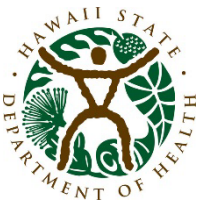
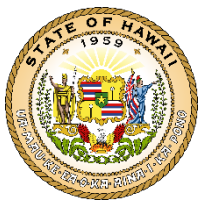




Hawai'i Department of Health, Office of Solid Waste Management

Segregated Rate Study for the Hawai'i Deposit Beverage Container Program

2026 Report



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Executive Summary

Overview

The Hawai'i Department of Health (DOH), Office of Solid Waste Management (OSWM) contracted with Crowe LLP and Cascadia Consulting Group (Cascadia) to conduct a segregated rate study (seg. rate) for the Hawai'i Deposit Beverage Container (DBC) Program in 2025 and 2026. Cascadia and OSWM designed the study to collect data about beverage containers redeemed by the public at certified redemption centers (CRCs). OSWM may use the findings from this study to update the segregated rates for deposit beverage containers.

Over the course of the study, Cascadia collected, sorted, weighed and counted more than 145,000 beverage containers from 16 CRC operators and the materials recovery facility (MRF) handling material from the City & County of Honolulu's curbside recycling collection program. Cascadia characterized the containers redeemed by more than 350 customers.

Results

The current segregated rates used by the DBC program were last updated in 2010. Based on the containers characterized in this study, Cascadia calculated a segregated rate for each material and its subtype. The segregated rate is expressed as the number of Containers per Pound (CPP). This calculation considered the aggregated count and weight data for each material subtype. The proposed segregated rate for each material type is shown in Table 1:

Table 1: Proposed Segregated Rates

Material Type	Proposed Segregated Rate
Aluminum	30.7
Bi-metal	6.2
Glass	2.1
Plastic	25.3

Introduction and Background

Introduction and Study Objectives

The Hawai'i Department of Health (DOH), Office of Solid Waste Management (OSWM) contracted with Cascadia Consulting Group (Cascadia) to conduct a segregated rate study for the Hawai'i Deposit Beverage Program in 2025 and 2026. Cascadia and OSWM designed the study to collect data about beverage containers redeemed by the public at certified redemption centers (CRCs). The study included one round of data collection from December 2025 to January 2026.

The main objective of the study was to provide data for OSWM to update the segregated rates for deposit beverage containers. Secondary objectives for the study included:

- Comparing segregated rates for various size containers.
- Comparing segregated rates for containers with and without lids.
- Comparing the segregated rate at the CRCs against the segregated rate for material processed by the MRF that handles the City & County of Honolulu curbside (“blue bin”) recycling.
- Comparing how the current segregated rate and the segregated rates proposed in this study affect the redemption rate.
- Analyzing separately the volume and weight for randomly selected individual container samples to inform decisions for future studies, including any changes in the list of material subtypes or the number of containers to sort.

Project Overview

Cascadia's approach to the study emphasized characterizing the maximum number of containers possible. The objective of the study was to help inform the development of defensible segregated rates for each material.

Over the course of the study, Cascadia spent 31 days collecting, sorting, counting, and weighing (characterizing) more than 145,000 beverage containers redeemed by more than 350 customers at 16 CRC operators and the MRF handling material from the City & County of Honolulu's curbside recycling collection program.

Frequently Used Terms

Customer: A person delivering DBC material to a CRC for redemption.

Sample: All containers of a particular material type from a particular customer.

Container: An individual bottle, jar, jug, or can redeemed by a customer.

Material Type: All containers are grouped into one of four material types: Aluminum, Bi-metal, Glass, or Plastic. See Appendix A. Material Type Definitions for further detail on the material types.

Material Subtype: Containers in each material type are further detailed by their volume and, for plastic containers, by the resin used in their construction.

In particular, it is important to distinguish between customers, samples, and containers. A customer may bring many samples, and each sample may consist of many containers.

Summary of Methodology

This section provides an overview of the methodology used to characterize and develop segregated rates for deposit beverage containers brought to certified redemption centers across Hawai'i. The methodology is made up of three main steps:

1. Develop a sampling plan.
2. Select and sort samples of beverage containers.
3. Analyze container data.

A detailed description of the study design and methodology is provided in Appendix B. Detailed Study Design.

Develop Plan

Select Sites for Sampling

Cascadia dedicated a total of 31 days to field work and allocated one to two sampling days per site. The site selection process included two steps: allocating a number of sites to each county and selecting sites to fulfill the allocation. Cascadia ensured the number of sites were approximately proportional to the number of containers redeemed in the county in the Fiscal Year (FY) 2025. For example, if approximately half of all containers were redeemed in Honolulu, approximately half of the field days were allocated to Honolulu. Sites were then selected based on the average number of containers each site receives with large site selected preferentially. The selection process is detailed more fully in Appendix B. Detailed Study Design.

Define Materials

Cascadia developed a material list for the study that would support defensible segregated rates for DBC material types—aluminum, bi-metal, glass, and plastic. Cascadia characterized redeemed materials into 50 subtypes. The subtypes divided DBC material types into categories by labeled container size and plastic resin. Definitions of all material subtypes are provided in Appendix A. Material Type Definitions.

Schedule Field Work

Cascadia worked with County and CRC staff to confirm that adequate space and support were available to facilitate characterization efforts during each day of the study. Cascadia's project manager contacted site staff at selected CRCs one week before each scheduled visit to remind staff of the field work. Cascadia also provided one additional reminder by phone the day before each scheduled site visit.

Select and Sort Samples

Select Samples

At the start of each workday, once Cascadia’s field team set up their workstation and equipment, they selected the first customer load redeemed by the CRC. After the CRC paid out the redemption value to the customer, the field team took temporary possession of the redeemed material and stored it in large garbage cans until it could be counted and weighed. The field team collected a new sample each time a team member was available to collect a customer’s redeemed material from the CRC staff and there were garbage cans available for storage. The variable collection period ensured that loads selected for counting and weighing were randomly selected over the course of the study.

Bi-Metal Sampling Procedure

The field team used different sampling methods for bi-metal containers because they are redeemed infrequently at CRCs. These methods were designed to ensure that the field team collected a representative bi-metal container sample from the CRC. The methods used varied depending on how the CRC collected and stored bi-metal containers as well as how many bi-metal containers were available at the site at the time of the field visit. These methods are described in detail in Appendix B. Detailed Study Design.

Sort Samples

The field team hand-sorted as many redeemable containers as they could by size (in ounces), using the following process:

1. The field team dumped a single material type of redeemed material (the sample) onto the sort table. Only one sample was on the sort table at a time.
2. The field team sorted the sample into the appropriate subtypes using plastic laundry baskets or barrels with one material subtype per basket/barrel. The field crew counted the materials as they were being sorted. All broken or partial containers were sorted into a single basket/barrel. The crew manager monitored the homogeneity of the sorted materials as they accumulated, re-sorting any materials that were improperly classified. Once sorting was complete, the team photographed the sample alongside a placard labeled with a unique ID, the customer number, and the material subtype.
3. The crew manager weighed one basket/barrel of sorted material at a time using a digital scale and recorded the material weight (the gross weight) on the *Container Tally Sheet* along with the container count. Each broken or partial container with the HI-5 label visible counted as a single container.
4. The counted material was returned to the possession of the CRC, and the crew manager recorded the weight of the empty basket/barrel (the tare weight).
5. The data management software used for the study subtracted the tare weight from the gross weight to calculate the weight of the redeemed containers (the net weight). All calculations are based on the net weight of redeemed containers.

6. The field team repeated Steps 1 through 4 until all samples from a customer were sorted, weighed, and counted.
7. Each day the field team randomly selected two samples of each material type, and the field team weighed each container of the material type in the selected samples individually. Individual container weights and volumes were recorded on the *Individual Container Tally Sheet*.
8. At the end of each day, the crew manager conducted a quality control review of all recorded data for completeness.

Examples of the field forms used for this study are provided in Appendix D. Example Field Forms. The field team adhered to the Quality Control Plan and Health and Safety Plan outlined in Appendices E. Quality Control Plan and Appendix F. Health and Safety Plan.

Analyze Data

The methods used to analyze the data are described in detail in Appendix C. Description of Calculations and Statistical Procedures. This study utilized the same analytical processes as were used in previous rounds of the study.

Cascadia calculated a segregated rate for each material type and each of the subtypes. The equation Cascadia used to determine the segregated rate for a material type is below.

$$\text{Seg. Rate} = \frac{\text{Subtype A \# of Conts.} + \text{Subtype B \# of Conts.} + \text{Subtype C \# of Conts.} + \dots}{\text{Subtype A Wt. of Conts.} + \text{Subtype B Wt. of Conts.} + \text{Subtype C Wt. of Conts.} + \dots}$$

The equation Cascadia uses to determine the segregated rate for each material subtype, which considers the aggregated count and weight data for each subtype for that material, is below.

$$\text{Seg. Rate} = \frac{\text{Subtype A \# of Conts.}}{\text{Subtype A Wt. of Conts.}}$$

Deviations from the Planned Design

Sampling Schedule

Cascadia’s field crew adhered to the schedule as proposed, with the following exceptions:

- The field crew intended to sort several small batches of each commodity each day at the Oahu MRF but instead sorted large batches of a single commodity each day to accommodate the facility’s processing schedule.
- The field crew intended to characterize containers at the Kauai Community Recycling Service (KCRS) CRC in Kekaha. However high wind and heavy rain forced the field team to skip that facility and sort at the KCRS Kapaa CRC instead.

These deviations did not impact the allocation of sites to each island.

Sorting Procedures

The field crew made minor changes to the sorting procedures over the course of the study including adding an explicit category for non-redeemable containers. The changes did not impact the data quality.

Study Results

The project team used the collected data to:

- Calculate the segregated rate, variance-to-mean ratio (VMR), and the 90 percent confidence interval around the segregated rate for each material type and subtype for all CRCs.
- Calculate the proportion, by weight and by count, each material subtype accounts for within the material type for all CRCs (for example, the proportion of all redeemed aluminum cans that are less than 10 ounces).
- Compare segregated rate, VMR, and the 90 percent confidence interval around the segregated rate for containers with and without lids, for the plastic material type.
- Compare segregated rate, VMR, and the 90 percent confidence interval around the segregated rate for the aluminum and plastic material types for all CRCs and the MRF handling the Honolulu blue cart recycling.
- Compare how the current segregated rates and the segregated rates proposed in this study affect the redemption rates.
- Assess the separately calculated volumes and weights for randomly selected individual container samples to determine whether any changes, such as in the list of material subtypes or the number of containers to sort, should be considered for future studies.

Results from each of these analyses are provided in the sections that follow.

Segregated Rate and Variance-to-mean Ratios

Segregated Rate is a measure of the average number of containers in a pound of a specified material. The segregated rate can be calculated for a material type or for a material subtype. The segregated rate is calculated using all commodity appropriate containers in a sample as redeemed by the facility. This means there are occasions where, for example, a facility redeemed a plastic bottle with the glass; in these scenarios, the segregated rate does not include the plastic bottle in the glass segregated rate for that sample.

