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# Business Recycling Requirement Evaluation

July 2013



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## EXECUTIVE SUMMARY

In September 2008, the Metro Council adopted Ordinance 08-1200 to amend Metro Code and establish the Business Recycling Requirement (BRR) for local governments in the region. At that time, staff made a commitment to evaluate BRR in three years.

To evaluate the implementation practices and impacts/outcomes of BRR, Resource Conservation & Recycling staff looked at local jurisdictions' implementation of BRR, a survey of area business practices and a waste composition study.

An examination of local government implementation activities showed that local jurisdictions used a variety of approaches to fulfill their requirements around business notification and have not yet engaged in any enforcement.

A survey of area businesses found that almost all businesses have onsite collection systems in place to collect the BRR-required materials; these businesses also reported a solid knowledge of the BRR requirements.

Lastly, the waste composition study noted a lower percentage of recyclables in the commercial waste stream.

The following report goes into greater detail about these findings and includes recommendations for next steps.

## INTRODUCTION

The report measures outputs, such as number of businesses notified, number of businesses that responded and number of enforcement actions. It considers outcomes, such as the ability to recycle BRR materials, availability of containers and signage, and awareness of BRR. Lastly, it considers impacts, such as changes in the composition of business waste disposed.

This report describes how the program was implemented by local governments. Local governments were required to:

- Adopt the requirements through local code.
- Notify businesses within their jurisdiction of their responsibilities.
- Establish a compliance program.
- Report annually to Metro.

This report also describes a survey of local businesses that assessed respondents' knowledge of which materials were recycled at their businesses and their awareness of the regional Recycle at Work program. The survey also asked whether a business started recycling because of the mandatory requirements and how difficult it was to implement mandatory recycling.

Finally, a commercial waste composition study and capture rate analysis looked to assess the possible impacts BRR has had on the commercial waste stream. Findings are summarized in each section of this report with an overall summary and recommendations at the end of the report.

## BACKGROUND

After a long period of research, planning and stakeholder consultation, Metro Council adopted an ordinance in 2008 to increase business recovery in the Metro region.

For more than 20 years, Metro has worked with the 25 cities and three counties in the Portland metropolitan area to increase recycling and waste prevention and to meet state-mandated and Regional Solid Waste Management Plan recovery goals.

By the late 1990s, the foundations of residential recycling in the Metro region were well laid, but overall recovery had stalled – the low-hanging fruit had been picked. With the goal of boosting regional recovery, a working group of Metro and local government solid waste managers and directors met over several months to develop a corrective action approach, which included an analysis of the materials remaining in the regional waste stream.

The plan, which became known as the Waste Reduction Initiatives, focused on sectors with rich streams of discrete recoverable materials – construction and demolition, commercial organics and business recyclables. Metro and local government staff then developed targeted programs for each of those sectors.

Since 1999, Metro and local governments have provided a free education and technical assistance program to businesses. Through the Recycle at Work (RAW) program, Metro and local jurisdictions send recycling specialists to businesses to help them start or improve their recycling and waste prevention efforts.

Research on business recovery programs in other jurisdictions in the U.S. and Canada found that effective business recovery efforts relied on onsite technical assistance. This finding was reinforced in a survey of Metro-region businesses, which found they preferred that approach, too.

Onsite technical assistance, plus increased education and outreach, was implemented in the 2000-01 fiscal year. Through the Recycle at Work (RAW) program, Metro and local jurisdictions send recycling specialists, housed in their respective jurisdiction, to businesses to help them start or improve their recycling and waste prevention efforts. The RAW program did lead to greater recovery over time, but by mid-2003, it was clear that the region would be unable to meet its state-mandated recovery goals without additional tools because businesses were still throwing away 100,000 tons per year of recoverable paper and containers.

A Metro-local government-business-citizen group met for five months in 2003; its charge was to identify ways of increasing recovery across all three focus areas (construction and demolition, commercial organics and business recyclables), clarify roles and responsibilities, determine feasibility and recommend a contingency plan to Metro Council.

The group's primary recommended strategy for increasing recovery in the business sector was to require local governments to adopt mandatory business recycling requirements for specific materials, coupled with additional limited-duration funding from Metro to local governments to expand assistance and outreach to businesses.

Metro Council directed staff to devote resources initially toward increased education and outreach and to undertake extensive stakeholder consultation with the region's solid waste and recycling community, as well as local business groups and local elected officials. From 2003 to 2006, more than 1,000 people provided advice on approaches to increase business recycling.

The Metro Council, after considering the costs and benefits of potential approaches, directed staff to develop a required business recycling program.

Between February and May 2008, Metro met with local business groups and elected officials for their input on a possible required recycling ordinance for businesses. The BRR program and stakeholder feedback were presented to the Metro Policy Advisory Committee and the Solid Waste Advisory Committee between May and July 2008. Both advisory committees voted in favor of adopting the program. Metro Council formally adopted BRR in September 2008. Local governments adopted mandatory business recycling ordinances between late 2008 and early 2010.

BRR directed local governments to require businesses to do the following:

- Source separate all recyclable paper, cardboard, glass and plastic bottles and jars, and aluminum and steel cans for reuse and recycling.
- Provide recycling containers for internal maintenance or work areas where recyclable materials may be collected and/or stored.
- Post signs where recyclable materials are collected, stored or both that identify the materials that the business must source separate for reuse or recycling and that provide recycling instructions to employees.

To implement the program, all local governments in the region were required to adopt the recycling requirements through local code, notify their businesses, establish a compliance program and report annually to Metro. Local jurisdictions had the option of developing their own local code language or using model code provided by Metro; some jurisdictions chose to incorporate the requirement into their business licensing program. Local governments that adopted the requirements were eligible for supplemental funding from Metro to help support additional education and technical assistance over a four-year period. Funding allocations were based upon the number of employees in the jurisdiction and were used for direct business assistance and resources, education and compliance.

Local jurisdictions with fewer than 25 businesses and fewer than 100 people employed by those businesses were exempt from the requirements, which relieved the administrative burden of enacting an ordinance for small cities with very few businesses. The businesses in these communities continue to have access to commercial recycling collection services and Recycle at Work.

## Program elements

The program requires local businesses to recycle all types of paper and certain containers, such as plastic bottles, aluminum cans and glass; provide recycling containers; and post signage with recycling instructions. Because most businesses already recycle, this requirement simply formalizes existing practices. Businesses that do not currently recycle are asked to recycle the same items residents already recycle at home. And to help businesses recycle, local governments will continue providing education and technical assistance services through RAW.

Table 1

Jurisdiction	BRR Compliant	Adoption Date	Jurisdiction	BRR Compliant	Adoption Date
<b>Banks</b>	No	No	Lake Oswego	Yes	4/13/2009
<b>Barlow</b>	Yes	Covered under Clackamas County ordinance	Maywood Park	Exempt	Exempt
Beaverton	Yes	4/1/2009	Milwaukie	Yes	2/17/2009
<b>Canby</b>	Yes	11/18/2009	<b>Molalla</b>	Yes	2/11/2009
Clackamas County	Yes	7/9/2009	Multnomah County	No (In process)	No
Cornelius	Yes	2/9/2009	<b>North Plains</b>	No	No
Damascus	No	No	Oregon City	Yes	7/15/2009
Durham	Yes	2/24/2009	Portland	Yes	4/30/2008
<b>Estacada</b>	No	No	Rivergrove	Exempt	Exempt
Fairview	Yes	7/1/2009	<b>Sandy</b>	Yes	5/6/2013
Forest Grove	Yes	5/26/2009	Sherwood	Yes	12/1/2009
<b>Gaston</b>	No	No	Tigard	Yes	4/28/2009
Gladstone	Yes	12/9/2008	Troutdale	No	No
Gresham	Yes	4/15/2009	Tualatin	Yes	3/19/2009
Happy Valley	Yes	Covered under Clackamas County ordinance	Washington County	Yes	2/16/2010
Hillsboro	Yes	3/3/2009	West Linn	Yes	2/23/2009
Johnson City	Exempt	Exempt	Wilsonville	Yes	5/18/2009
King City	Yes	4/1/2009	Wood Village	Yes	2/24/2009

\*bold represents jurisdictions in the Metro watershed but outside Metro's political boundaries

## LOCAL GOVERNMENT IMPLEMENTATION

### Notification

Metro's BRR was not prescriptive in how or what should be included in code adopted by jurisdictions, other than identifying four major components required of any jurisdiction: All jurisdictions must notify businesses about the requirement, the recyclable material to be included in the requirement to recycle, and the obligation to provide containers and signage. In addition, jurisdictions were required to identify an enforcement protocol and report to Metro annually.

To allow maximum flexibility around local government notification, Metro code did not dictate how notification should be conducted.

Notification approach included mailings, use of business licenses, haulers, media, Community Environmental Services (CES) of Portland State University conducting door-to-door outreach, and other in-person visits.

Damascus and Troutdale are the only jurisdictions in Metro's boundary that have not adopted BRR. RAW funding has been held from these two jurisdictions since FY 11-12.

### Beaverton

In 2009, the City of Beaverton used an initial letter to notify businesses of new recycling requirements. This was followed up with two additional mailings that included a recycling tool kit, a resource order form and a list of five Best Management Practices (BMPs) for implementing the city's business recycling requirements. Visits from recycling specialists were targeted at specific geographic areas of the city as well as at businesses that had not responded to the earlier mailings.

In 2011, Metro hired CES to conduct the RAW annual outreach campaign. Beaverton used this as an opportunity to recruit new businesses to the program and also to target areas with lower response rates on BRR notification.

Beaverton is still engaged in direct communication with businesses around their recycling requirements, and includes a flyer about RAW and BRR in all new business license packets.

