural disaster in Part 2B as construction and demolition (C&D) debris.
- ✓ Report only quantities collected during the reporting period stated above.

## 2. Recyclables Collection Data

**2A.** Municipal solid waste (MSW) recyclables collected from residential and commercial sources in \_\_\_\_\_ during the stated reporting period. Refer to the Scope of MSW Recycling table for specific examples of what to include as recycling.

2A. RECYCLABLE MATERIAL	Source of Recyclable Material				TOTAL (tons)
	Residential (tons)	Were EPA Conversion Factors Used?	Commercial (tons)	Were EPA Conversion Factors Used?	
<b>Commingled Materials</b> (describe in Comments section below)					
<b>Food Waste</b>					
<b>Glass Containers:</b>					
Clear					
Amber					
Green					
Mixed Glass					
Other Glass					
Subtotal Glass					
<b>Lead-Acid Batteries</b>					
<b>Metals:</b>					
Aluminum Cans					
Tin/Steel Cans					
Major Appliances					
Other Ferrous					
Other Nonferrous					
Mixed Metals					
Subtotal Metals					

2A. RECYCLABLE MATERIAL	Source of Recyclable Material				TOTAL (tons)
	Residential (tons)	Were EPA Conversion Factors Used?	Commercial (tons)	Were EPA Conversion Factors Used?	
<b>Paper:</b>					
Old Magazines					
Old Newspaper					
Old Corrugated Containers					
Office Papers					
Telephone Directories					
Mixed Paper					
Other Paper					
Subtotal Paper					
<b>Plastic:</b>					
PETE					
HDPE					
PVC					
LDPE					
PP					
PS					
Mixed Plastic					
Other Plastic					
Subtotal Plastic					
<b>Textiles</b>					
<b>Tires</b>					
<b>Wood:</b>					
Wood Packaging					
Other Wood					
Subtotal Wood					
<b>Yard Trimmings:</b>					
Brush and Branches					
Grass					
Leaves					
Tree Stumps					
Mixed Yard Trimmings					
Subtotal Yard Trimmings					

2A. RECYCLABLE MATERIAL	Source of Recyclable Material				TOTAL (tons)
	Residential (tons)	Were EPA Conversion Factors Used?	Commercial (tons)	Were EPA Conversion Factors Used?	
Other Recyclables:					
_____					
_____					
_____					
Subtotal Other Recyclables					
<b>TOTAL (tons)</b>					
Are any of the reported quantities estimates, i.e., guesses? If they are estimates, explain how they were determined below.					
Explanation of estimates/Comments: _____					
_____					
_____					

2B. Other types of recyclables collected from sources in \_\_\_\_\_  
state or locality  
 during the stated reporting period.

RECYCLABLE MATERIAL	Were EPA Conversion Factors Used?	AMOUNT RECEIVED (tons)
Agricultural Waste		
Automobile Bodies		
Combustion Ash		
<b>Construction and Demolition Debris:</b>		
Asphalt		
Concrete		
Metals		
Natural disaster debris		
Wood		
Other C&D		
<b>Industrial Process Waste</b>		
<b>Municipal Sewage Sludge</b>		
<b>Preconsumer Waste</b>		
<b>Used Oil</b>		
<b>Other</b> _____		
<b>TOTAL (tons)</b>		

Are any of the reported quantities estimates, i.e., guesses?  
 If they are estimates, explain how they were determined below.

Explanation of estimates: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## Exhibit 2: List of Materials Included in Recycling Rate Study

Abbreviation	Recycled Material
CC	Corrugated Cardboard/Kraft Paper
OP	Office Paper/Mixed Paper
M	Magazines
N	Newsprint
#2P	#2 Natural HDPE Plastic (Most Commonly Milk Jugs)
#1PN	#1 PETE Plastic (Including Soft Drink Bottles)
#1PC	#1 PETE Colored Plastic (Most Commonly Laundry Detergent Bottles, Bleach Bottles, Etc.)
PB	Plastic Product Bags
G	Glass
AC	Aluminum Cans
SC	Steel/Tin Cans
HHW	Household Hazardous Waste
YW	Yard Waste
HA	Household Appliances
EW	Electronic Waste
MO	Used Motor Oil
OM	Other Metals
LAB	Lead-Acid Batteries (Typically Vehicle Batteries)
OB	Other Batteries (Typically Household-Use, Electronics Batteries)
UT	Used Tires