The **variance-to-mean ratio (VMR)** is a statistical measure of whether the study data is dispersed or clustered. The VMR compares the variance in the per sample segregated rate data against the mean segregated rate. In a standard binomial distribution (the method on which sample sizes are based), the VMR is between 0 and 1. A VMR greater than 1 indicates that the data may be clustered or concentrated, particularly at relatively low or high values from the mean. The VMR cannot be calculated for material subtypes with data from only a single sample.

The **90% confidence interval** describes the accuracy of the estimates. When calculations are performed at the 90 percent confidence level, we are 90 percent certain that the true segregated rate is within the confidence interval specified (segregated rate +/-). In other words, we are 90% certain that the true segregated rate for aluminum DBC containers is between $29.51 - 1.2\% = 29.15$ and $29.51 + 1.2\% = 29.86$. The confidence interval cannot be calculated for material subtypes with data from only a single sample.

Key Findings

Table 2 presents the segregated rate, VMR, and 90 percent confidence interval for each material type and its subtypes using the data from CRCs.

Aluminum

The segregated rate and 90% confidence interval for aluminum containers overall are 30.7 and 7.1% respectively. This means that we are 90% confident that the true segregated rate is between 28.5 and 32.8. The 90% confidence interval has increased since previous studies indicating a wider variety of aluminum containers are being redeemed and containers from more customers should be characterized to ensure DOH is utilizing the most precise segregated rate. In a practical sense, this suggests that the average customer may receive a different DBC refund depending on if they choose to have their containers weighed or counted.

Nearly 96% of the aluminum containers characterized (67,653 containers) were between 10 ounces and one liter (these containers were the most prevalent containers characterized by the field teams). The field team did not characterize any aluminum containers larger than one liter and consequently could not calculate any accompanying subtype-level data for these containers.

Bi-metal

The segregated rate and 90% confidence interval for bi-metal containers overall are 6.2 and 5.7%, respectively. This means that we are 90% confident that the true segregated rate is between 5.9 and 6.6. The 90% confidence interval has decreased slightly since previous studies. The number of customers redeeming bi-metal containers is still relatively small compared to other commodities. Containers from more customers should be characterized to ensure DOH is utilizing the most precise segregated rate. In a practical sense, this suggests that the average customer may receive a different DBC refund depending on if they choose to have their containers weighed or counted.

More than 83% of bi-metal containers characterized (4,148 containers) were between 10 ounces and one liter. The field team did not characterize any partial bi-metal containers and consequently could not calculate any accompanying subtype-level data for these containers.

Glass

The segregated rate and 90% confidence interval for glass containers overall are 2.1 and 2.8%, respectively. The relatively small 90% confidence interval indicates a reasonably high confidence in the results. In a practical sense, this suggests that the average customer will receive a consistent DBC refund whether they choose to have their containers weighed or counted.

Approximately 90% of glass containers characterized (10,150 containers) were between 10 ounces and one liter.

Glass is the only material type with an appreciable quantity of partial containers, accounting for more than 6%, by weight, of the containers characterized, several orders of magnitude higher than for any other material type.

Plastic

The segregated rate and 90% confidence interval for plastic containers overall are 25.3 and 6.3%, respectively. This means that we are 90% confident that the true segregated rate is between 23.7 and 26.9. Around 93% of the plastic containers characterized (44,710 containers) were between 10 ounces and one liter.

More than 99% of the plastic containers characterized were made from PET resin, with most of the remaining containers made from HDPE resin (92 containers). The field team characterized one container made from another plastic resin.

Table 2: Sample Data for All CRCs

		All Non MRF Sites				
Material	Size	Count	Net (lb)	Seg. Rate	VMR	Seg. Rate +/-
Aluminum Overall	Combined	70,834	2,310.46	30.7	10.35	7.1%
Aluminum	<5 oz.	0	0.00	0.0		
Aluminum	5 - 10 oz.	3,181	77.54	41.0	11.33	8.4%
Aluminum	10 - 15 oz.	61,560	1,940.27	31.7	0.36	1.3%
Aluminum	15 - 24 oz.	5,338	249.61	21.4	4.15	6.4%
Aluminum	24 - 34 oz.	755	43.03	17.5	2.82	8.4%
Aluminum	>34 oz.	0	0.00	0.0		
Bi-metal Overall	Combined	5,013	804.98	6.2	0.64	5.7%
Bi-metal	<5 oz.	0	0.00	0.0		
Bi-metal	5 - 10 oz.	689	63.17	10.9	1.19	7.7%
Bi-metal	10 - 15 oz.	225	38.36	5.9	0.38	7.0%
Bi-metal	15 - 24 oz.	3,868	615.48	6.3	0.12	2.6%
Bi-metal	24 - 34 oz.	55	30.37	1.8		
Bi-metal	>34 oz.	176	57.60	3.1	0.01	1.6%
Glass Overall	Combined	11,313	5,434.57	2.1	0.08	2.8%
Glass	<5 oz.	4	0.96	4.2	0.01	19.2%
Glass	5 - 10 oz.	949	430.41	2.2	0.06	3.8%
Glass	10 - 15 oz.	9,188	4,052.11	2.3	0.06	2.6%
Glass	15 - 24 oz.	722	455.94	1.6	0.05	3.7%
Glass	24 - 34 oz.	240	247.95	1.0	0.02	3.6%
Glass	>34 oz.	210	247.21	0.9	0.02	8.5%

All data and calculations exclude partial containers and non-redeemable containers

The VMR and segregated rate +/- cannot be calculated for subtypes with data from a single customer

Table 2: Sample Data for All CRCs, continued

		All Non MRF Sites				
Material	Size	Count	Net (lb)	Seg. Rate	VMR	Seg. Rate +/-
Plastic Overall	Combined	48,184	1,901.54	25.3	6.61	6.3%
Plastic	<5 oz.	48	1.27	37.9	1.24	14.9%
Plastic	5 - 10 oz.	978	18.65	52.4	19.54	11.7%
Plastic	10 - 15 oz.	2,557	116.32	22.0	4.08	6.9%
Plastic	15 - 24 oz.	38,916	1,219.58	31.9	5.05	5.1%
Plastic	24 - 34 oz.	3,237	293.61	11.0	0.48	3.1%
Plastic	>34 oz.	2,448	252.11	9.7	0.42	3.2%
PET Overall	Combined	48,091	1,896.69	25.4	6.61	6.3%
PET	<5 oz.	48	1.27	37.9	1.24	14.9%
PET	5 - 10 oz.	971	18.36	52.9	19.34	11.6%
PET	10 - 15 oz.	2,487	113.62	21.9	4.10	6.9%
PET	15 - 24 oz.	38,914	1,219.41	31.9	5.05	5.1%
PET	24 - 34 oz.	3,237	293.61	11.0	0.48	3.1%
PET	>34 oz.	2,434	250.42	9.7	0.47	3.3%
HDPE Overall	Combined	92	4.78	19.3	5.20	19.6%
HDPE	<5 oz.	0	0.00	0.0		
HDPE	5 - 10 oz.	7	0.30	23.7	6.08	85.3%
HDPE	10 - 15 oz.	69	2.63	26.2	0.69	10.8%
HDPE	15 - 24 oz.	2	0.16	12.3	2.43	198.6%
HDPE	24 - 34 oz.	0	0.00	0.0		
HDPE	>34 oz.	14	1.69	8.3	1.88	31.9%
Other Plastic Overall	Combined	1	0.06	15.6		
Other	<5 oz.	0	0.00	0.0		
Other	5 - 10 oz.	0	0.00	0.0		
Other	10 - 15 oz.	1	0.06	15.6		
Other	15 - 24 oz.	0	0.00	0.0		
Other	24 - 34 oz.	0	0.00	0.0		
Other	>34 oz.	0	0.00	0.0		

All data and calculations exclude partial containers and non-redeemable containers

The VMR and segregated rate +/- cannot be calculated for subtypes with data from a single customer

Subtype Proportions

Each DBC material type consists of six container-size-based subtypes: less than 5 ounces, 5-10 ounces, 10-15 ounces, 15-24 ounces, 24-34 ounces, over 34 ounces. Figure 1 and Figure 2 illustrate the distribution of container sizes for each DBC material type by weight and by total count. The figures combine the two smallest size-based subtypes and the two largest size-based subtypes for ease of reading since there are a very small number of containers in the very small and very large subtypes. The subtype making up the greatest proportion of aluminum by weight (84%) and count (87%) is 10- to 15-ounce aluminum containers. The subtype making up the greatest proportion of bi-metal by weight (76%) and count (77%) is 15- to 24-ounce bi-metal containers. The subtype making up the greatest proportion of glass by weight (75%) and count (81%) is 10- to 15-ounce glass containers. The subtype making up the greatest proportion of plastic by weight (64%) and count (84%) is 15- to 24-ounce plastic containers. These sizes correspond to the typical soda can, coconut water can, beer bottle, and water bottle respectively.

Figure 1: Material Subtype Proportions by Weight

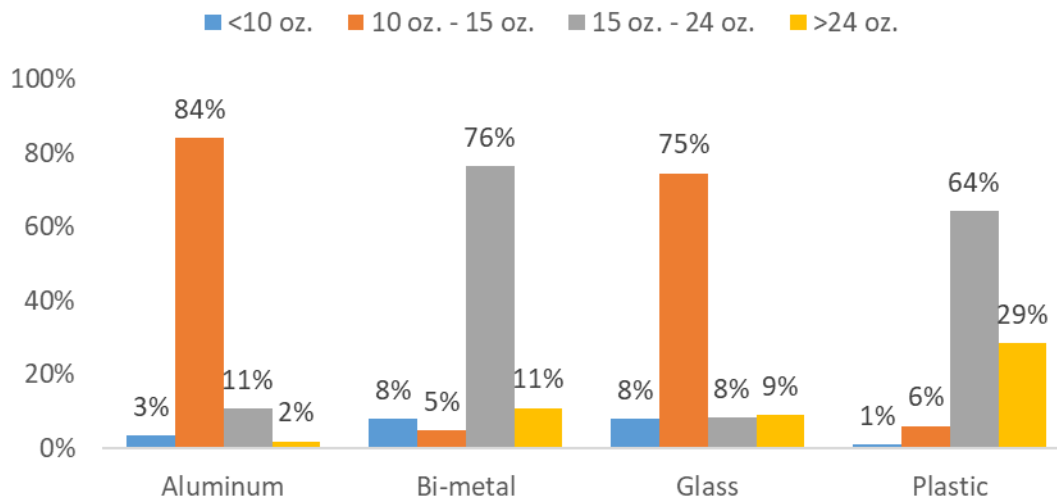
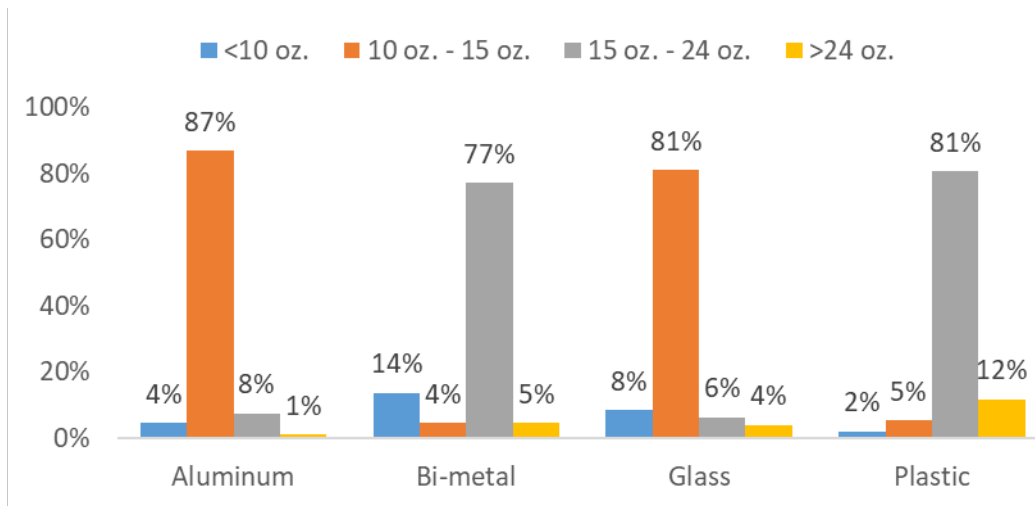


Figure 2: Material Subtype Proportions by Count



Certified Redemption Center and Material Recovery Facility Comparisons

Cascadia also investigated any differences in the segregated rate at CRCs and the segregated rate at MRFs handling the containers collected from the City and County of Honolulu’s Curbside Recycling “Blue Bin” program. The comparative analysis did not include bi-metal and glass containers because MRFs generally do not redeem those containers.