### Clackamas County

Cities in Clackamas County work with the county through a cooperative agreement to provide RAW (and other solid waste and recycling) services. Money allocated to jurisdictions from Metro to implement RAW and BRR goes to the county, which provides those services to 13 cities and unincorporated Clackamas County. Adoption of BRR by Clackamas County cities and the county took place over much of 2009.

The BRR notification process consisted of mailing packets to businesses operating in unincorporated Clackamas County as well as within the Clackamas County BRR-compliant cities. The notification packet consisted of a cover letter indicating the adoption of the ordinance, a flyer about free assistance offered through RAW and a postcard to return to the County showing compliance. Clackamas County used the

cities' business licenses to generate a list to receive notification packets starting in 2009; where these lists didn't exist, the county used state employment data and purchased a list from Metro Presort for unincorporated Clackamas. A second letter was sent to those businesses that did not respond to the first notification letter. Onsite cold visits were made to those businesses that did not respond to the two notifications to ensure they met the BRR requirements.

Clackamas County also used the RAW annual outreach work conducted by CES to target areas of unincorporated Clackamas County where response rates to notification were low.

Ongoing notification will be included through cities' business licensing process. Work is also being done with the county's haulers to notify businesses, and RAW recycling specialists continue making businesses aware of the requirements through RAW program services.

### **Gresham**

The City of Gresham used its business license database to generate a list of businesses to receive notification letters. The initial notification letter informed businesses of the new recycling requirements; city staff developed a follow-up approach, depending on the number of employees in a business. For businesses with fewer than 20 employees, a tool kit that included five commercial recycling BMPs was provided and assistance was offered, if needed. Businesses with 20 to 79 employees also received the tool kit and a follow-up phone call. For businesses with more 80 or more employees, a special letter was drafted that offered RAW assistance; a follow-up call was made to make sure practices were in place to meet the new requirements and to offer further RAW assistance. This process confirmed that 16% of Gresham's businesses were in compliance with the requirements; business compliance will continue to be verified through RAW technical assistance.

### **Portland**

The City of Portland was the only jurisdiction in the Metro region with mandatory business recycling before Metro adopted BRR. Portland's 1996 ordinance required Portland businesses to recycle 50 percent of their generated waste. When Portland revised its code in 2009, this increased to 75 percent. To notify businesses of the changes in recycling requirements due to BRR, Portland mailed letters to all of its businesses. Businesses were identified as large and small generators, with large generating more than 50 tons of paper each year and small fewer than 50 tons of paper. Letters to large generators were followed up with a phone call to offer assistance; small generators were directed to online resources. For small-generator businesses, follow-up assistance was by request.

Another method of notification Portland used was an outreach campaign. This included presentations and offers of assistance to business organizations, such as the Building Owners and Managers Association, Small Business Advisory Council and Portland Business Alliance, to help their members comply. Portland also placed ads on TriMet busses and in the Portland Tribune and The Oregonian, and on OregonLive.com. Portland also worked with its haulers on a voluntary basis to notify businesses, which resulted in the delivery of 22,000 education tool kits printed in six languages.

The education tool kit included five BMPs and a "Report Card" that confirmed a business as certified based on the city's requirements, as incomplete or with no report submitted. In 2010, Portland hired

CES to evaluate the five BMPs and their relationship to how a business performed in its recycling rate at that particular business. This study resulted in Portland dropping its five BMPs, discontinuing its recognition program of BRR-compliant businesses and moving to compliance verification that was easily done visually by RAW staff. The final change that resulted from the study was removing waste prevention as a required action.

### Washington County

Washington County has cooperative agreements with the cities of Banks, Cornelius, Durham, Forest Grove, Hillsboro, King City, North Plains, Sherwood, Tigard and Tualatin to provide outreach and education assistance to the businesses in these jurisdictions.

Several cities in the county’s cooperative elected to initially contract with CES to conduct the first round of outreach and BRR notification prior to Washington County adopting BRR. These cities included Cornelius, Durham, Forest Grove, Hillsboro and Tualatin. CES used a combination of business license addresses, hauler lists and state employment data to notify the businesses within these five cities. A brochure that included five BMPs to help businesses start recycling programs and comply with the requirements was delivered to businesses by mail and handed out during site visits.

Following Washington County’s adoption of BRR in early 2010, county staff coordinated and conducted BRR assistance and outreach on behalf of cooperative city members, with the exception of Tualatin and Tigard, which elected to continue to receive their supplemental BRR funds directly. The initial focus for Washington County was to notify businesses within the unincorporated areas of the county.

Notification letters alerting unincorporated county businesses to the new requirements were sent to over 3,500 businesses based on a mailing list purchased from Metro Presort. The county also launched a media campaign through the KGW website and the Hillsboro Argus newspaper, which drove businesses to a web page dedicated to BRR.

Washington County staff conducted site visits and directly reached more than 1,200 businesses (see

Figure 1.) In addition to print, web and in-person notification, Washington County offered five

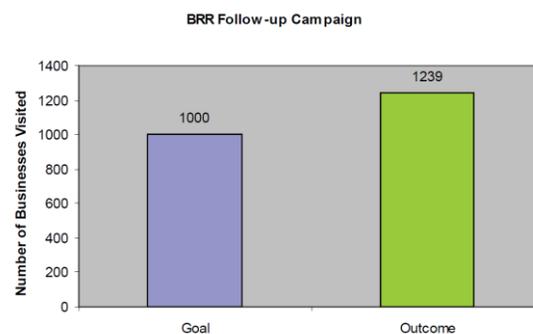


Figure 1

workshops, four in English and one in Spanish, to provide businesses with recycling and waste prevention strategies and to inform them of the requirements. These workshops were conducted in collaboration with the City of Hillsboro, Hillsboro Chamber of Commerce, Virginia Garcia Memorial Health Center and Adelante Mujeres.

In 2011 Washington County collaborated with haulers to provide assistance to businesses without recycling service. Another component of the county's BRR outreach campaign was a mailing to 7,500 businesses identifying available resources— 330 businesses responded and the county continues to receive requests for materials and assistance from this outreach.

### **Resources Developed**

The RAW program continued to provide containers and posters to businesses to assist in setting up recycling programs, as it had before BRR was adopted. Many jurisdictions also developed additional resources that could be mailed or used by recycling specialists to assist businesses in complying with the recycling requirements. Appendix A lists materials created to inform and educate businesses on BRR by jurisdiction.

### **Enforcement**

Below is a summary of the jurisdictions' enforcement protocols. To date, no jurisdiction has taken enforcement action against a business. Further descriptions of each jurisdiction's enforcement protocol are in Appendix B.

**Beaverton** has language in its code on enforcement, but is also finalizing in-person notifications with all businesses, so elected officials will be more comfortable with issuing fines for non-compliant businesses.

**Clackamas County** has established a protocol of notification to non-compliant businesses and fines that, if uncorrected, would lead to court.

**Gresham** has established enforcement through the city's ability to levy civil penalties.

**Portland** has an enforcement protocol that was developed collaboratively with the Recycle at Work Program and the Bureau of Planning and Sustainability, Solid Waste and Recycling enforcement staff. Staff shadowed both the assistance and inspection visits to inform an inspection strategy.

**Washington County's** BRR is enforced through a complaint-driven system, which is consistent with the code enforcement process of the Washington County Solid Waste and Recycling Program.

### **Local Jurisdiction Feedback**

In the course of this evaluation, local jurisdictions were asked to comment on successes and challenges in implementing BRR. The following summarizes those comments, primarily around themes rather than by jurisdiction.

Most businesses were receptive to the requirement and the assistance provided to help them comply. Surveys were conducted by both CES and Washington County staff doing door-to-door outreach to

businesses. They found that 96 to 97 percent of businesses either were very positive or neutral about the notification and assistance received; only 3 to 4 percent of businesses had a negative reaction.

Jurisdictions noted that when mailed notification made it to the correct person at businesses, he or she found the information very helpful. Jurisdictions also mentioned that a secondary benefit of their efforts was strengthening their relationships with cities and haulers through additional communication and coordination regarding the BRR requirements.

Local government recycling specialists found BRR a useful tool in communicating with businesses that might not necessarily be eager to adopt recycling activities. It also helped when specialists worked with businesses onsite, because the requirement meant businesses had an interest in finding out more about what they needed to do to comply.

All the jurisdictions found that mailings weren't the most productive way of getting the message to businesses about the requirement. Response rates to the mailings in general were low, with many returned letters. This was especially true with businesses with large numbers of employees because the mailing may never have gotten to the correct person.

Jurisdictions noted that the requirement to recycle glass containers posed a challenge for their recycling specialists, because many businesses don't generate much or any glass and therefore don't see a need to collect it.

Messaging to businesses around the requirements was easy within jurisdictions, but in cases where there were multi-jurisdiction businesses and/or a corporate structure outside the region, the message was more difficult to deliver. As a result, the Metro-local government Business Recovery Work Group is working on ways to better coordinate RAW assistance with these types of businesses.

Based on stakeholder input, Metro chose to take a non-prescriptive approach to how jurisdictions adopted BRR. Although jurisdictions felt this gave them flexibility, it also resulted in different jurisdictional requirements and messaging that made it difficult to create a consistent message across the region. In particular, many jurisdictions developed different BMPs, and tracking requirements also varied.

Although all the jurisdictions acknowledge the need for enforcement, they also recognize that in the current business and political climate, enforcement actions may be difficult to undertake, because elected officials don't want to be viewed as anti-business.

## **Conclusions**

In implementing BRR, jurisdictions took varied approaches, but all used mail notification supplemented with some sort of follow-up. Staggered adoption by jurisdictions also led to variation in approach and tools and resources developed. Metro developed an approach that allowed for flexibility in adoption. Variation was a predictable element that was weighed for the benefit of making BRR more palatable for local jurisdictions to adopt. In general, in-person notification had the best results, but with the costs associated with in-person notification, mailings worked reasonably well as an alternative. All reported general ease in rolling out BRR once it was adopted in their jurisdictions, with minimal associated problems.