Exhibit 3: Initial Survey of Solid Waste Collection and Disposal Companies; cities, Recycling Facilities, Organizations and Businesses

Survey of Materials Being Recycled in the Ozark Rivers Solid Waste Management District

Company Name: \_\_\_\_\_ Contact Person: \_\_\_\_\_

Address: \_\_\_\_\_ Telephone: \_\_\_\_\_ Email: \_\_\_\_\_

Please keep my company name and contact information confidential. ☐ Yes ☐ No

Type of Material: <i>Please see list of Recyclables</i>	If you track volumes, please indicate amounts below:	Please state what unit of measurement is being used (pounds, tons, cubic yards, etc.)	Daily, weekly, monthly, quarterly, or annual basis?	If you do not track volumes of materials, please provide your best estimate.	Do you process and use the material on-site or is it shipped elsewhere?	If it is shipped elsewhere, where does it go? (If you sell to multiple end-users/brokers, please list all)	Do you know what the material is recycled/ repurposed into?	Comments:
Example: <i>Cardboard</i>	40	tons	Per year			Picked up by <i>Axel Paperstock</i>	Recycled into <i>cardboard</i>	
Example: <i>Plastic film &amp; bags</i>	3	tons	Per year			Sold to Apex <i>Plastics Brokers</i>	Recycled into film	

Company Name: _____								
Type of Material (i.e. #1 plastic, newsprint, corrugated cardboard, motor oil, etc.)	If you track volumes, please indicate amounts below:	Please state what unit of measurement is being used (pounds, tons, cubic yards, etc.)	Daily, weekly, monthly, quarterly, or annual basis?	If you do not track volumes of materials, please provide your best estimate.	Do you process and use the material on-site or is it shipped elsewhere?	If it is shipped elsewhere, where does it go? (If you sell to multiple end-users/brokers, please list all)	Do you know what the material is recycled/repurposed into?	Comments:

## Exhibit 4: Cover Letter to Solid Waste Collection and Disposal Companies

### MEMORANDUM

TO: Solid Waste Collection and Disposal Companies in the Ozark Rivers Solid Waste Management District

FROM: Tammy Snodgrass, Assistant Director/Environmental Programs Manager,  
Meramec Regional Planning Commission

DATE: January 16, 2015

SUBJECT: Recycling Rate Study for the Ozark Rivers Solid Waste Management District

I am writing today to ask for your assistance in gathering data on the volumes and types of materials being recycled in the Ozark Rivers Solid Waste Management District (ORSWMD). The district includes the counties of Crawford, Dent, Gasconade, Maries, Phelps, Pulaski and Washington. The Meramec Regional Planning Commission (MRPC) is contacting all of the companies and/or organizations that might accept recyclables from any of those seven counties. As some solid waste collection and disposal companies also do recycling, we are including the waste haulers in our survey. If your company does not participate in any recycling activities, you may simply make that notation on the enclosed survey and return it in the envelope provided.

MRPC is working with the ORSWMD to gather data on the volumes and types of materials being recycled in our region. We are collecting information in an attempt to establish a recycling baseline for our region. This information will help the district gauge the success of local recycling programs and assist the district in future planning. If you have questions or concerns regarding the data being collected, or wish to have your information kept confidential, please contact us and we will be happy to insure that your business/organization name will not be released.

We are collecting data specific to the ORSWMD. If you collect materials from outside this seven-county area, and do not track your material by county, we would ask that you try to estimate what you are collecting from just our seven counties. Attached is a spreadsheet with questions regarding the materials that you may collect. If you already have a spreadsheet that includes the same information, you may forward that document instead.

Please complete the following information and return the survey to us no later than February 9, 2015. Again, thank you for your assistance. If you have questions or concerns, please contact me at (573) 265-2993, extension 104 or via email at [tsnodgrass@meramecregion.org](mailto:tsnodgrass@meramecregion.org).

TS

Enclosures

## Exhibit 5: Cover Letter to Recycling Facilities, Organizations and Businesses

### MEMORANDUM

TO: Recycling Facilities, Organizations and Businesses in the Ozark Rivers Solid Waste Management District

FROM: Tammy Snodgrass, Assistant Director/Environmental Programs Manager, Meramec Regional Planning Commission

DATE: January 16, 2015

SUBJECT: Recycling Rate Study for the Ozark Rivers Solid Waste Management District

I am writing today to ask for your assistance in gathering data on the volumes and types of materials being recycled in the Ozark Rivers Solid Waste Management District (ORSWMD). The district includes the counties of Crawford, Dent, Gasconade, Maries, Phelps, Pulaski and Washington. The Meramec Regional Planning Commission (MRPC) is contacting all of the companies and/or organizations that might accept recyclables from any of those seven counties.