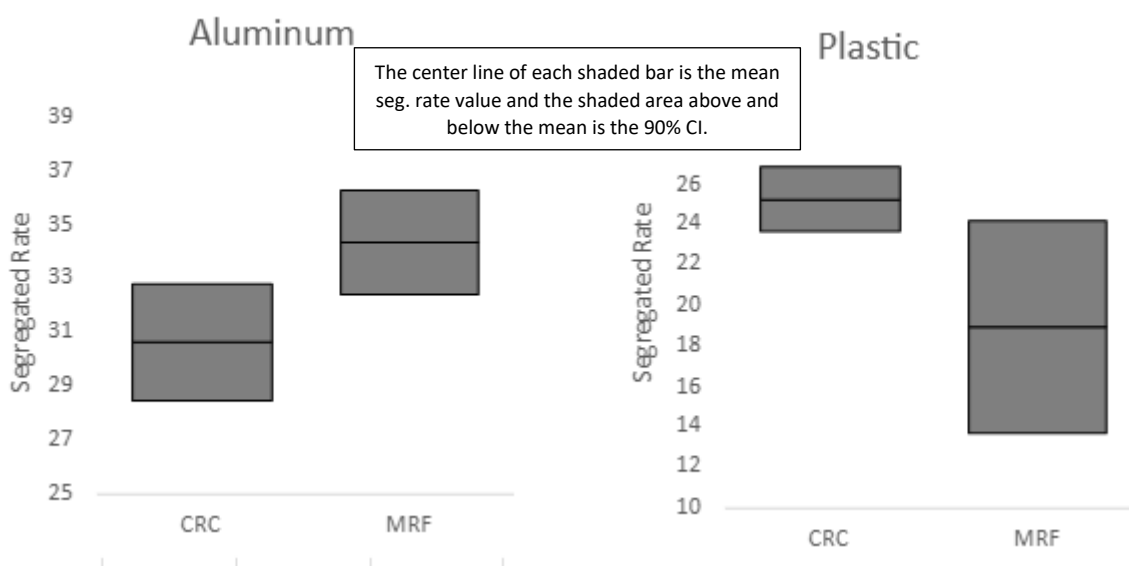
Table 3 shows the results of this comparative analysis for aluminum and plastic. It is important to note that the absolute size of the difference is not a definitive determination that the difference in segregated rate is “real.”

Table 3: Sample Data from CRCs and the MRF

Material	Size	All Non MRF Sites					MRF				
		Count	Net (lb)	Seg. Rate	VMR	Seg. Rate +/-	Count	Net (lb)	Seg. Rate	VMR	Seg. Rate +/-
Aluminum Overall	Combined	70,834	2,310.46	30.66	10.35	7.1%	6,397	186.16	34.36	0.20	5.6%
Plastic Overall	Combined	48,184	1,901.54	25.34	6.61	6.3%	3,522	185.31	19.01	3.26	27.7%

For each of the material types, Figure 3 shows the segregated rate at the CRC and the segregated rate at the MRF along with the confidence intervals (CI). The black line in the center of each shaded bar is the mean segregated rate value and the shaded area above and below the mean illustrates the 90 percent confidence interval. The CRC mean segregated rate is lower than the MRF mean segregated rate for aluminum and higher for plastic. For both aluminum and plastic, the CRC 90 percent confidence interval overlaps with the 90 percent confidence interval around the MRF mean segregated rate. This suggests (though is not statistical proof) that there is likely not a “real” difference in the segregated rate at CRCs and MRFs sites, and any difference in the segregated rate between the CRCs and MRFs is within the “margin of error” (the confidence interval).

Figure 3: CRC and MRF Mean Segregated Rate and 90% Confidence Intervals



This study did not investigate why the segregated rate is different at a CRC compared to a MRF material. One possibility is that the MRF redeems different sizes of containers than walk up customers at the CRCs. Figure 4 illustrates that the subtype proportions for aluminum were largely similar for CRCs and the MRF. For aluminum, there were twice as many small-sized (less than 10 ounces) containers redeemed at the MRF, compared with the amount redeemed at CRCs. For plastic, there were noticeably more large-sized (over 24 ounces) containers redeemed at the MRF, compared with the amount redeemed at CRCs (Figure 5).

Figure 4: Aluminum Subtype Proportions for CRCs and MRF by Count

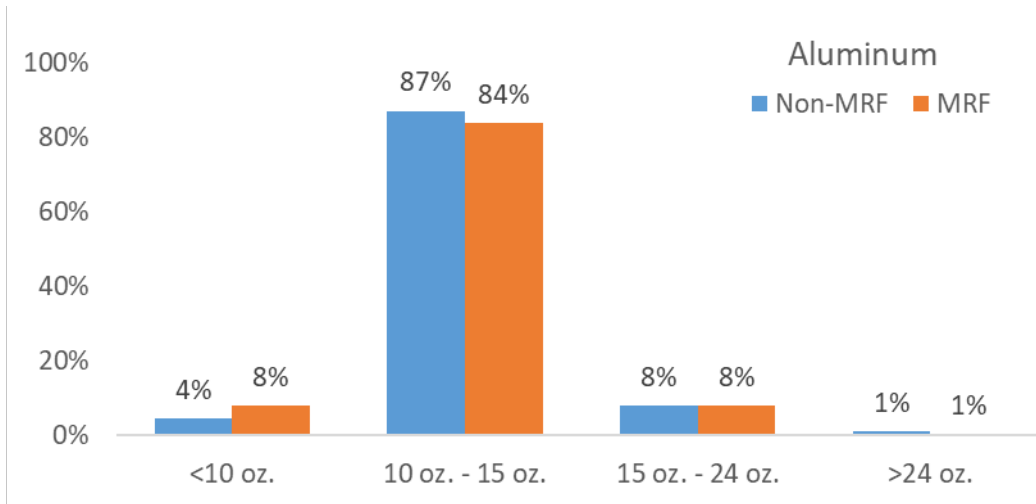


Figure 5: Plastic Subtype Proportions for CRCs and MRF by Count

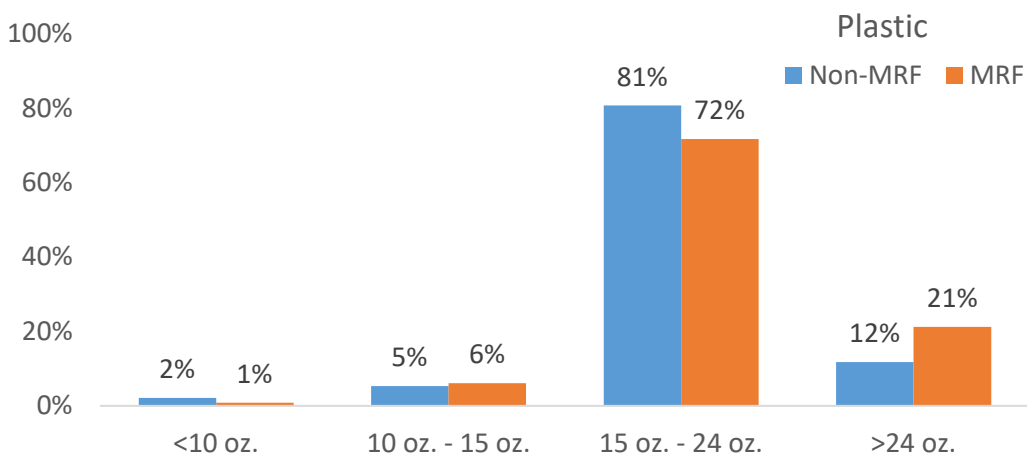


Table 4 provides detailed sample data for the MRF, separating the segregated rate, VMR, and confidential intervals for each size-based subtype for aluminum and plastic in addition to the resin-based subtype (PET) for plastic. Only PET containers were found in the samples of plastic containers redeemed at the MRF.

Table 4: MRF Sample Data

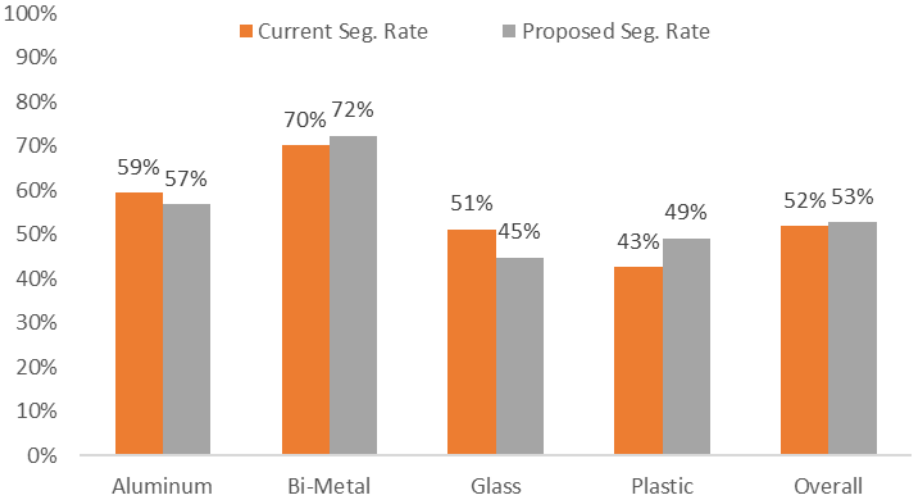
		MRF				
Material	Size	Count	Net (lb)	Seg. Rate	VMR	Seg. Rate +/-
Aluminum Overall	Combined	6,397	186.16	34.4	0.20	5.6%
Aluminum	<5 oz.	0	0.00	0.0		
Aluminum	5 - 10 oz.	504	11.88	42.4	0.00	0.6%
Aluminum	10 - 15 oz.	5,350	153.77	34.8	0.16	5.0%
Aluminum	15 - 24 oz.	511	18.73	27.3	0.10	4.9%
Aluminum	24 - 34 oz.	32	1.78	18.0		
Aluminum	>34 oz.	0	0.00	0.0		
Plastic Overall	Combined	3,522	185.31	19.0	3.26	27.7%
Plastic	<5 oz.	0	0.00	0.0		
Plastic	5 - 10 oz.	31	0.82	37.8	13.73	44.3%
Plastic	10 - 15 oz.	215	11.91	18.1	0.03	3.1%
Plastic	15 - 24 oz.	2,527	94.79	26.7	1.02	13.1%
Plastic	24 - 34 oz.	318	27.63	11.5	0.01	2.0%
Plastic	>34 oz.	431	50.16	8.6	0.01	2.9%
PET Overall	Combined	3,522	185.31	19.0	3.26	27.7%
PET	<5 oz.	0	0.00	0.0		
PET	5 - 10 oz.	31	0.82	37.8	13.73	44.3%
PET	10 - 15 oz.	215	11.91	18.1	0.03	3.1%
PET	15 - 24 oz.	2,527	94.79	26.7	1.02	13.1%
PET	24 - 34 oz.	318	27.63	11.5	0.01	2.0%
PET	>34 oz.	431	50.16	8.6	0.01	2.9%