To date there have been no enforcement actions, which may limit the effectiveness of the recycling requirements. Some businesses still do not recycle some materials. When identified, these businesses have been informed of the BRR requirements. It has been difficult to work with businesses that have locations in multiple jurisdictions. And, because all jurisdictions have different enforcement protocols, it is difficult to create a regional message about compliance.

## SURVEY OF METRO AREA BUSINESSES

### Methodology

A telephone survey, which basically replicated a baseline survey conducted in 2007, was conducted to measure changes in practice and awareness over the 2007-2012 period. Questions in a 2007 survey about a specific Recycle at Work outreach campaign were removed, and questions about recycling practices and the business recycling requirements were added. A random population sample was identified as the preferred population and was compared to the random population from the 2007 survey.

A minimum of 600 businesses was needed to replicate the 2007 survey and achieve a 4 percent confidence interval for all responses. The 2012 survey got 611 responses. For questions that were replicated from the baseline survey, a chi-square test or t-test was used to test statistical significance.<sup>1</sup> Additional questions were asked about business recycling requirements, and for these questions, percent of responses are used with the 4 percent confidence interval.

### Results

#### Repeat questions

The questions represented in figures 1 through 10 focused on a business' ability to recycle certain materials. All had values of statistical significance at the 1 percent level, with the exception of old corrugated containers, which tested at the 5 percent significance level. (When evaluating statistics, 5 percent significance typically represents a strong significance and 1 percent is very strong significance.)

The findings indicated that for all materials, more businesses reported that they were able to recycle those materials in 2012 than in 2007.

Figures 11 through 15 ask about knowledge of the existing RAW program and services and the businesses' knowledge of BRR. Fewer businesses recognized the RAW program in the 2012 survey than in the 2007 survey. Because the 2007 survey was administered right after an outreach campaign and no such outreach took place before the 2012 survey, it is likely that this is the reason for the observed decline in recognition of the program and the services offered. Businesses reported 42 percent knowledge of mandatory recycling and of that 42 percent, 11 percent reported adding materials or starting recycling programs as a result of mandatory recycling. None of the businesses aware of the requirements reported difficulty implementing them.

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<sup>1</sup> **CONFIDENCE INTERVAL.** A term used in inferential statistics that measures the probability that a population parameter will fall between two set values. The confidence interval can take any number of probabilities, with the most common being 95% or 99%. **CHI-SQUARE.** A test that uses the chi-square statistic to test the fit between a theoretical frequency distribution and a frequency distribution of observed data for which each observation may fall into one of several classes. **T-TEST.** A statistical examination of two population means. A two-sample t-test examines whether two samples are different and is commonly used when the variances of two normal distributions are unknown and when an experiment uses a small sample size. **STATISTICAL SIGNIFICANCE.** A result that is not likely to occur randomly, but rather is likely to be attributable to a specific cause. Statistical significance does not always indicate practical significance.