MRPC is working with the ORSWMD to gather data on the volumes and types of materials being recycled in our region. We are collecting information in an attempt to establish a recycling baseline for our region. This information will help the district gauge the success of local recycling programs and assist the district in future planning. If you have questions or concerns regarding the data being collected, or wish to have your information kept confidential, please contact us and we will be happy to insure that your business/organization name will not be released.

We are collecting data specific to the ORSWMD. If you collect materials from outside this seven-county area, and do not track your material by county, we would ask that you try to estimate what you are collecting from just our seven counties. Attached is a spreadsheet with questions regarding the materials that you may collect. If you already have a spreadsheet that includes the same information, you may forward that document instead.

Please complete the following information and return the survey to us no later than February 9, 2015. Again, thank you for your assistance. If you have questions or concerns, please contact me at (573) 265-2993, extension 104 or via email at [tsnodgrass@meramecregion.org](mailto:tsnodgrass@meramecregion.org).

TS

Enclosures

**Exhibit 6: Cover Letter to Cities**

**MEMORANDUM**

**TO:** Cities in the Ozark Rivers Solid Waste Management District

**FROM:** Tammy Snodgrass, Assistant Director/Environmental Programs Manager,  
Meramec Regional Planning Commission

**DATE:** January 16, 2015

**SUBJECT:** Recycling Rate Study for the Ozark Rivers Solid Waste Management District

Meramec Regional Planning Commission (MRPC) would appreciate your assistance in providing input on a recycling rate study that the Ozark Solid Waste Management District (ORSWMD) has funded. MRPC is working with the ORSWMD to gather data on the volumes and types of materials being recycled in our region. We are collecting information in an attempt to establish a recycling baseline for our region. This information will help the district gauge the success of local recycling programs and assist the district in future planning.

Attached is a survey form that has been developed to collect information from the cities located in the solid waste district. On this form, cities are requested to provide information on the recycling programs available to your residents. If you operate your own recycling programs, the survey form includes sections for you to provide information on the types and amounts of materials you collect. We are also gathering information on any companies providing recycling services within your community and we are requesting your help in identifying these businesses. We will be reaching out to these businesses to obtain collection rates from them in order to help us determine a recycling rate for your city that is accurate and complete.

Please complete the following information and return the survey form to MRPC no later than February 9, 2015. If you have questions or concerns, please contact me at (573) 265-2993 or via email at [tsnodgrass@meramecregion.org](mailto:tsnodgrass@meramecregion.org). I thank you sincerely for your assistance as we work to gather information on the recycling opportunities and programs offered and available in your community and throughout the MRPC region and the Ozarks Rivers Solid Waste Management District.

TS

Enclosures

## Exhibit 7: Revised Survey of Solid Waste Collection and Disposal Companies (to Include Cities, Organizations and Businesses)

### Survey of Materials Being Recycled in the Ozark Rivers Solid Waste Management District

We Provide Recycling Opportunities to Businesses and Individuals Located in the Following Cities Within the Ozarks Rivers Solid Waste Management District:					
Argyle	Doolittle	Mineral Point	St. James		
Belle	Edgar Springs	Morrison	St. Robert		
Bland	Freeburg	Newburg	Steelville		
Bourbon	Gasconade	Owensville	Sullivan		
Caledonia	Hermann	Potosi	Vienna		
Chambers	Irondale	Richland	Waynesville		
Crocker	Leasburg	Rolla	Westphalia		
Cuba	Linn	Rosebud			
Dixon	Meta	Salem			

The Following Materials Are Included in Ozarks Rivers Solid Waste Management District Recycling Rate Study:	
Abbreviation	Recycled Material
CC	Corrugated Cardboard/Kraft Paper
OP	Office Paper/Mixed Paper
M	Magazines
N	Newsprint
#2P	#2 Natural HDPE Plastic (Most Commonly Milk Jugs)
#1PN	#1 PETE Plastic (Including Soft Drink Bottles)
#1PC	#1 PETE Colored Plastic (Most Commonly Laundry Detergent Bottles, Bleach Bottles, Etc.)
PB	Plastic Product Bags
G	Glass
AC	Aluminum Cans
SC	Steel/Tin Cans
H-W	Household Hazardous Waste
YW	Yard Waste
HA	Household Appliances
EW	Electronic Waste
MO	Used Motor Oil
OM	Other Metals
LAB	Lead-Acid Batteries (Typically Vehicle Batteries)
OB	Other Batteries (Typically Household-Use, Electronics Batteries)
UT	Used Tires