All data and calculations exclude partial containers and non-redeemable containers
 The VMR and segregated rate +/- cannot be calculated for subtypes with data from a single customer

Alternative Redemption Rate Scenarios

Cascadia compared how the current segregated rates and proposed segregated rates may affect the redemption rates. For this analysis, Cascadia applied the current segregated rate and the segregated rate proposed in this study to the containers redeemed in the FY2025 and then divided by the number of containers reported sold in the same FY. Figure 6 shows that the proposed segregated rates slightly reduce the redemption rates for aluminum and glass and slightly increases the redemption rates for bi-metal and plastic. The proposed segregated rates would increase the overall redemption rate by one percentage point.

Figure 6: Alternative Redemption Rates for Current and Proposed Segregated Rates



Individual Container Data

Each day of work, the field crew collected volume and weight data for a random selection of individual containers. The purpose of this data collection was to profile the labeled volume of redeemed containers and refine the methods for determining the minimum number of containers to characterize for a robust data set. The following figures illustrate the findings from the individual container data collected at CRCs. As shown in Figure 7 and Figure 8, aluminum and glass each have an overwhelming peak for 12-ounce containers. Aluminum 12-ounce containers accounted for 72% of all aluminum containers in the selected individual container samples, while glass 12-ounce containers accounted for 63% of all glass containers in the selected individual container samples. This corresponds with the size of a standard soda or beer container.

Figure 7: Aluminum Individual Container Data

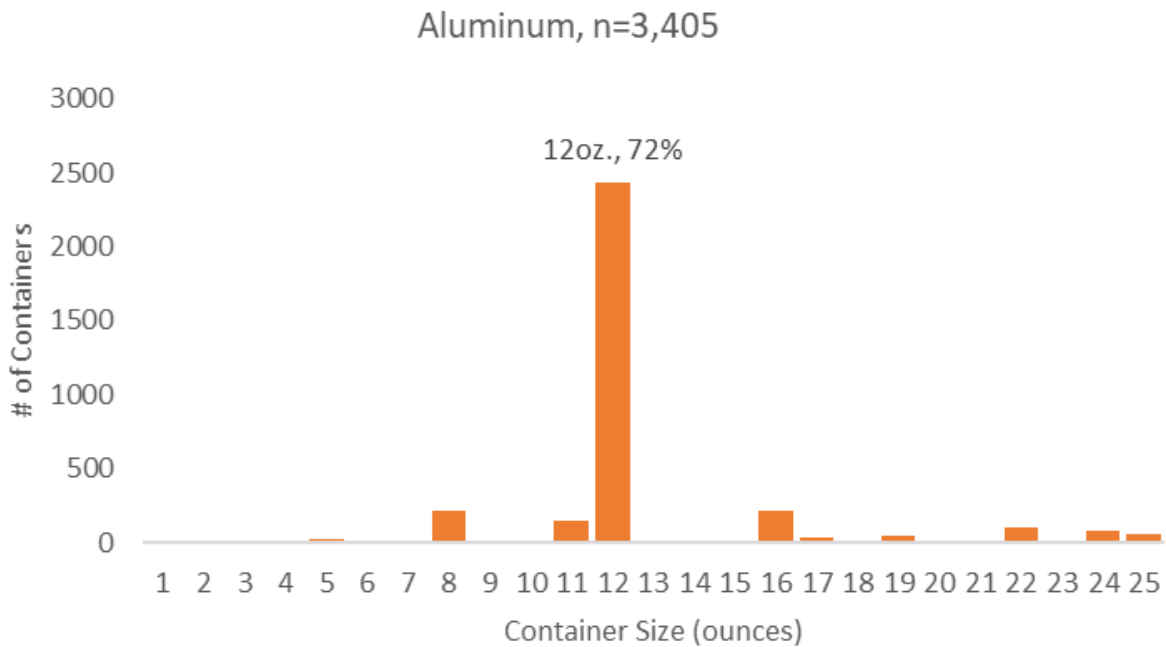
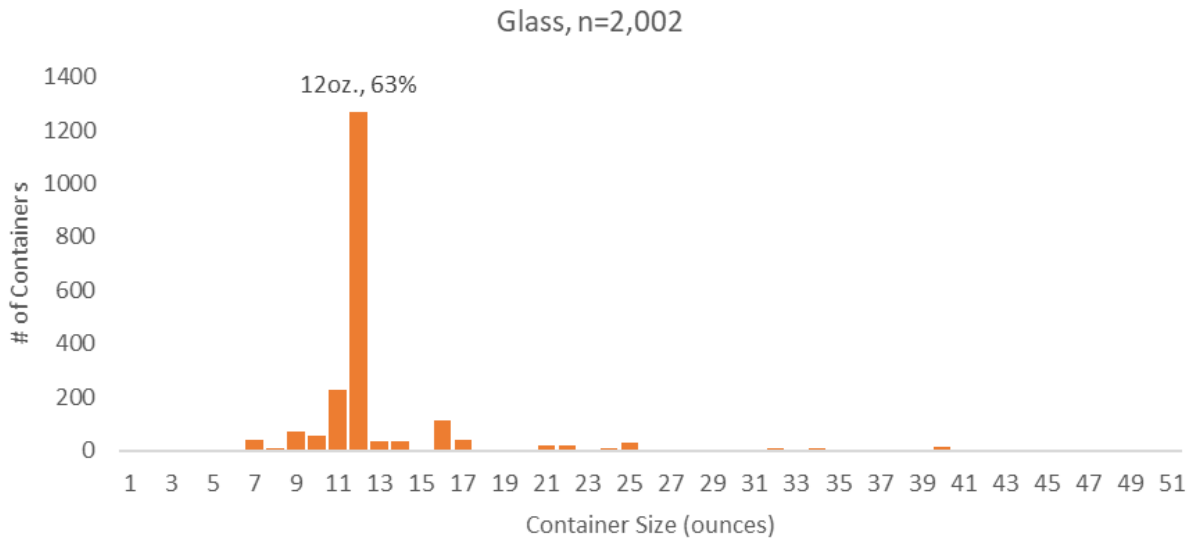


Figure 8: Glass Individual Container Data



As shown in Figure 9 and Figure 10, bi-metal and plastic have an major peaks for 18-ounce and 17-ounce containers, respectively, which are the most common size for bi-metal coconut water containers and plastic water bottles. Bi-metal 18-ounce containers accounted for 70% of all bi-metal containers in the selected individual container samples, while plastic 17-ounce containers accounted for 54% of all plastic containers in the selected individual container samples.

Figure 9: Bi-metal Individual Container Data

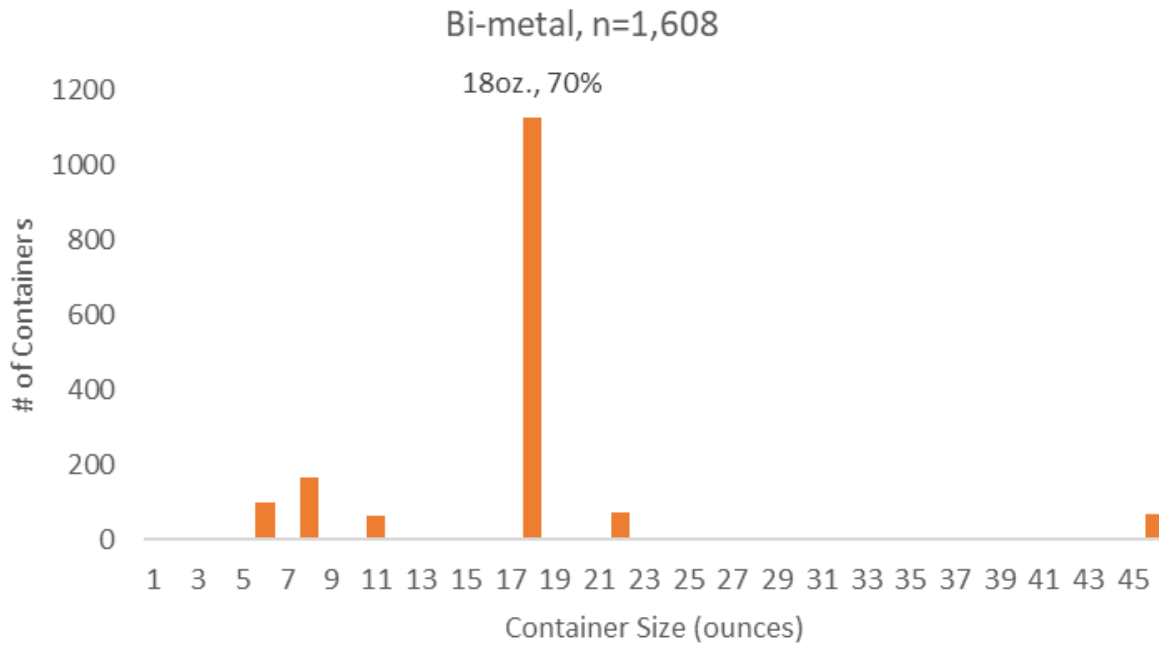
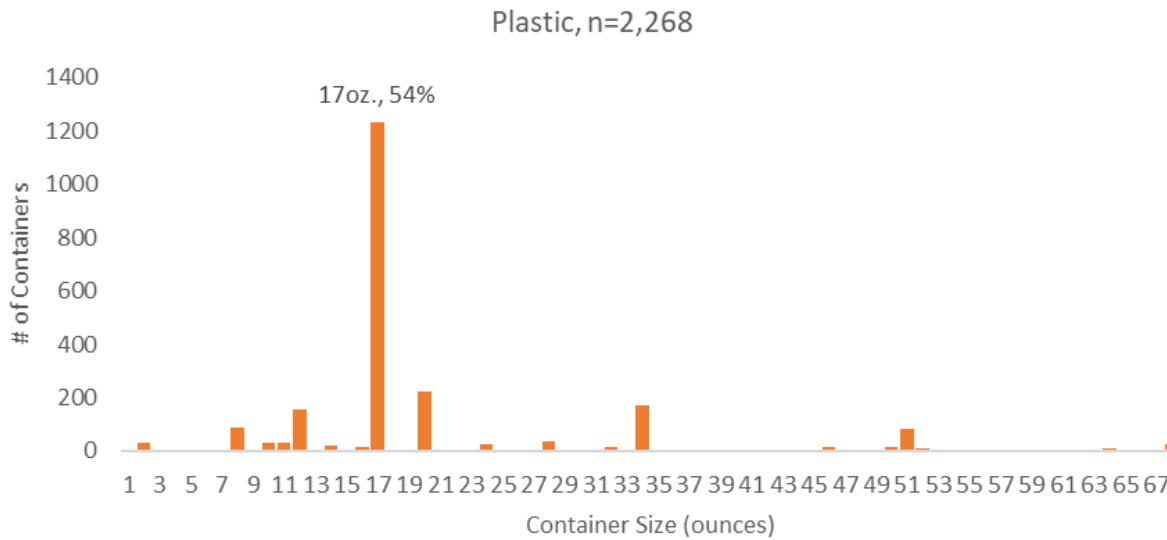