Results for questions repeated from the 2007 survey

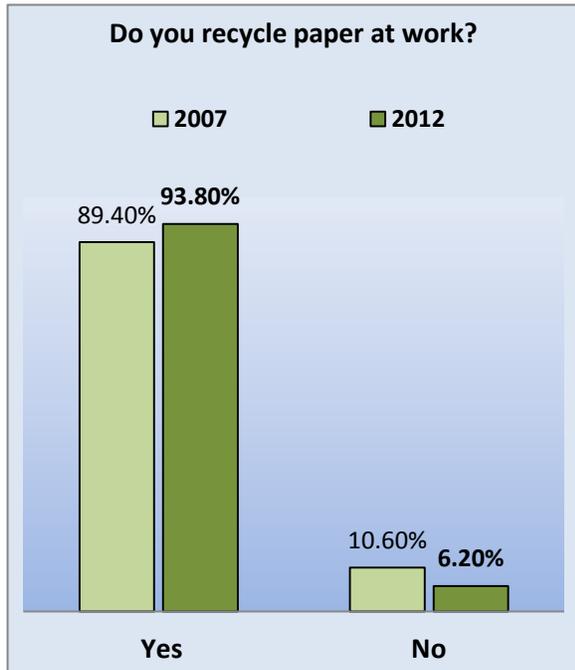


Figure 2

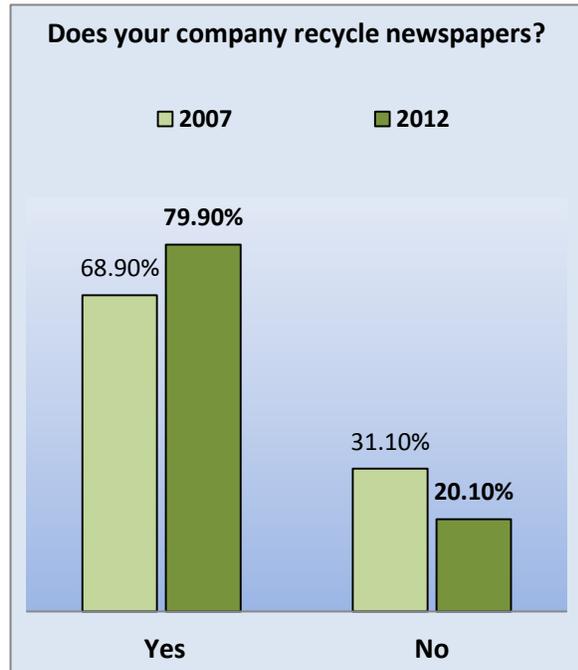


Figure 3

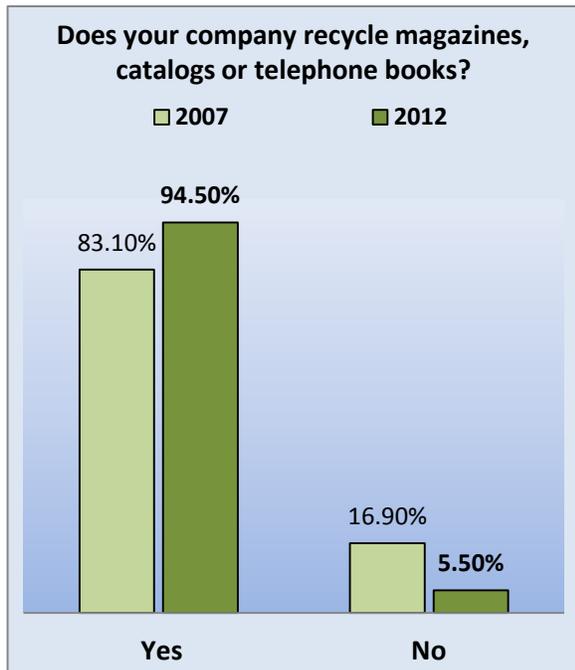


Figure 4

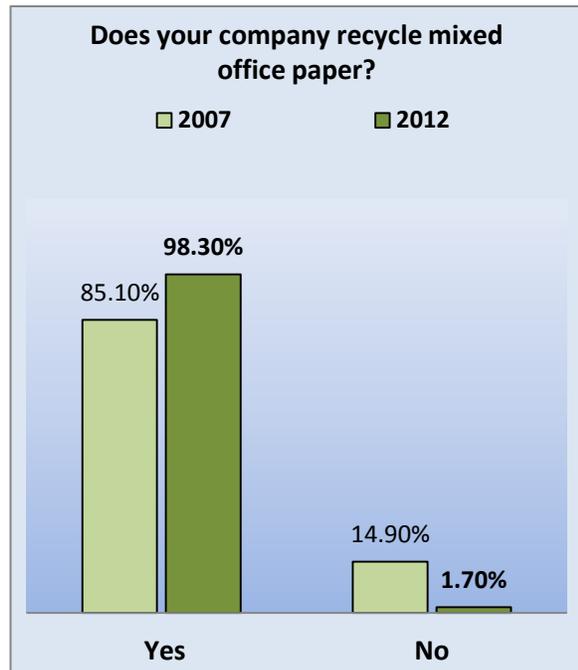


Figure 5

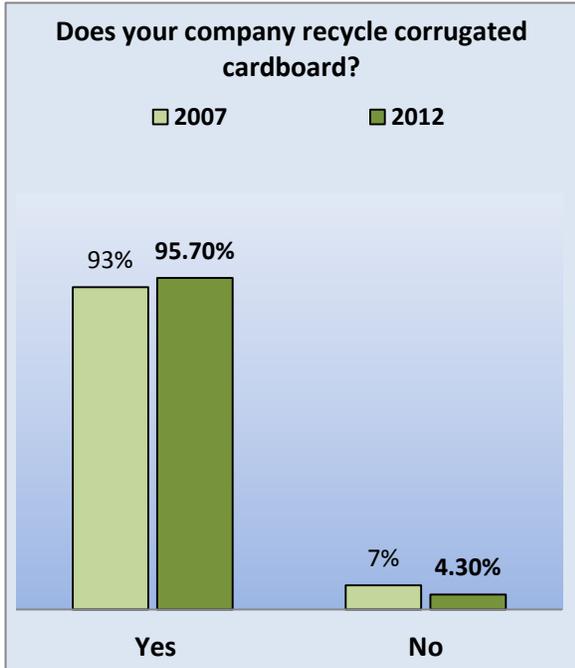


Figure 6

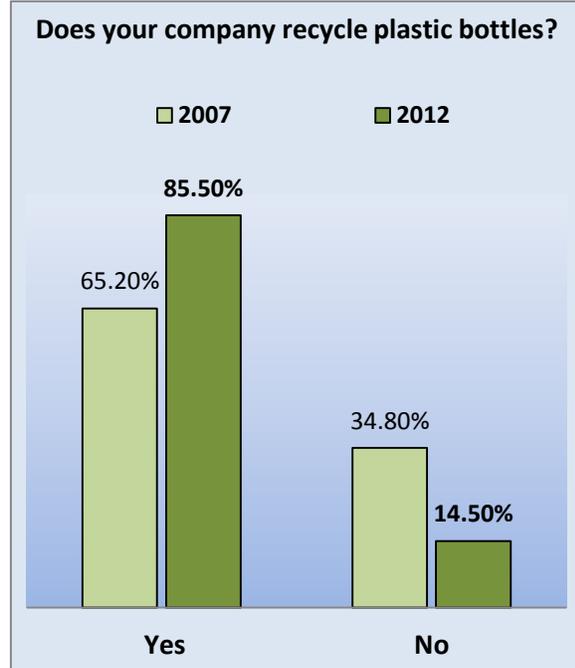


Figure 7

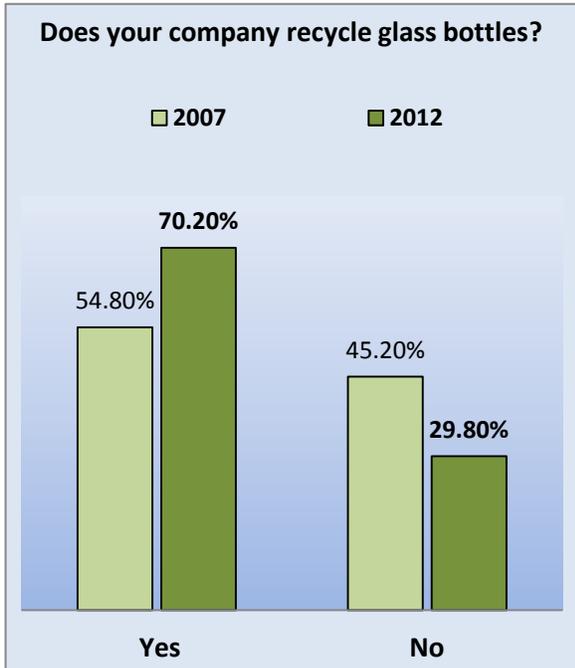


Figure 8

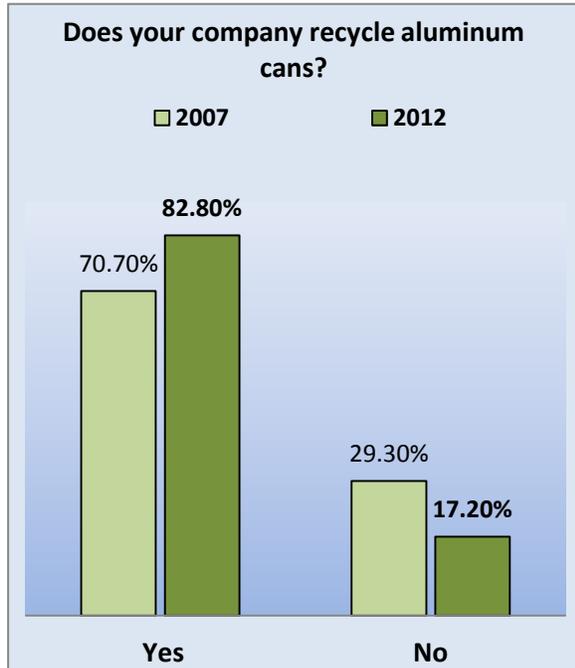


Figure 9

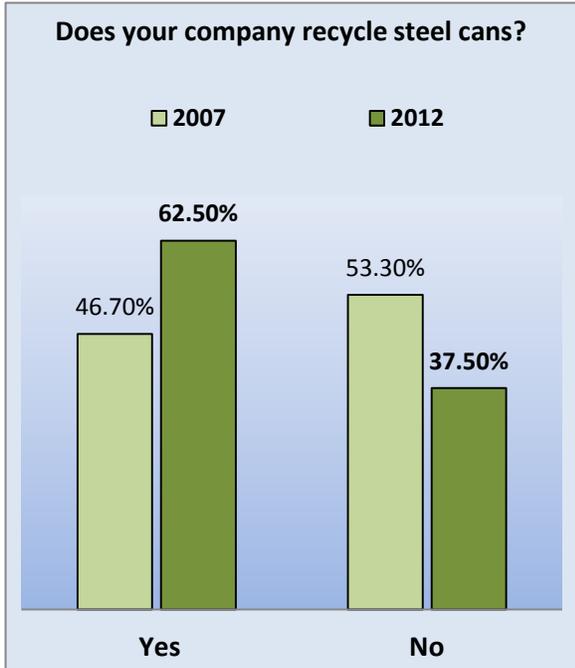


Figure 10

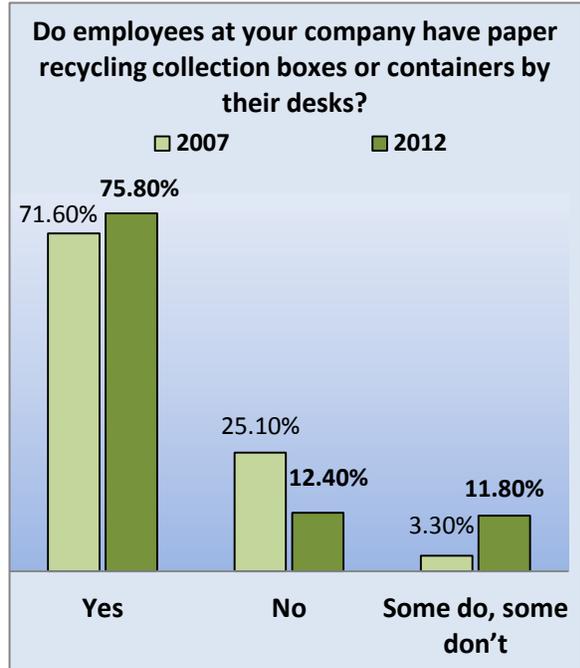


Figure 11

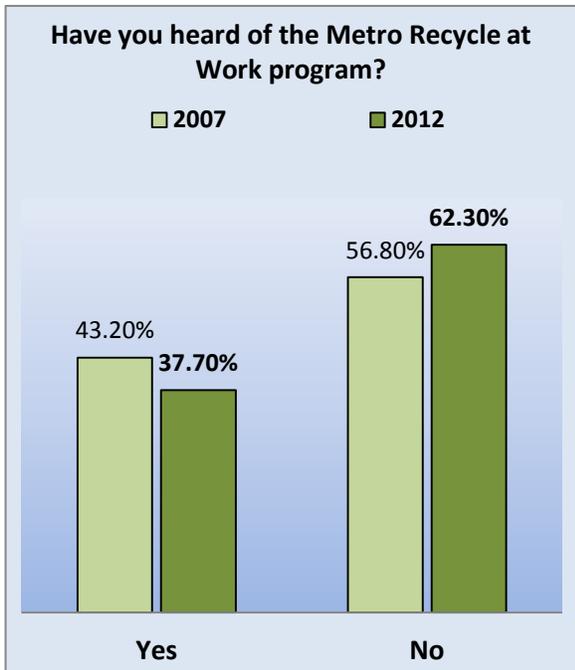


Figure 12

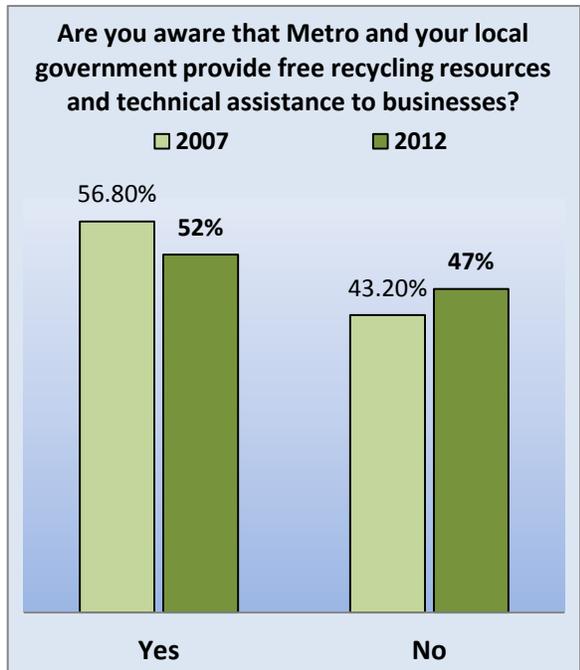


Figure 13

New questions

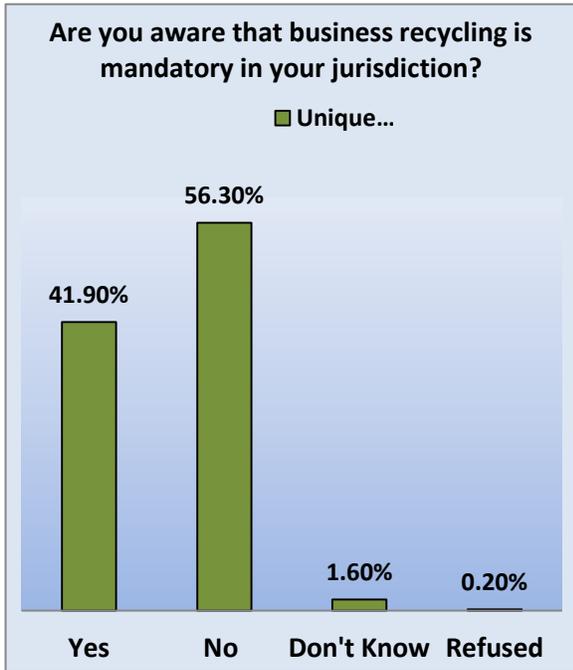


Figure 14

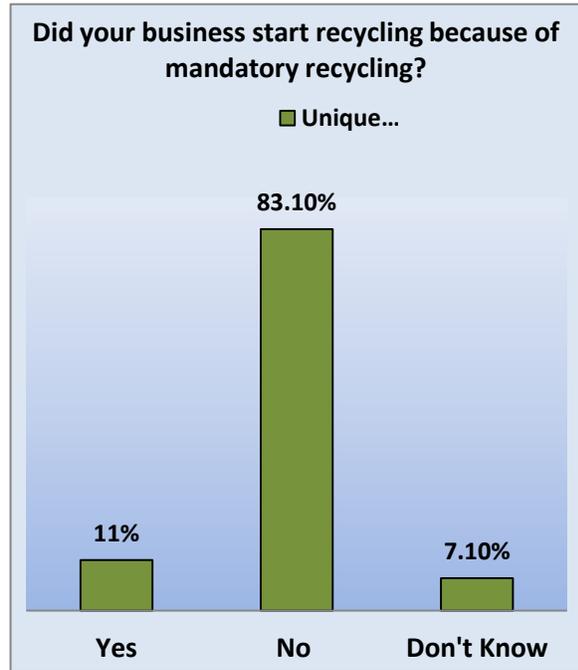


Figure 15

(This question was only asked of those who responded yes to the question in Figure 14.)

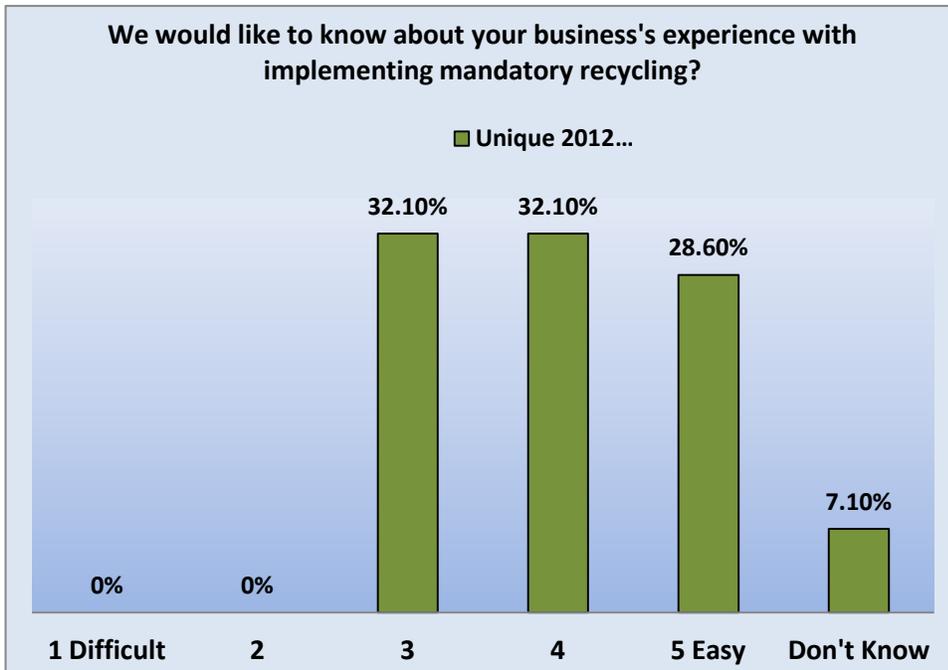


Figure 16

(This question was only asked of those who responded yes to the question in Figure 14.)

## Conclusions

In order to try to ascertain changes over time, it was important to keep the 2012 questions the same as the 2007 survey. The findings indicate that businesses are recycling more materials in 2012 than in 2007 (pre-BRR). The increases in the percentage points of respondents that they were recycling ranged from 2% to 20% increase depending on material type. The 93.5% favorable response to the question in Figure 1, “Do you recycle paper at work?”, is consistent with Metro’s expectation that almost all businesses in the region have the ability to collect and recycle BRR-required materials. This assumption is based on paper being generated in almost all businesses and there being consistent collection service options in place. It is unclear, however, whether the responses to this question indicated that business employees are fully educated about what’s recyclable or are actually recycling.

As a sign that local government notification had a positive result, more than 40 percent of respondents said they were aware of mandatory recycling, and for those that were, 11 percent had added systems to recycle and found it moderate too easy to implement these systems and practices. With 24,801 businesses in the Metro region with three or more employees, 10,392 businesses should be aware of BRR and 1,143 businesses should have added recycling or materials to their existing program based on mandatory requirements.

Findings for awareness of the RAW program showed a slight decrease in 2012 from 2007, which does not seem to correlate with the BRR awareness results. It is likely that the main reason for this is the timing of the two surveys. The 2007 survey was designed to evaluate a RAW outreach campaign. It would be expected that respondents would have recognition of the program after an outreach campaign, unlike in 2012, when the survey didn’t follow a media campaign.