## Survey of Materials Being Recycled in the Ozark Rivers Solid Waste Management District

Company Name: _____		Contact Person: _____						
Address: _____		Email: _____						
Please keep my company name and contact information confidential. <input type="checkbox"/> Yes <input type="checkbox"/> No								
Type of Material (i.e. #1 plastic, newsprint, corrugated cardboard, motor oil, etc.)	If you track volumes, please indicate amounts below:	Please state what unit of measurement is being used (pounds, tons, cubic yards, etc.)	Daily, weekly, monthly, quarterly, or annual basis?	If you do not track volumes of materials, please provide your best estimate.	Do you process and use the material on-site or is it shipped elsewhere?	If it is shipped elsewhere, where does it go? (If you sell to multiple end-users/brokers, please list all)	Do you know what the material is recycled/repurposed into?	Comments:
Example: Office paper	15	tons	Per year			Picked up by Apex Paperstock	Recycled into cardboard & paper	

Company Name: _____								
Type of Material (i.e. #1 plastic, newsprint, corrugated cardboard, motor oil, etc.)	If you track volumes, please indicate amounts below:	Please state what unit of measurement is being used (pounds, tons, cubic yards, etc.)	Daily, weekly, monthly, quarterly, or annual basis?	If you do not track volumes of materials, please provide your best estimate.	Do you process and use the material on-site or is it shipped elsewhere?	If it is shipped elsewhere, where does it go? (If you sell to multiple end-users/brokers, please list all)	Do you know what the material is recycled/repurposed into?	Comments:

## Survey of Materials Being Recycled in the Ozark Rivers Solid Waste Management District

City: \_\_\_\_\_ Contact Person: \_\_\_\_\_

Address: \_\_\_\_\_ Telephone: \_\_\_\_\_ Email: \_\_\_\_\_

Our city does offer recycling programs to our residents. Yes ☐ No ☐ *If yes, please complete the entire survey.*

Our city does offer solid waste collection services to our residents. Yes ☐ No ☐

Our city does not provide solid waste collection services and/or recycling services to our residents. These services are provided by the following company/companies:

Solid Waste Collection/Recycling Company	Contact/Address if Known	Please specify services provided that may include: curbside collection, drop-off collection, recycling (to include types of materials accepted)

Other recycling services/opportunities are offered by the following businesses in our community:

Business	Contact/Address if Known	Types of Recyclables Collected/Accepted

*Please add another page if necessary to include all items collected/accepted.*

## Exhibit 8: Follow up Letter to Solid Waste Collection and Disposal Companies

### MEMORANDUM

TO: Solid Waste Collection and Disposal Companies in the Ozark Rivers Solid Waste Management District

FROM: Tammy Snodgrass, Assistant Director/Environmental Programs Manager,  
Meramec Regional Planning Commission

DATE: March 30, 2015

SUBJECT: Recycling Rate Study for the Ozark Rivers Solid Waste Management District

Meramec Regional Planning Commission (MRPC) would appreciate your assistance in providing input on a recycling rate study that the Ozark Solid Waste Management District (ORSWMD) has funded. MRPC is working with the ORSWMD to gather data on the volumes and types of materials being recycled in our region. We are collecting information in an attempt to establish a recycling baseline for our region. This information will help the district gauge the success of local recycling programs and assist the district in future planning. If your company does not participate in any recycling activities, you may simply make that notation on the enclosed survey and return it.

Attached is a survey form that has been developed to collect information from the solid waste collection and disposal companies and cities located in the solid waste district. On this form, you are requested to provide information on the recycling programs available to your customers. The survey form includes sections for you to provide information on the types and amounts of materials you collect.

**Please complete the following information and return the survey form to MRPC no later than April 15, 2015.** If you have questions or concerns, please contact Candace Connell at (573) 263-8651 or via email at [cconnell@wavecomputers.net](mailto:cconnell@wavecomputers.net). You can also contact me directly at (573) 265-2993, extension 104 or via email at [tsnodgrass@meramecregion.org](mailto:tsnodgrass@meramecregion.org). I thank you sincerely for your assistance as we work to gather information on the recycling opportunities and programs offered and available in your community and throughout the MRPC region and the Ozarks Rivers Solid Waste Management District.