Figure 10: Plastic Individual Container Data





Recommendations

Recommendations for Future Field Work and Analyses

Based on the 2025-2026 data collection, we recommend incorporating the following items into future field work and analyses:

- Align container subtype sizes with the definition of “small” in the current segregated rate. Currently “small” plastic containers (containers 17 ounces and smaller) and mixed plastic containers have different segregated rates. The current study was not designed to measure 17 ounce and smaller containers so a revised “small” plastic segregated rate cannot be calculated.
- Complete additional characterization work for MRFs. A preliminary analysis of the segregated rate data for the materials processed by MRFs indicates that the mean segregated rate is different for materials characterized at the CRCs and MRF. This indicates that materials redeemed by MRFs may warrant a separate segregated rate.

Recommendations for Revised Segregated

Hawai'i Department of Health's Deposit Beverage Container Program's segregated rates were last updated at the end of 2010. The current rates and the proposed rates are shown in Table 5.

Table 5: Current and Proposed Segregated Rates

Material Type	Current Segregated Rate	Proposed Segregated Rate
Aluminum	32.0	30.7
Bi-metal	5.9	6.2
Glass	2.4	2.1
Plastic	18.8	25.3

Appendix A. Material Type Definitions

Aluminum Containers. Beverage containers made of aluminum.

1. *Containers <5oz.* Whole containers made of aluminum that are less than 5 ounces in size.
2. *Containers 5-10oz.* Whole containers made of aluminum that are at least 5 ounces but less than 10 ounces in size.
3. *Containers 10-15oz.* Whole containers made of aluminum that are at least 10 ounces but less than 15 ounces in size.
4. *Containers 15-24oz.* Whole containers made of aluminum that are at least 15 ounces but less than 24 ounces in size.
5. *Containers 24-34oz.* Whole containers made of aluminum that are at least 24 ounces but less than 34 ounces (approximately 1 liter) in size.
6. *Containers > 34oz.* Whole containers made of aluminum that are over 34 ounces (approximately 1 liter) in size.
7. *Partial aluminum containers.* Partial containers made of aluminum. Each portion of a container with the HI-5 label visible will be counted as a single container.
8. *Lids and caps from aluminum containers.*
9. Non-redeemable aluminum. Non-CRV (HI-5) aluminum cans that were found in samples. Also includes any aluminum that has the label removed and cannot be clearly identified as a HI-5 acceptable container.

Bi-metal Containers. Beverage containers made of primarily ferrous materials.

10. *Containers <5oz.* Whole containers made of bi-metal that are less than 5 ounces in size.
11. *Containers 5-10oz.* Whole containers made of bi-metal that are at least 5 ounces but less than 10 ounces in size.
12. *Containers 10-15oz.* Whole containers made of bi-metal that are at least 10 ounces but less than 15 ounces in size.
13. *Containers 15-24oz.* Whole containers made of bi-metal that are at least 15 ounces but less than 24 ounces in size.
14. *Containers 24-34oz.* Whole containers made of bi-metal that are at least 24 ounces but less than 34 ounces (approximately 1 liter) in size.

15. *Containers > 34oz.* Whole containers made of bi-metal that are over 34 ounces (approximately 1 liter) in size.
16. *Partial bi-metal containers.* Partial containers made of bi-metal. Each portion of a container with the HI-5 label visible will be counted as a single container.
17. *Lids and caps from Bi-metal containers*
18. Non-redeemable Bi-metal. Non-CRV (HI-5) bi-metal cans that were found in samples. Also includes any bi-metal that has the label removed and cannot be clearly identified as a HI-5 acceptable container.

Glass Containers. Beverage containers made from glass.

19. *Containers <5oz.* Whole containers made of glass that are less than 5 ounces in size.
20. *Containers 5-10oz.* Whole containers made of glass that are at least 5 ounces but less than 10 ounces in size.
21. *Containers 10-15oz.* Whole containers made of glass that are at least 10 ounces but less than 15 ounces in size.
22. *Containers 15-24oz.* Whole containers made of glass that are at least 15 ounces but less than 24 ounces in size.
23. *Containers 24-34oz.* Whole containers made of glass that are at least 24 ounces but less than 34 ounces (approximately 1 liter) in size.
24. *Containers > 34oz.* Whole containers made of glass that are over 34 ounces (approximately 1 liter) in size.
25. *Partial glass containers.* Partial containers made of glass. Each portion of a container with the HI-5 label visible will be counted as a single container.
26. *Lids and caps from glass containers.*
27. Non-redeemable Glass. Non-CRV (HI-5) glass containers that were found in samples. Also includes any glass that has the label removed and cannot be clearly identified as a HI-5 acceptable container.

Plastic Containers. Beverage containers made of plastic.

28. *PET Containers <5oz.* Whole #1 PET plastic containers that are less than 5 ounces in size. Also include hybrid plastic and metal containers where the plastic portion is #1 PET.

29. *PET Containers 5-10oz.* Whole #1 PET plastic containers that are at least 5 ounces but less than 10 ounces in size. Also include hybrid plastic and metal containers where the plastic portion is #1 PET.
30. *PET Containers 10-15oz.* Whole #1 PET plastic containers that are at least 10 ounces but less than 15 ounces in size. Also include hybrid plastic and metal containers where the plastic portion is #1 PET.
31. *PET Containers 15-24oz.* Whole #1 PET plastic containers that are at least 15 ounces but less than 24 ounces in size. Also include hybrid plastic and metal containers where the plastic portion is #1 PET.
32. *PET Containers 24-34oz.* Whole #1 PET plastic containers that are at least 24 ounces but less than 34 ounces (approximately 1 liter) in size. Also include hybrid plastic and metal containers where the plastic portion is #1 PET.
33. *PET Containers > 34oz.* Whole #1 PET plastic containers that are over 34 ounces (approximately 1 liter) in size. Also include hybrid plastic and metal containers where the plastic portion is #1 PET.
34. *Partial PET containers.* Partial #1 PET plastic containers. Each portion of a container with the HI-5 label visible will be counted as a single container. Also include hybrid plastic and metal containers where the plastic portion is #1 PET.
35. *HDPE Containers <5oz.* Whole #2 HDPE plastic containers that are less than 5 ounces in size.
36. *HDPE Containers 5-10oz.* Whole #2 HDPE plastic containers that are at least 5 ounces but less than 10 ounces in size. Also include hybrid plastic and metal containers where the plastic portion is #2 HDPE.
37. *HDPE Containers 10-15oz.* Whole #2 HDPE plastic containers that are at least 10 ounces but less than 15 ounces in size. Also include hybrid plastic and metal containers where the plastic portion is #2 HDPE.
38. *HDPE Containers 15-24oz.* Whole #2 HDPE plastic containers that are at least 15 ounces but less than 24 ounces in size. Also include hybrid plastic and metal containers where the plastic portion is #2 HDPE.
39. *HDPE Containers 24-34oz.* Whole #2 HDPE plastic containers that are at least 24 ounces but less than 34 ounces (approximately 1 liter) in size. Also include hybrid plastic and metal containers where the plastic portion is #2 HDPE.
40. *HDPE Containers > 34oz.* Whole #2 HDPE plastic containers that are over 34 ounces (approximately 1 liter) in size. Also include hybrid plastic and metal containers where the plastic portion is #2 HDPE.

41. *Partial HDPE containers.* Partial #2 HDPE plastic containers. Each portion of a container with the HI-5 label visible will be counted as a single container. Also include hybrid plastic and metal containers where the plastic portion is #2 HDPE.
42. *Other Plastic Containers <5oz.* Whole plastic containers made of a resin other than PET or HDPE that are less than 5 ounces in size. Also include hybrid plastic and metal containers where the plastic portion a resin other than PET or HDPE.
43. *Other Plastic Containers 5-10oz.* Whole plastic containers made of a resin other than PET or HDPE that are at least 5 ounces but less than 10 ounces in size. Also include hybrid plastic and metal containers where the plastic portion a resin other than PET or HDPE.
44. *Other Plastic Containers 10-15oz.* Whole plastic containers made of a resin other than PET or HDPE that are at least 10 ounces but less than 15 ounces in size. Also include hybrid plastic and metal containers where the plastic portion a resin other than PET or HDPE.
45. *Other Plastic Containers 15-24oz.* Whole plastic containers made of a resin other than PET or HDPE that are at least 15 ounces but less than 24 ounces in size. Also include hybrid plastic and metal containers where the plastic portion a resin other than PET or HDPE.
46. *Other Plastic Containers 24-34oz.* Whole plastic containers made of a resin other than PET or HDPE that are at least 24 ounces but less than 34 ounces (approximately 1 liter) in size. Also include hybrid plastic and metal containers where the plastic portion a resin other than PET or HDPE.
47. *Other Plastic Containers > 34oz.* Whole plastic containers made of a resin other than PET or HDPE that are over 34 ounces (approximately 1 liter) in size. Also include hybrid plastic and metal containers where the plastic portion a resin other than PET or HDPE.
48. *Partial Other Plastic containers.* Partial containers made of a resin other than PET or HDPE. Each portion of a container with the HI-5 label visible will be counted as a single container. Also include hybrid plastic and metal containers where the plastic portion a resin other than PET or HDPE.
49. *Lids and caps from plastic containers.*
50. *Non-redeemable plastic.* Non-CRV (HI-5) plastic that was found in sample. Also includes any plastic that has the label removed and cannot be clearly identified as a HI-5 acceptable bottle.

Appendix B. Detailed Study Design

Overview

The Hawai'i Department of Health's Office of Solid Waste Management (OSWM) is conducting the Segregated Rate Study for the Hawai'i Deposit Beverage Container Program in 2025–2026 to collect data on the quantity and weight of beverage containers redeemed at certified redemption centers (CRCs). OSWM is requesting an update to a similar study completed in 2016–2017 to account for potential changes in container types and sizes over the past decade. The objective of the 2025 Hawai'i Segregated Rate Study is to generate statistically robust data on the composition and weights of Hawai'i's residential deposit containers. This information will be used to update the segregated rates applied by the Deposit Beverage Container (DBC) Program.