## WASTE COMPOSITION STUDY

### Background

In 2007, Metro contracted with Sky Valley Associates to conduct a baseline evaluation of business waste composition in select Metro wasteshed cities and counties. The study looked at paper and containers, as well as other recyclables and waste. The list of materials is included in Appendix C. Samples were taken from commercial routes and identified from a random selection of businesses from the 2006 North West Prospects database. Two-hundred and fifty-two samples were collected from 18 jurisdictions and sorted primarily at Metro’s transfer stations.

The objective of the 2007 study was to collect data on the amount of paper and containers being disposed by businesses across the region and to provide a baseline for paper and containers disposed by jurisdiction. This study informed Metro’s decision to adopt BRR.

Part of evaluating the results of BRR was to conduct a follow-up waste characterization study after the program had been implemented for at least two years. In 2012, Sky Valley Associates was hired to conduct this study. Working with the Oregon Department of Environmental Quality, a methodology was established to highlight changes in the composition of the commercial waste stream against the 2007 baseline waste composition study.

Unlike the 2007 study, Metro wanted to look at the region in aggregate rather than by jurisdiction, since most jurisdictions had implemented BRR. As a result, fewer samples were needed to achieve the same confidence intervals. The material categories remained the same as the 2007 study, and most of the load sorts again took place at Metro's transfer stations.

## **Methodology**

### **Load selection method**

In the 2007 study, the business sector was divided into sampling groups based on business size (number of employees) for each jurisdiction. A random sample of businesses was drawn from the North West Prospects 2006 database. Haulers provided route information for the randomly selected businesses. Sky Valley then pulled the sample from the route truck at the disposal site.

For 2012, Sky Valley used the same routes, unless a route had changed, in which case Sky Valley identified a new route with the same hauler.

### **Further sample selection from loads**

Hauler loads were dumped in an elongated pile and one sample was drawn from each pile, using a 16-cell grid (eight sections, two layers) superimposed over the dumped material. The waste within the cell was extracted and placed on a tarp for sorting.

Samples were sorted into 10 categories (see Appendix C):

1. Paper
2. Cardboard (OCC)
3. Plastic containers
4. Aluminum containers, foil and steel cans
5. Glass bottles
6. Plastic film
7. Metal
8. Wood
9. Food waste
10. Other waste

### **Sample size**

The average sample weight was 200 pounds, and the minimum weight for each sample was 175 pounds. If a sample was found to be too small after sorting and weighing, additional material was collected from a similar disposal vehicle and sorted and weighed so that the total weight was over 200 pounds.

## Data analysis

Both sets of data had confidence intervals of 4 percent. In order to consider changes between the 2007 and 2012 data, a Z-test was chosen as the preferred test to identify changes over time. <sup>2</sup>

## Results

The following table and pie charts illustrate the percentage of the commercial waste stream in 2007 and 2012 represented by each of the 10 categories identified by Metro.