TS

Enclosures

**Exhibit 9: Follow-up Cover Letter to Recycling Facilities, Organizations and Businesses**

**MEMORANDUM**

TO: Companies Located in the Ozark Rivers Solid Waste Management District that Provide Recycling Opportunities

FROM: Tammy Snodgrass, Assistant Director/Environmental Programs Manager,  
Meramec Regional Planning Commission

DATE: March 30, 2015

SUBJECT: Recycling Rate Study for the Ozark Rivers Solid Waste Management District

I am writing today to ask for your assistance in gathering data on the volumes and types of materials being recycled in the Ozark Rivers Solid Waste Management District (ORSWMD). The district includes the counties of Crawford, Dent, Gasconade, Maries, Phelps, Pulaski and Washington. The Meramec Regional Planning Commission (MRPC) is contacting all of the companies and/or organizations that might accept recyclables from individuals, businesses or cities located in any of those seven counties. If your company does not participate in any recycling activities, you may simply make that notation on the enclosed survey and return it in the envelope provided.

MRPC is working with the ORSWMD to gather data on the volumes and types of materials being recycled in our region. We are collecting information in an attempt to establish a recycling baseline for our region. This information will help the district gauge the success of local recycling programs and assist the district in future planning. If you have questions or concerns regarding the data being collected, or wish to have your information kept confidential, please note this on the survey form. We will insure that any request for confidentiality will be honored.

We are collecting data specific to the ORSWMD. If you collect materials from outside this seven-county area, and do not track your material by county, we would ask that you try to estimate what you are collecting from just our seven counties. Attached is a spreadsheet with questions regarding the area that you provide recycling opportunities to and the materials that you collect. If you already have a spreadsheet that includes the same information, you may forward that document instead.

We greatly appreciate your time and contribution to this recycling rate study. **We ask that you complete the following information and return the survey to us by April 15, 2015.** You can also scan the completed survey and email to Candace Connell at her email address provided below. If you have questions or concerns, please contact Candace Connell at (573) 263-8651 or via email at [cconnell@wavecomputers.net](mailto:cconnell@wavecomputers.net). You can also contact me directly at (573) 265-2993, extension 104 or via email at [tsnodgrass@meramecregion.org](mailto:tsnodgrass@meramecregion.org). Again, thank you for your assistance.

TS  
Enclosures

## Exhibit 10: Follow Up Cover Letter to Cities

### MEMORANDUM

TO: Cities in the Ozark Rivers Solid Waste Management District

FROM: Tammy Snodgrass, Assistant Director/Environmental Programs Manager,  
Meramec Regional Planning Commission

DATE: March 30, 2015

SUBJECT: Recycling Rate Study for the Ozark Rivers Solid Waste Management District

Meramec Regional Planning Commission (MRPC) would appreciate your assistance in providing input on a recycling rate study that the Ozark Solid Waste Management District (ORSWMD) has funded. MRPC is working with the ORSWMD to gather data on the volumes and types of materials being recycled in our region. We are collecting information in an attempt to establish a recycling baseline for our region. This information will help the district gauge the success of local recycling programs and assist the district in future planning.

Attached is a survey form that has been developed to collect information from the cities located in the solid waste district. On this form, cities are requested to provide information on the recycling programs available to your residents. If you operate your own recycling programs, the survey form includes sections for you to provide information on the types and amounts of materials you collect. We are also gathering information on any companies providing recycling services within your community and we are requesting your help in identifying these businesses. We will be reaching out to these businesses to obtain collection rates from them in order to help us determine a recycling rate for your city that is accurate and complete.

Please complete the following information and return the survey form to MRPC no later than April 15, 2015. If you have questions or concerns, please contact Candace Connell at (573) 263-8651 or via email at [cconnell@wavecomputers.net](mailto:cconnell@wavecomputers.net). You can also contact me directly at (573) 265-2993, extension 104 or via email at [tsnodgrass@meramecregion.org](mailto:tsnodgrass@meramecregion.org). I thank you sincerely for your assistance as we work to gather information on the recycling opportunities and programs offered and available in your community and throughout the MRPC region and the Ozarks Rivers Solid Waste Management District.

TS

Enclosures

## Exhibit 11: Recycling Study Worksheet

[illegible]



[illegible]



[illegible]