The segregated rate represents the number of containers per pound (CPP) for a specific material type. To develop updated segregated rates, the study will involve characterizing (collecting, sorting, counting, and weighing) beverage containers of various materials and sizes redeemed at CRCs across the state. Consistent sampling procedures and data management protocols will be used to ensure that the resulting dataset is representative, defensible, and reliable for long-term program planning. Findings from this study will support the development of segregated rates for beverage containers and help confirm the feasibility and fairness of current redemption values.

Study Parameters

The 2016–2017 fieldwork prioritized characterizing the maximum number of containers feasible to establish defensible segregated rates for each material. This current study will follow similar parameters. Cascadia will collect, sort, count, and characterize containers from fifteen sites across the state over 31 workdays. Throughout the study, Cascadia will characterize aluminum, bi-metal, glass, and plastic containers. Redeemed materials will be categorized into 50 subtypes, with an emphasis on producing defensible segregated rates for the DBC material types. Definitions of all material subtypes are provided in Appendix A. Material Type Definitions.

Streams

This study focuses on material dropped off by Hawai'i residents to be redeemed through the DBC Program, including aluminum, bi-metal, glass, and plastic. A list of materials can be found in Appendix A. Material Type Definitions.

Sampling Universe

This study focuses on all existing CRCs that reported redeeming containers in FY 2025. Molokai and Lanai each have a small number of CRCs, but due to the low volume of material redeemed and the logistics required to sample on those islands, Molokai and Lanai CRCs have been excluded from the sampling universe. However, their redemption data were considered when allocating sampling days to counties. At the time of study planning there are 50 eligible CRCs. More than half of all containers are redeemed in the City and County of Honolulu. The number of CRCs in each county as well as the quantities of redeemed containers for each county are summarized in Table 6.

Table 6. Summary of Certified Redemption Centers

County	No. of Sites	No. of Containers	% of Containers
Hawai'i	16	98,047,993	19%
Kauai	5	35,176,185	7%
Maui	6	82,684,701	16%
O'ahu (Honolulu)	23	294,578,371	58%
Total	50	515,515,286	100%

Selected Sites for Sampling

CRCs selected for sampling are determined based on the average number of containers each facility receives, the number of facilities on each island, and identification of the largest quartile. To maintain proportional representation across islands, we will sample approximately one quarter of the facilities on each island. Specifically, Hawaii Island has 16 sites, of which four will be sampled; Kauai has five sites, with three selected; Maui has six sites, with four selected; and O'ahu has 23 sites, with seven selected for sampling including two days at a MRF. Cascadia allocated one to two sampling days per facility. A summary of total sampling days is provided in Table 7. Specific site selection is shown in Table 8.

Table 7. Number of Days per County

County	No. of days
Hawai'i	7 days
Kauai	3 days
Maui	8 days
O'ahu (Honolulu)	13 days
Total	31 days

Table 8. Sites Selected for Sampling

County	Company	Location	Address	City	Zip
Hawai'i	Mr. K's Recycle & Redemption Center	Hilo - Kinoole	815 Kinoole St.	Hilo	96720
Hawai'i	HMP, Inc	Next to USPS	15-2859 Pahoia Village Rd	Pahoia	96778
Hawai'i	Atlas Recycling	Hilo - Makaala	30 Makaala St.	Hilo	96720
Hawai'i	Atlas Recycling	Alapa Recycling	74-5600 Alapa St	Kona	96740
Kauai	Kauai Community Recycling	Curbside, next to Napa Auto Parts	962-A Kipuni Way	Kapaa	96746
Kauai	Kauai Community Recycling	Old Mill Lot	Kekaha Road	Kekaha	96752
Kauai	Reynolds Recycling	Lihue - Ahukini	3460 Ahukini Rd	Lihue	96766
O'ahu	K & C Metal	Waipahu Depot	94-037 Waipahu Depot Rd.	Waipahu	96797
O'ahu	Monster HI-5 & Tires	Waialae Ave	2960 Waialae Ave.	Honolulu	96826
O'ahu	Reynolds Recycling	Waiakamilo location	1385 Colburn St	Honolulu	96817
O'ahu	CM Recycling	Sand Island Access	204 Sand Island Access Rd.	Honolulu	96819
O'ahu	Reduce Reuse Recyclers	Kapolei - Kalaeloa	91-161 Kalaeloa Blvd	Kapolei	96707
O'ahu	Reduce Reuse Recyclers	Mall - Alaloa	46 Alaloa St	Kaneohe	96744
O'ahu	Reduce Reuse Recyclers	Honolulu - Kapahulu	548 Kapahulu Ave.	Honolulu	96815
Maui	Aloha Glass	Kahului - Amala	75 Amala Pl.	Kahului	96732
Maui	Aloha Shell	Kahului - Puunene	110 S. Puunene Ave.	Kahului	96732
Maui	Aloha Glass	(Pi'ilani Village)	225 Piikea Ave	Kihei	96753
Maui	Reynolds Recycling	Kahului - Wakea	9 South Wakea Avenue	Kahului	96732

Cascadia spent 31 days characterizing containers across the four counties (Hawai'i, Kauai, Maui, and O'ahu). The number of sites vary by county and is approximately proportional to the number of containers redeemed in the county in FY 2025. Table 9 shows the proposed sampling calendar.

Table 9. Proposed Sampling Calendar

Island	Company	Location	Team 1 - Date	Team 2 - Date
Hawai'i	Mr. K's	Hilo - Kinooole	December 13, 2025	
Hawai'i	Mr. Ks	Hilo - Kinooole	December 14, 2025	
Hawai'i	HMP	Pahoe	December 15, 2025	
Hawai'i	HMP	Pahoe	December 16, 2025	
Hawai'i	Atlas	Hilo - Makaala	December 17, 2025	
Hawai'i	Atlas	Hilo - Makaala	December 18, 2025	
Hawai'i	Atlas	Hilo - Waianuenue	December 19, 2025	
Kauai	KCRS	Napa Auto Parts - Kapaa		December 16, 2025
Kauai	KCRS	Old Mill – Kekaha Road		December 17, 2025
Kauai	Reynolds	Lihue - Ahukini		December 18, 2025
O'ahu	K&C	Waipahu Depot	January 6, 2026	
O'ahu	K&C	Waipahu Depot	January 7, 2026	
O'ahu	Monster HI-5	Waialae Ave	January 8, 2026	
O'ahu	Monster HI-5	Waialae Ave	January 9, 2026	
O'ahu	Reynolds	Honolulu - Waiakamilo	January 10, 2026	
O'ahu	Reynolds	Honolulu - Waiakamilo	January 11, 2026	
O'ahu	CM Recycling	Sand Island Access	January 13, 2026	
O'ahu	RRR MRF	Kapolei - Kalaelo	January 14, 2026	
O'ahu	RRR MRF	Kapolei - Kalaelo	January 15, 2026	
O'ahu	CM Recycling	Sand Island Access	January 16, 2026	
O'ahu	RRR Recycling	Honolulu - Kapahulu	January 17, 2026	
O'ahu	RRR Recycling	Mall - Alaloa	January 20, 2026	
O'ahu	RRR Recycling	Mall - Alaloa	January 21, 2026	
Maui	Aloha Glass	Kahului - Amala		January 5, 2026
Maui	Aloha Glass	Kahului - Amala		January 6, 2026
Maui	Aloha Shell	Kahului- Puunene		January 7, 2026
Maui	Aloha Shell	Kahului - Puunene		January 8, 2026

Island	Company	Location	Team 1 - Date	Team 2 - Date
Maui	Aloha Glass	Kihei – Piilani Hwy		January 9, 2026
Maui	Aloha Glass	Kihei – Piilani Hwy		January 12, 2026
Maui	Reynolds	Kahului - Wakea		January 13, 2026
Maui	Reynolds	Kahului - Wakea		January 14, 2026

Sample Size and Allocation

Cascadia evaluated the sampling approaches used in previous segregated rate studies, including the methodology applied in California and in Hawai’i’s 2016–2017 study, to ensure that this year’s approach remains statistically robust. While multiple methods exist for determining the minimum number of containers needed, the 2025–2026 study will follow the same methodology and statistical parameters used in the previous Hawai’i study, including maintaining an error rate of ±3% at the 90% confidence level for each of the four DBC material types.

The calculation methods and supporting statistical procedures are described in Appendix C. Description of Calculations and Statistical Procedures. The minimum number of containers required to achieve the specified precision is summarized in Table 10.

Table 10. Minimum Number of Containers to Count

Material Type	Minimum Counts
Aluminum	750
Bi-metal	750
Glass	750
Plastic	750

Based on the 2016 characterization, we expect to exceed minimum required number of containers for all material types. Cascadia will maximize container counts at each site by having the field team count and weigh as many containers as they are able each day they are on site instead of stopping once they reach a specific container count.

Site Logistics and Coordination

Once the fieldwork schedule is finalized, OSWM will notify operators of the selected CRCs about the upcoming study. Following this initial notification, Cascadia will coordinate directly with site managers to schedule fieldwork dates and confirm site logistics. Cascadia will contact each CRC by phone and email to communicate the planned visit dates and ensure that adequate space and support are available for efficient and safe work. One week prior to each scheduled visit, Cascadia will send a reminder to CRC staff, followed by a final confirmation call the day before fieldwork. The crew manager will train the field team, assist with characterization activities, and ensure adherence to methodology and quality and safety protocols. Each field team is composed of two people:

- **Crew Manager:** responsible for collecting samples, coordinating with CRC staff and consumers, and conducting quality checks on the characterization.
- **Crew Member:** responsible for completing the primary characterization work.

Equipment

Each field team will be equipped with the following:

- 6-8 plastic laundry baskets (for sorted material)
- 5-6 large plastic baskets
- 35-pound digital scale that reads to 0.001 pounds (battery and AC power operated)
- iPad
- Dry erase markers/eraser
- 6' table to sort material
- Small hand rake
- Small stiff bristled brush
- Large push broom
- Dustpan
- Clip board
- Pens and paper
- Paper copies of all field forms
- 3 Laminated placards
- 2 copies of the study design
- Power bank
- 1-2 10x10 tarps

- Wood clamps
- 2 – 2x4x6' pieces of wood and 1 – 2x4x2' piece
- XL box to protect scale from wind
- Comprehensive contact list and daily schedule
- Close-toed shoes
- Heavy duty gloves
- Nitrile gloves
- Safety glasses
- Hard hats
- Safety vests
- Dust masks
- First aid kit
- Rain gear
- Sanitizing wipes

Logistics

The field team will spend at least eight hours at each site, with a 30-minute lunch break taken at a logistically appropriate time. If a CRC is open for fewer than eight hours, the field team will remain on site for the facility's full open hours (minus the 30-minute lunch break).

For CRCs that operate for more than eight hours per day, the field team will coordinate with CRC staff to determine the hours with the highest customer activity and will schedule their on-site work during those peak periods.