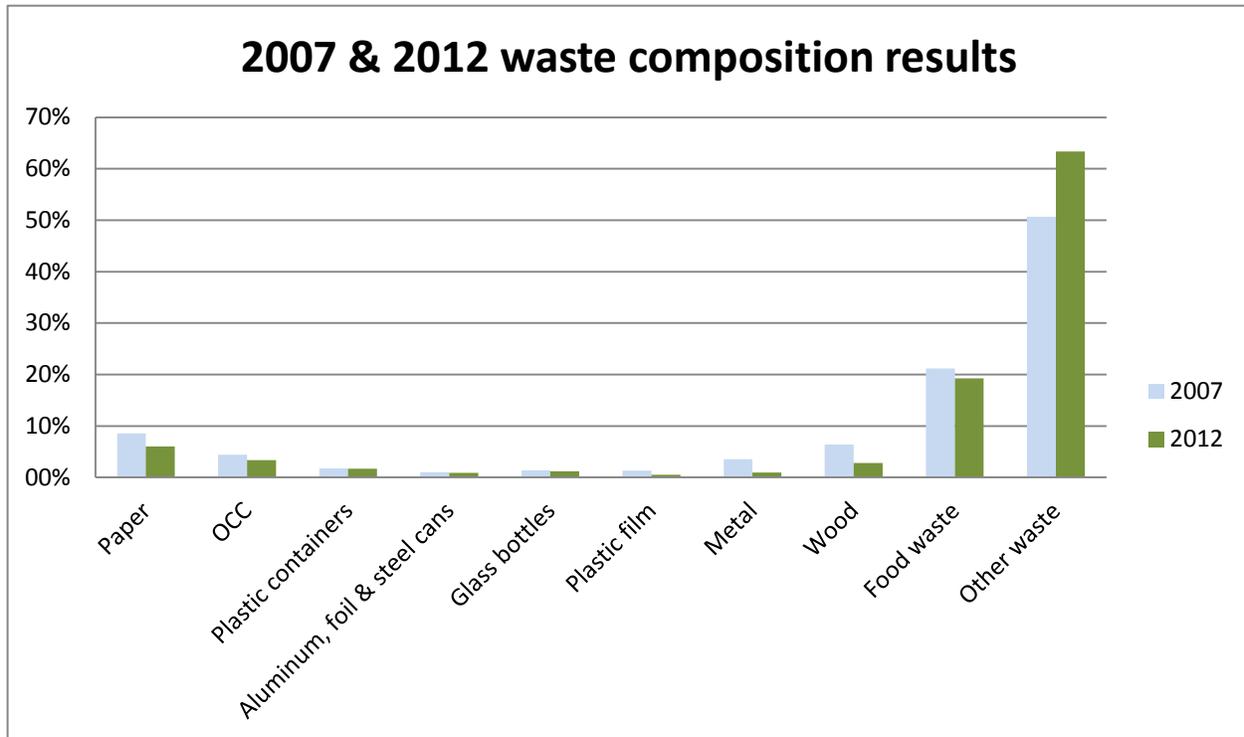


Figure 17

Table 2

Material	2007	2012
Paper	8.52%	6.03%
OCC	4.39%	3.34%
Plastic containers	1.72%	1.69%
Aluminum, foil & steel cans	0.97%	0.89%
Glass bottles	1.38%	1.18%
Plastic film	1.31%	0.51%
Metal	3.51%	0.94%
Wood	6.41%	2.81%
Food waste	21.14%	19.26%
Other waste	50.67%	63.35%

<sup>2</sup> The Z-test relies on a hypothesis test where the null hypothesis is no change between the two populations.

## 2007 waste composition by material type

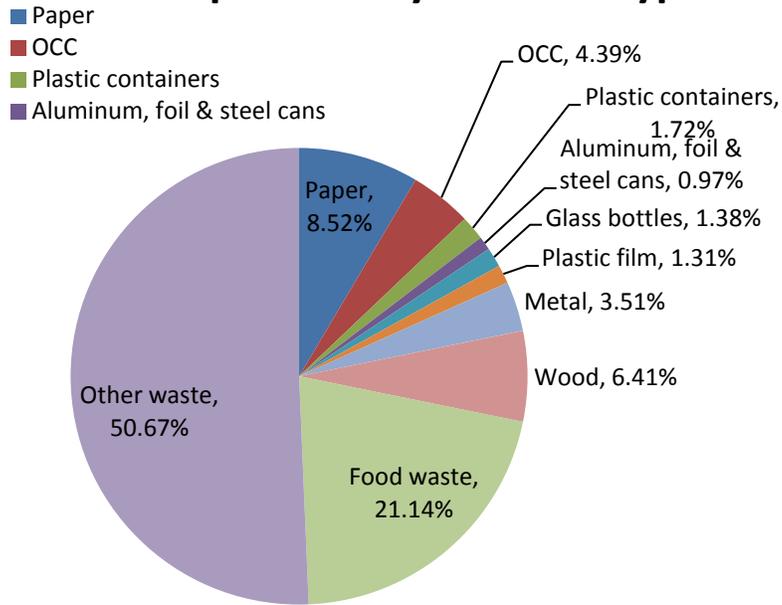


Figure 18

## 2012 waste composition by material type

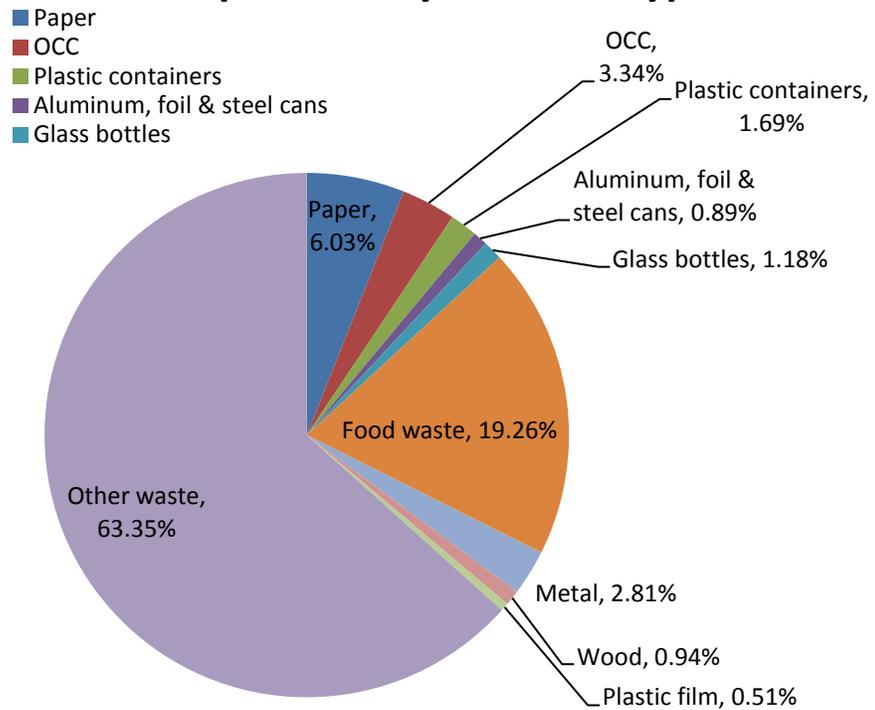


Figure 19

With a confidence interval of 4 percent, there are no statistical differences between 2007 and 2012 for any of the individual recyclable materials. There is a difference, however, if you aggregate the BRR recyclables into one category, and do the same for other recyclables. Other waste also shows a statistical difference.

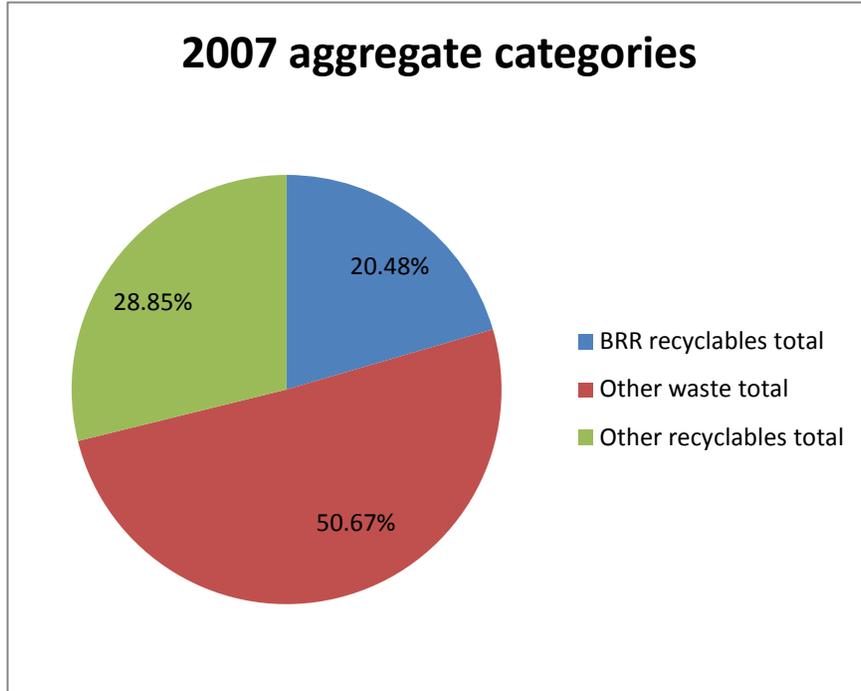


Figure 20

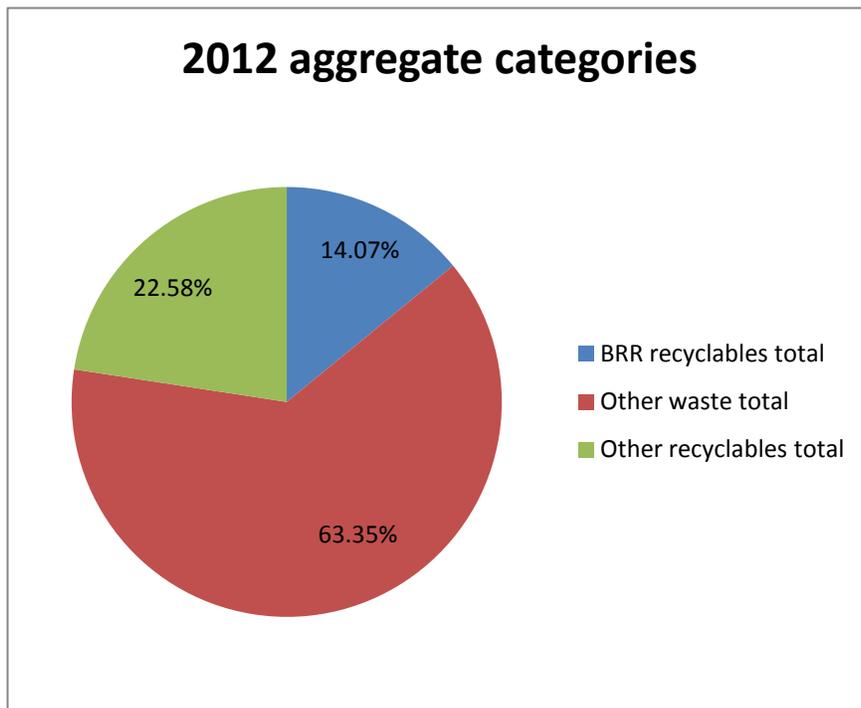


Figure 21

## Capture Rate

Even when we know the composition of the commercial waste stream, it is still not clear what the percentage is of the various materials in our waste system we are actually collecting and what the opportunity is to collect more.

The capture rate is one way to answer this question, because it looks at the percentage of materials in the total waste stream that are collected through recycling programs. By looking at 2012 Metro disposal data, DEQ's 2010 recovery data by sector and the commercial waste composition study conducted in 2012, Metro calculates that in 2012 the region captured 83 percent of BRR-covered materials (paper and containers) in the commercial sector.

## Conclusions

Analyzing waste composition in 2007 and 2012 shows that Other Waste increases over this period and recyclables in aggregate decrease (no change could be identified for individual recyclables in isolation, such as paper or food). As more recyclables are recovered, their presence in the waste stream decreases as a percentage and Other Waste increases. Although this is good news, we cannot directly attribute the change to the implementation of the Business Recycling Requirement program.

It is likely that BRR, combined with economic changes, ongoing education of businesses and changes in consumer preferences all contributed to this change. Items such as wood or OCC have a direct connection to economic output. If construction activity decreases or retailers sell fewer goods, the total amount of these materials would be expected to decrease in the waste stream and these are not available to be recovered. In addition, consumer preferences affect the presence of certain materials in the waste stream, e.g., when fewer newspapers are sold, fewer old newspaper are discarded.

## SUMMARY OF FINDINGS

BRR has proved to be successful in getting businesses to understand the recycling requirements and take actions to meet those requirements. Nearly all businesses have received some form of notification either through mailings or direct contact. It is clear from the business survey findings that almost all businesses have systems in place to capture the BRR-identified materials and that some have added or expanded collection as a result of BRR. In aggregate, the amount of collectable recyclables in the waste stream has decreased since BRR was adopted and we're getting 83% of the desired materials, but it's not clear that BRR was the main contributor to this change. The economy, changes in consumer preferences and continuing education of businesses likely contributed to this change as well.

## OPTIONS FOR IMPROVEMENT

With the region capturing 83 percent of the BRR materials, options for further improvement are limited.

One would be to increase Recycle at Work funding and provide assistance to more businesses. However, the amount of funding required to make a significant impact makes this an unlikely outcome.

The other option is for local governments to enforce the requirements. There are still business discarding large amounts of materials such as OCC. The survey of businesses indicated that almost all businesses have the opportunity to recycle, yet based on the waste composition study, many still don't take full advantage of this. In particular, enforcement could be effective if focused on larger generators of BRR materials.

## APPENDIX A

### Jurisdiction Material

#### Beaverton:

- Introductory tool kit.
- Letter outlining five BMPs.
- Postage-paid RAW resource order form.

#### Community Environmental Service (Cornelius, Durham, Fairview, Forest Gove, Hillsboro and Tualatin):

- BRR Courtesy Evaluation form.
- Notification letters.
- Five Easy Steps brochure (BMPs).
- Recycling posters in Spanish.
- Window clings.
- Hauler request form.

#### Clackamas County:

- Notification packet that included a cover letter, flyer about RAW assistance, employee recycling guide and a postage-paid postcard with the five BMPs.

#### Gresham:

- Tool kit that included promotion of RAW services and resources and five BMPs.
- Certification window cling.

#### Portland:

- Notification letter.
- Five Easy Steps brochure (BMPs).
- Progress report.
- Certification decal.
- Composting flyers in six languages.
- Recycling poster in six languages.
- RAW E-Training tool (interactive online training tool).
- Portland-specific Salesforce site to track BRR compliance.

#### Washington County:

- Change of Service Request form (for haulers).
- New customer letter from haulers.
- Initial business notification letter/flyer.
- Postage-paid assistance request postcard.

- RAW services/resources order form.
- BRR Courtesy Evaluation form.
- Recycling Certified Business window cling.
- Webpage dedicated to BRR information and a list of BRR, compliant businesses certified by Washington County.
- Excel spreadsheet for BRR site visit information.

## APPENDIX B

### Jurisdiction Enforcement Protocol

#### Beaverton

1. A business or business recycling service customer that does not comply with the business recycling requirement may receive a written notice of noncompliance. The notice of noncompliance shall describe the violation, provide the business or business recycling service customer an opportunity to cure the violation within the time specified in the notice, and offer assistance with compliance.
2. A business or business recycling service customer that does not cure a violation within the time specified in the notice of noncompliance may receive a written citation. The citation shall provide an additional opportunity to cure the violation within the time specified in the citation and shall notify the business or business recycling service customer that it may be subject to a fine.
3. A business or business recycling service customer that does not resolve a violation within the time specified in the citation may be subject to a fine.
4. A violation of a provision of this article or of a rule duly promulgated under authority of this article by a business or business recycling service customer shall constitute a Class 1 Civil Infraction and shall be processed according to the procedure set forth in BC [2.10.010](#) through [2.10.050](#) .
5. Each violation of this article or of a rule duly promulgated under authority of this article relating to BRR shall constitute a separate civil infraction. Each day that a violation of a provision of this article or of a rule promulgated under authority of this article is committed or is permitted to continue shall constitute a separate civil infraction.
6. Any penalty imposed pursuant to this article or a rule duly promulgated under authority of this article is in addition to, and not in lieu of, any other civil, criminal or administrative penalty or sanction otherwise authorized by law. [BC [4.08.540](#), added by Ordinance No. 4497, 12/15/08]

#### Clackamas County

1. Letter is sent requesting contact with us within 10 days:
  - a. Site check is conducted to confirm violation
  - b. Assistance offered to bring business into compliance
2. If assistance is refused:
  - a. Second letter is sent providing specific timelines to comply:
  - b. Notifies non-compliant business when the \$75/monthly administrative fee will begin to accruing until the violation is abated and potential additional civil penalties, citations, liens, etc. (legal info)
  - c. Provide second opportunity for direct assistance to bring business into compliance with BRR
  - d. Fee waived if deadlines met
3. First citation if business fails to comply:
  - a. \$75/monthly administrative fee assessed

- b. Fine imposed
- c. Opportunity to correct and stop enforcement
- 4. Second citation if business fails to comply:
  - a. \$75/monthly administrative fee assessed
  - b. Fine imposed
  - c. Opportunity to correct and stop enforcement process
- 5. Hearing
- 6. Circuit Court

### **Gresham**

1. Identify businesses that are not in compliance with BRR, notify those businesses that they are out of compliance, and let them know that help is available.
2. If no action is taken, a civil penalty warning is sent, reiterating the opportunity to rectify the change.
3. If after two weeks no action has been taken, a civil penalty is assessed.

### **Portland**

1. If assistance and compliance efforts fail, resistant businesses will be referred to enforcement for inspection, assessment of penalties or other appropriate enforcement action.
2. Inspection warrants: City staff can obtain an inspection warrant if refused entry onto the property.
3. Process: Written notice of potential infraction, 30-day compliance period, follow-up inspection for compliance, penalties assessed for non-compliance, appeal process for assessment.
4. Penalties: Assessments increase with repeated violations. Penalties of up to \$500 may be imposed for first violations, up to \$1,000 for second violations, and up to \$1,500 for subsequent violations. The basis of the penalty may vary according to the nature of the violation (e.g., per day, per incident, per month, other) and the amount may vary depending on the type and severity of the violation.

#### Compliance standard:

Staff will look in garbage containers and where noticeable amounts of recyclable materials are visible; assistance and compliance steps will be taken based on these findings.

#### Investigations:

Complaints will be investigated by focusing on the activities of the business and the services available from the garbage and recycling company, property manager and janitorial provider. Garbage loads may also be inspected at the transfer station or landfill. Where there are significant amounts of materials that could be recycled, BPS will work with the garbage and recycling company to provide further outreach assistance to the business customers on that route.

Future plans include inspecting a random sample of businesses each year. Only common areas used for storing garbage and recycling will be subject to inspection. Entry into other areas of a business will be with permission of the business.

## **Washington County**

All businesses within the county shall comply with waste prevention, recycling and composting requirements as set forth in the county's solid waste and recycling program administrative rules. For the purpose of this section, the term business shall mean any commercial or nonprofit entity, such as a store, office, manufacturing and industry facility, restaurant, warehouse, school, college, university, government, hospital and other similar entities doing business within the unincorporated county, but excludes businesses permitted in residences.

A county officer, as defined in the uniform citation ordinance and a private citizen may issue a citation for violation of this chapter and the rules and regulations adopted pursuant thereto. Citations shall conform to the requirements of the uniform citation ordinance, Chapter 1.08. Enforcement of citations shall be through Chapter 1.08.

## APPENDIX C

### Material Categories for the 2007 Commercial Baseline Evaluation Study

#### Field Sorting Categories

Materials for the 2007 Commercial Baseline Evaluation Study will be sorted individual material categories (shown in bold) defined below. The numbered items under each category have been numbered to be consistent with the DEQ material definition for the waste composition studies.