At the end of each day, the field team will ensure that the sorting area is left in good condition by conducting a thorough cleanup. This effort is intended to minimize or eliminate any risk of litter and includes the following steps:

- Removing all sorted containers.
- Sweeping and cleaning the sort area to prevent windblown litter.
- Removing and properly disposing of any single-use personal protective equipment.
- Checking out with the CRC manager.

Obtaining and Sorting Container Samples

Sample Selection

Cascadia will collect containers from CRC staff after the redemption value has been paid to the customer. At the start of each workday, once the field team has set up their workstation and equipment, they will select the first customer sample redeemed by the CRC. Immediately after the transaction is completed, the field team will take temporary possession of the sample and store it in large garbage cans until it can be counted and weighed.

A sample is defined as all material of a single type from a single customer (e.g., all glass containers from one customer). Samples will not be commingled. Bi-metal containers are infrequently redeemed so the field team will collect bi-metal containers from every customer who redeems them to increase the number of bi-metal samples. For bi-metal containers, it may be necessary to supplement recently redeemed material with samples collected from previously redeemed material stored onsite. The procedure for collecting these supplemental bi-metal samples is described in the following subsection. For all other material types (aluminum, glass, and plastic), the field team will collect a new sample whenever a team member is available to receive material from CRC staff and there are empty garbage cans available for storage.

The interval between collected samples will vary depending on the size of each load and the time required to complete counting and weighing; however, sample collection is expected to occur continuously throughout the day as customers arrive. This approach ensures that selected loads are effectively random.

Bi-Metal Sampling Procedure for Stockpiled Material

Bi-metal containers are redeemed infrequently at the CRCs. To characterize as many bi-metal containers as possible, the field team will employ a variety of sample collection methods depending on each CRC's unique situation. The purpose of each method is to ensure that the field team collects a representative bi-metal container sample. Possible methods for sampling bi-metal containers, in addition to sampling directly from customers as described in the previous section, are detailed below.

- If there is 0.5 cubic yards or less of stockpiled bi-metal material, the field team will collect and characterize the entire amount as a single sample.
- If the CRC aggregates bi-metal from multiple customers over extended periods (days or weeks) and stores the material loose (un-bagged) in a rigid container (e.g., bin, bunker, roll-off), and if more than 0.5 cubic yards of material is present, the field team will divide the stockpile into a series of equal-sized visual “slices” (see illustration in Figure 11). A slice will be selected at random prior to fieldwork, and each slice will have a volume no greater than 0.5 cubic yards. The field team will characterize one full 32-gallon garbage can of material at a time from the selected slice until the entire slice has been processed. Using slices ensures that all material in the stockpile has an equal probability of being selected, even if some self-stratification occurs (e.g., heavier containers settling toward the bottom and lighter containers accumulating near the top).
- If the CRC stores bi-metal containers from each customer individually or creates grouped batches of bimetal containers (for example, by bagging material as it is redeemed) and there is more than 0.5 cubic yards of stockpiled material, the field team will use a paint marker to number each bag or grouping sequentially from 1 to n . The field team will then use the RANDBETWEEN function in Microsoft Excel, setting the lower bound to 1 and the upper bound to the total number of bags/groupings to randomly select bags/groupings until approximately 0.5 cubic yards of bi-metal containers have been selected. An illustration of the numbered bags is provided in Figure 12.

Figure 11. Illustration of Bunker Slices

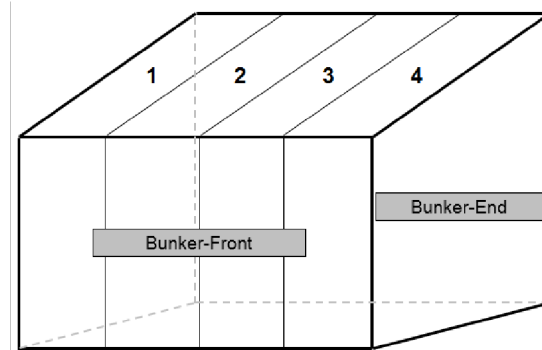


Figure 12. Numbered Bags or Bi-metal Containers



Sampling Procedures for Material Redeemed at the MRF

Curbside residential and commercial materials are processed by the MRF into deposit and non-deposit fractions. The deposit fraction is conveyed to a secondary processing line for final quality control checks, where it is separated into the two deposit material types: aluminum and plastic. From the secondary line, the materials are transported to a CRC for weighing and redemption, similar to the process for public walk-up customers.

When characterizing MRF materials, the MRF will sort the materials from the secondary processing line into 3-yard tipping bins, one bin per material type, and deliver the bins to the field team. A sample is defined as a single 3-yard bin of material. Aside from this unique sample collection method, the field team will characterize MRF materials in the same manner as all other samples.

The MRF only sorts out aluminum and plastic. The field team will only be sorting these two commodities on field days at the MRF.

Sample Sorting

All samples will be hand-sorted, and data will be entered electronically in the field. Paper field forms will be available as a backup to the electronic entry forms. Material will be sorted by size (in ounces), as outlined in the material list, then counted, photographed, and weighed. Size categories include <5 oz., 5-10 oz., 10-15 oz., 15-24 oz., 24-34 oz., and >34 oz. Containers that fall on a size boundary will be sorted into the next larger size category. For example, a 24-oz. soda bottle will be classified in the 24-34 oz. category rather than the 15-24 oz. category.

Non-redeemable containers will be sorted, counted, and recorded separately. The non-redeemable containers will not be characterized by size (since many are missing labels the size is unknown). This category includes non-HI-5 material as well as bottles or containers without HI-5 labels.

The field team will follow the process below to hand sort containers:

1. **Sample Preparation:** The field team will dump a single material type of redeemed material (the sample) onto the sort table. Only one sample will be on the sort table at a time.
2. **Sorting:** The team will sort the sample into the appropriate subtypes using plastic laundry baskets or barrels with one material subtype per container. Materials will be counted as they are sorted. All broken or partial containers will be placed into a single designated basket. The crew manager will monitor the homogeneity of the sorted material, re-sorting any items that are improperly classified. Once sorting is complete, the team will photograph the sample alongside a placard labeled with a unique ID, the customer number, and the subtype.
3. **Weighing:** The crew manager will weigh one basket or barrel of sorted material at a time using a digital scale and record the gross weight on the Container Tally Sheet along with the container count. Each broken or partial container with a visible HI-5 label will be counted as one container.

4. **Tare Measurement:** The counted material will be returned to the possession of the CRC, and the crew manager will record the weight of the empty basket or barrel (tare weight).

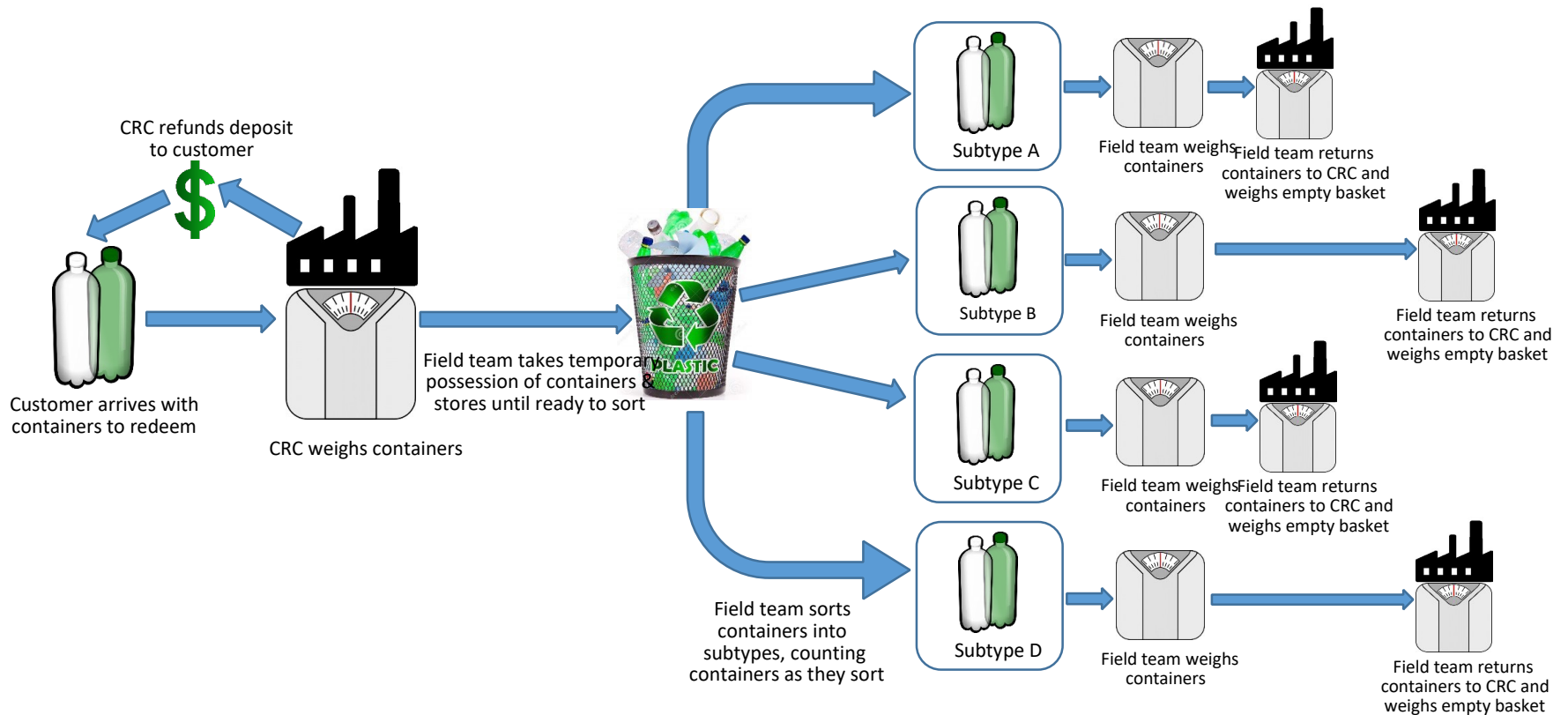
MATERIAL LIST

The study includes four DBC material types, aluminum, glass, bi-metal, and plastic, and 50 material subtypes, as detailed in Appendix A. Material Type Definitions. These material types are the primary focus of the study and correspond to the groupings used by OSWM to determine redemption values.

Aluminum, bi-metal, and glass containers will each be subdivided into seven size-based subtypes.

Plastic containers will be subdivided into 21 subtypes based on both resin type and container size. The size subtypes are consistent with those used in the 2016 study.

Figure 13. Summary of the Characterization Method



Each day, two samples of each material type will be selected for more detailed weighing. For these selected samples, one basket of material will be set aside before sorting the rest of the material into subtypes. Each container in the basket will be weighed individually, the container volume will be recorded, and for plastic containers, the resin type will also be noted. Once all data for the basket has been recorded, the material will be returned to the sort table and sorted into subtypes as usual. Only whole containers will be weighed as part of this detailed effort. Individual container weights and volumes will be recorded on the Individual Container Tally Sheet.

This additional data collection serves two purposes:

1. Individual container weights will be reviewed to inform the number of containers to sort in future studies.
2. Individual container volumes will be used to profile the population of redeemed containers. The resulting population profile may indicate different size breaks for material subtypes or the need for additional material subtypes.