#### CATEGORY 1: PAPER

1. Gable Top Beverage Cartons (Milk Cartons). Poly-coated bleached paperboard boxes that contain ready-to-drink beverages such as milk or orange juice. Can include plastic pour spouts as part of the carton. Does not include cream or half & half boxes. Needs count.
2. Aseptic drink boxes. Paper/foil/plastic laminate boxes used to package juice and other ready-to-drink beverages. Does not include aseptic containers used to package non-beverages. Needs count.
7. Hi-Grade office/printing/writing paper (uncoated high-grades). Printing, writing and computer papers, including mainly thermo-chemical pulps. Both virgin pulp substitutes and high-grade de-ink fibers are included. This category is composed of high-grade paper, which includes white ledger, colored ledger, computer printouts, computer tab cards, bond, copy machine, and carbonless paper. Excludes glossy coated paper such as magazines and pure groundwood publications such as catalogs, astro-brights and other unbleachables, and glue-bound publications.
8. Newspaper (ONP). Printed ground-wood newsprint (minimally bleached fiber); referred to as #1 news. This category also includes glossy paper typically used in newspaper insert advertisements, if believed to be distributed with newspapers.
9. Magazines. Includes glossy publications such as some catalogs, but excludes newspaper glossy inserts
10. Low-grade bleached recyclable paper. Includes other recyclable paper that would be at least marginally acceptable in a #6 newspaper mix. Includes junk mail, glossing and uncoated advertising sheets, bleached boxboard and bags (non-poly-coated), bleached boxes with small plastic windows, envelopes except brown unbleached kraft envelopes, construction paper, blue print paper, thermal copy and fax paper, used envelopes with sticky labels and/or plastic windows, greeting cards, sticky notes, paperbacks, uncoated groundwood catalogs and advertisements, phone books, egg cartons and other recyclable bleached molded paper products (but not paper plant pots). Includes paper bound with fasteners including spiral-bound notebooks and plastic reinforced tab dividers, cigarette boxes (not the individual packs) that do not have excessive foil, plastic. Does not include paper with grey or brown fibers or wet strength or poly-coated paper.
11. Low grade unbleached recyclable paper. Paper with grey or fibers such as cereal boxes, shoe boxes clothing forms, and other grey and brown chipboard. Excludes poly-coated paper. Includes brown unbleached kraft envelopes, but excludes paper that was bleached and then re-dyed brown or grey, such as manila envelopes. Also includes bright-dye (fiesta and neon) papers and

envelopes, which although originally bleached, are unbleachable and would contaminate other bleached paper.

12. Polycoated paper. Poly-coated bleached and unbleached paperboard used for ice cream, frozen TV dinners, and many other frozen food boxes. Includes multi-walled bags. Includes non drink box aseptic packaging such as soup cartons. Does not include cups or non-food poly-coated packages.
13. Hard-covered books. Books with hard covers, and excluding paperbacks.

## **CATEGORY 2: CORRUGATED CARDBOARD**

3. Wine Boxes. Corrugated outer box with a plastic film lining.
4. Corrugated cardboard and kraft paper (OCC). 1 square foot and larger. Kraft linerboard and containerboard cartons and shipping boxes with corrugated paper medium (unwaxed). This category also includes Kraft (brown) paper bags. Excludes waxed and plastic-coated cardboard, solid boxboard, multi-walled bags that are not pure unbleached kraft.
5. Corrugated cardboard and kraft paper (OCC). less than 1 square foot in size - same as above but smaller
6. Waxed corrugated cardboard. OCC that is impregnated with wax, commonly used for grocery produce boxes.

## **CATEGORY 3: PLASTICS**

16. Deposit Plastic Beverage Bottles. Any size beverage with an Oregon deposit for beer, soft drink, carbonated water and juice. Does not include out-of-state bottles or soft drink syrup containers. Needs Count.
17. No-Deposit Plastic Beverage Bottles (RPCs). 8-oz to 5 gallons plastic beverage bottle *without* an Oregon deposit such as milk, juice, water, alcohol, wine, smoothie, coffee, tea. Includes beer and soft drink bottles from out-of-state that are not marked with the Oregon refund value. Does not include cream, half & half, syrups, or powdered beverages. Needs count
18. No-deposit very small, large beverage bottles. Plastic Bottles less than 8 oz or larger than 5 gallons that hold ready-to-drink beverages. Mainly small liquor bottles. Needs count
19. Other Plastic Bottles. All non-beverage bottles. 8 oz to 5 gallons Used for non-beverage food, medicines, vitamins, hair and bath products, laundry supplies, antifreeze, oil
20. Plastic Tubs, Pails #2 & #5. Tubs, pails(buckets), flower pots, plant trays from 8 oz to 5 gallon in size. Made from HDPE (#2) or PP (#5) plastic and meets the definition in Oregon Revised Statute 459A.650 for Rigid Plastic Container

## **CATEGORY 4: GLASS**

69. Deposit beverage glass. Oregon deposit beer, soft drink, carbonated water and juice. Does not include beer or soft drink from out-of-state. Needs count
70. Clear non-deposit beverage glass. All clear non-deposit beverage glass, including broken glass identified as non-deposit beverage glass. Included are wine bottles, wine cooler bottles, liquor bottles, juice bottles, and other non-deposit glass beverage containers. Needs count

- 71. Colored non-deposit beverage glass. Same as above, except includes green, brown, and other colored glass. Needs count
- 72. Other clear container glass. Includes clear (unpigmented glass jars, ketchup/mustard bottles, baby food jars, pickle jars and mayonnaise jars, medicine and other non-beverage bottles, and other clear container glass that is not a beverage bottle.
- 73. Other colored container glass. Same as above, but for green, brown, and other colored glass.

#### **CATEGORY 5: ALUMINUM, FOIL AND STEEL CANS**

- 78. Deposit Aluminum beverage cans. Oregon Deposit beer, soft drink, carbonated water and juice needs count.
- 79. Other Aluminum Beverage Cans. No Oregon deposit. Includes carbonated drinks from other states, juice, coffee, tea, water. Needs count
- 80. Other aluminum containers and foil. Aluminum pet food cans, foil-formed trays/containers, and foil
- 83. Steel/Bimetal Deposit Beverage Cans. (rare) Oregon deposit, usually imported beer. Needs count.
- 84. Steel/Bimetal Other Beverage Cans. No Oregon deposit. Needs count.
- 85. Tinned cans. Predominantly steel cans (some with tin or enamel coatings) used to hold food, and non-food items. (prior to 2005 food and non-food tin cans were measured separately).
- 97. Empty or non-hazardous aerosol cans. Note - aerosol cans still containing hazardous materials such as paint are included in the "hazardous materials" categories.

#### **CATEGORY 6: FOOD WASTE**

- 50. Food waste. Food trimmings, coffee grounds, bones, spoiled or otherwise discarded food.

#### **CATEGORY 7: WOOD**

Manufactured wooden lumber and other items (excluding sawdust) including the following:

- 37. Reusable Dimensional Lumber: unpainted Dimensional lumber at least 1.5" thick by 3.5" wide, and at least 4 feet long, which is clean (nails and minimal fasteners OK, with more allowed in larger pieces) and not rotted or damaged, and without other materials being firmly attached such as wallboard. Also includes at least half-sheets of plywood at least 3/8 inch thick in good condition
- 38. Other Untreated Lumber 1 foot or larger...Exceeds 1 foot in length regardless of diameter. unfinished or unpainted dimensional lumber or wood, including plywood and unpainted oriented strandboard used for construction or resulting from building demolition. Excludes cedar shakes, shingles, reusable dimensional lumber
- 39. Other Untreated Lumber less than 1 foot....
- 40. Clean "hogged fuel" wood 1 foot and larger in at least one dimension. Includes particleboard, medium density fiberboard, any plywood with a fiber/resin overlay (such as is common for concrete forms) cedar shakes and shingles and other cedar lumber, compressed sawdust waferboard, masonite (high-density fiberboard).
- 41. Clean "hogged fuel" wood less than 1 foot..

- 42. Reusable Dimensional Lumber: Painted. Same as unpainted reusable dimensional lumber, but is painted (and not chemically treated)
- 43. Other Painted Lumber 1 foot or larger... Includes any lumber that is painted or primed, excluding furniture, chemically-treated lumber, and mixed wood/materials (split from chemically-treated lumber in 2000).
- 44. Other Painted Lumber less than 1 foot...
- 45. Chemically treated lumber. Pressure-treated or creosoted lumber or wood.
- 46. Wood pallets and crates and similar packaging lumber. Dimension lumber material used in pallets and crates. Also includes wood/wire crates with thin slats, if not mixed with plastic and other materials.

#### **CATEGORY 8: OTHER METAL**

- 86. Other non-ferrous metals - 8 inches or larger in at least one dimension. Metals that are not materials derived from iron, including copper, brass, bronze, lead, pewter, zinc, "stainless steel", and other metals to which a magnet will not adhere. Includes recyclable insulated copper and aluminum wire. Metals that are significantly contaminated are not included.
- 87. Other non-ferrous metals smaller than 8 inches
- 88. Other ferrous metals. 8 inches or larger in at least one dimension. Ferrous and alloyed ferrous scrap materials derived from iron, including household, industrial and commercial products not containing significant contaminants. This category includes scrap iron and steel to which a magnet adheres. Includes all-steel furniture such as bed frames. Does not include appliances, food cans, or other ferrous metal items listed elsewhere.
- 89. Other ferrous metal smaller than 8 inches

#### **CATEGORY 9: PLASTIC FILM**

- 29. "Recyclable" polyethylene film plastic. Plastic grocery bags, retail bags, newspaper bags, dry cleaner bags, pallet-wrap, shrink wrap, clear and black polyethylene plastic sheeting, hay sleeves and silage bags, fertilizer, peat, and feed bags from nurseries/agricultural operations, furniture and mattress wrap, bubble wrap, woven lumber wrap, roofing material wrap, insulation wrap, commercial bags and liners, commercial parts packaging, and building wrap. Excludes any plastic film that is not polyethylene or other polyolefin, any plastic film that is laminated to other materials (tape/labels are OK), any bag used as a garbage bag (can liners and tied-off garbage bags), bags that are contaminated with food and other sticky/contaminating materials on the inside, food and household product packaging such as frozen vegetable bags, diaper packaging, bread bags, ziplock and similar household use bags, saran wrap, and plastic sheeting used for ground cloths or paint masking, if contaminated with paint.
- 30. Plastic PVC Film. Film/flexible packaging made from chlorinated plastics. Includes Saran wrap, many shower curtains
- 31. Other film plastic. All other plastic bags and flexible plastic film including garbage bags, plastic strapping, and other flexible plastic items. Any plastic bag used as a garbage bag goes here. Does not include PVC plastic film