The field team will select two random samples for detailed weighing using a sheet of pre-printed random numbers. See Appendix D. Example Field Forms for example field forms.

At the end of each sorting day, the crew manager will conduct a quality control review of all recorded data for completeness. Electronic field forms automatically sync and save to cloud-based storage while in use. At the conclusion of the study, copies of all electronic field forms will be emailed, and any paper Container Tally Sheets will be transported to the Cascadia office for data entry and further review.

Appendix C. Description of Calculations and Statistical Procedures

Sample Size Calculations

The following method is described in the document *Technical Details for the Study to Determine the Refund Values and Number of Containers per Pound* published by CalRecycle in 2010. This describes the basis of the method used by CalRecycle to calculate their segregated rate and is the most conservative method for determining the appropriate sample size.

The number of containers sampled for each material type was determined as follows:

1. An ordinary binomial sampling procedure was used to calculate the number of containers (by material) to be counted and weighed. In binomial sampling, the required number of containers for a given precision and a specified confidence interval (level) was given by:

$$n = \frac{p * q * [Z_{\alpha/2}]^2}{e^2}$$

where:

n	=	Number of containers to be counted and weighed.
p	=	Proportion of HI-5 containers by count. The proportion p is usually estimated from a preliminary sample but may also be taken as a $p = 0.5$, which maximizes the value of $p * q$ and provides the most conservative sample size estimate.
q or (1-p)	=	Proportion of non-HI-5 containers by count.
e	=	Maximum accepted error for each material, in this case 3 percent.
α	=	The area of the critical region (the region outside of our confidence interval). For a confidence interval of 90 percent (0.90), the critical region is 0.10 (1-0.90).
$[Z_{\alpha/2}]$	=	Z-score for a given critical region determined by the selected confidence interval, assuming a randomly distributed sample population. The Z-score for our critical region (0.10/2) of our 90 percent confidence interval is 1.645.

1. Because the relevant measure was the commingled rate (HI-5 weight divided by total weight) instead of the number of HI-5 containers divided by all containers, the above equation was transformed. Specifically, the commingled rate may be expressed as a

function of p . Transforming the equation from containers to weights affected the precision of the estimates. Mathematically, it can be shown that the appropriate n for estimating the commingled rate is obtained by multiplying the computed sample (n) from the binomial formula by the term M^2 where:

$$M = \frac{ab}{[a(1-p) + bp]^2}$$

where:

2. a = Number of HI-5 containers per pound.
- b = Number of Non-HI-5 containers per pound.

The number of containers sampled was determined as the product of M^2 times n . Values for p , a , and b by material are shown in Table 11. These values were based on the results of previous studies.

Table 11: Variables Used in Binomial Transformation

Material Type	Formulae Variables	Containers per pound	Source
Aluminum	a (HI-5 containers)	30.5	2007 HI-5 segregated rate study
Aluminum	b (non HI-5 containers)	33.45	2010 CalRecycle segregated rate study technical guide
Bi-Metal	a (HI-5 containers)	6.5	2007 HI-5 segregated rate study
Bi-Metal	b (non HI-5 containers)	6.5	No data available, set to equal the most conservative value
Glass	a (HI-5 containers)	2.2	2007 HI-5 segregated rate study
Glass	b (non HI-5 containers)	0.96	2010 CalRecycle segregated rate study technical guide
Plastic	a (HI-5 containers)	17.5	2007 HI-5 segregated rate study
Plastic	b (non HI-5 containers)	17.5	No data available, set to equal the most conservative value

Determine Segregated Rates

Cascadia calculated a segregated container per pound rate (segregated rate) for each material type and for each of the subtypes. The segregated rate was calculated using the aggregate count and weight data for each of the subtypes within a material type. The equation Cascadia used to determine the segregated rate for each material type is below.

$$\text{Seg. Rate} = \frac{\text{Subtype A \# of Conts.} + \text{Subtype B \# of Conts.} + \text{Subtype C \# of Conts.} + \dots}{\text{Subtype A Wt. of Conts.} + \text{Subtype B Wt. of Conts.} + \text{Subtype C Wt. of Conts.} + \dots}$$

Using the example data in Table 14, the segregated rate for aluminum would be calculated as:

$$\text{Seg. Rate} = \frac{10 + 1,000 + 100}{0.10 + 32.40 + 10.10} = 26.06$$

Table 12: Example Data for segregated Rate Calculation

Aluminum	Count	Weight
<10 oz.	10	0.10
10 oz. to 1L	1,100	32.40
> 1L	100	10.10
Total	1,100	42.60

The equation Cascadia used to determine the segregated rate for a material subtype is below.

$$\text{Seg. Rate}_{\text{sub}} = \frac{\text{Subtype A \# of Containers}}{\text{Subtype A Weight of Containers}}$$

Using the example data in Table 14, the segregated rate for aluminum <10 oz. would be calculated as:

$$\text{Seg. Rate} = \frac{10}{0.1} = 100$$

We also calculated the segregated rate variance-to-mean ratio (VMR) for each of the material types and subtypes. The VMR is used to measure whether the study data is dispersed or clustered. In a standard binomial distribution, the VMR is between 0 and 1. Relatively large absolute values of the VMR for a particular subtype may suggest that future iterations of the study should investigate that subtype in further detail. The VMR formula is:

$$D = \frac{\sigma^2}{\mu}$$

where:

σ	=	The sample segregated rate variance
μ	=	The sample segregated rate mean



Appendix C. Description of Calculations and Statistical Procedures

Segregated Rate Study—Final Report

Appendix D. Example Field Forms

This appendix contains examples of the field forms used throughout the study, including:

- Sample placards
- Aggregated container tally sheets
- Detailed container tally sheets
- Detailed container characterization random numbers

Figure 14: Example Sample Placard


Hawaii Segregated Rate Study		Dec. 2025 – Jan 2026	
Customer #			
			
Date: ____ / ____ / ____			
Material Type		Container Size	
<input type="checkbox"/> Aluminum	<input type="checkbox"/> Bi-metal	<input type="checkbox"/> <5oz	<input type="checkbox"/> 24-34oz
<input type="checkbox"/> Glass	<input type="checkbox"/> Plastic	<input type="checkbox"/> 5-10oz	<input type="checkbox"/> >34oz
		<input type="checkbox"/> 10-15oz	<input type="checkbox"/> Partial
		<input type="checkbox"/> 15-24oz	<input type="checkbox"/> Caps
Notes:			

Figure 15: Example Aggregated Container Tally Sheet

Team: Date: ____/____/2025 Customer #:		Notes:			In the Material column, print two letters separated by a dash (-). First letter: First letter of material type A= Aluminum, B=Bi-metal, G=glass, P=PET, H=HDPE Second: size of material <5oz, 5-10oz, 10-15oz, 15-24oz, 24-34oz, >34oz, Partial					
2025 Segregated Rate Study for the Hawai'i Deposit Beverage Container Program										
Basket #	Material	Gross Wt	Count	Tare Wt		Basket #	Material	Gross Wt	Count	Tare Wt
1						44				
2						45				
3						46				
4						47				
5						48				
6						49				
7						50				
8						51				
9						52				
10						53				
11						54				
12						55				
13						56				
14						57				
15						58				
16						59				
17						60				
18						61				
19						62				
20						63				
21						64				
22						65				
23						66				
24						67				
25						68				
26						69				
27						70				
28						71				
29						72				
30						73				
31						74				
32						75				
33						76				
34						77				
35						78				
36						79				
37						80				
38						81				
39						82				
40						83				
41						84				
42						85				
43						86				

If found, please return to Cascadia Consulting Group at (206) 343-9759. Reward offered.

Figure 16: Example Individual Container Tally Sheet

Team: _____ Date: _____/_____/2025 Customer # _____	Notes: _____	In the Material column, print one letter: A= Aluminum, B=BI-metal, G=glass, P=PET, H=HDPE In the Volume column enter the container size to the nearest ounce.
---	--------------	--

Cont. #	Material	Volume (oz)	Weight				
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
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86							

2025 Segregated Rate Study for the Hawai'i Deposit Beverage Container Program

If found, please return to Cascadia Consulting Group at (206) 343-9759. Reward offered.

Figure 17: Example Detailed Container Characterization Random Numbers

Random Customer Number for Detailed Weighing, Team Big Island								
			Al.		Glass		Plastic	
13-Dec	Saturday	Random #	2	3	4	5	1	5
		Customers Served						
14-Dec	Sunday	Random #	1	4	3	5	2	5
		Customers Served						
15-Dec	Monday	Random #	1	2	4	2	2	3
		Customers Served						
16-Dec	Tuesday	Random #	2	5	3	2	2	4
		Customers Served						
17-Dec	Wednesday	Random #	3	4	2	3	1	2
		Customers Served						
18-Dec	Thursday	Random #	4	2	1	4	1	5
		Customers Served						
19-Dec	Friday	Random #	2	3	2	1	1	2
		Customers Served						

Appendix E. Quality Control Plan

The Cascadia team implemented sound quality control practices to ensure consistency, comparability, and accuracy of data. Our quality control measures were comprehensive and designed to provide multiple checks of the data collection and data entry processes from start to finish. In addition, our highly experienced QA/QC manager directed and oversaw data entry and analysis throughout the course of the characterization project to investigate, resolve, and communicate to field team members any identified data errors or discrepancies. Cascadia followed this quality control plan throughout the Segregated Rate Study to ensure quality and consistency during data collection, entry, analysis, and reporting.

Data Collection

To provide consistent sorting, the same crew members trained at the beginning conducted fieldwork throughout the study. All crew members studied the material lists and practiced the sampling protocol before starting work in the field. Staff training focused on the definitions for each container type as well as field safety, sorting techniques, and quality control procedures.

The crew manager oversaw all counting to provide real-time double checks of each data point.

Finally, the crew manager reviewed the field data forms at the end of each day and resolved any errors while the day's work was fresh in mind. After reviewing the field data forms, the crew manager made copies of any paper forms and stored them separately from the originals to avoid losing forms.

Data Entry

In-office Cascadia staff reviewed any paper field forms to ensure that all forms were accounted for, all fields were filled in, and that the necessary data were collected. Staff reviewed any anomalies discovered during this step and clarified with the crew manager and/or the CRC. After review, the project team entered the paper forms into a customized data entry and analysis database. Data collected electronically were imported into the database after a thorough review to ensure that all necessary fields were completed. The database was designed with built-in safeguards to reduce the chance of errors. For example, each entry field only accepts data values that fell within appropriate ranges (e.g., the segregated rate for each sample cannot be over or under a set threshold). Finally, Cascadia's QA/QC manager inspected the entered data and resolved any anomalous data points (outliers) by rechecking the hand-written field forms and sample photos. By combining the Cascadia-designed tally sheet, database, and corresponding electronic data entry forms, Cascadia could ensure accuracy, consistency among forms, and efficient recording of data.

Data Analysis

Cascadia used automated tools for analysis (e.g., building necessary calculations into the database) to reduce the possibility of human error. These tools also provided basic information checks that ensured valid and correct data analysis, such as the total number of samples collected and the average recorded net weight of samples. The methods and calculations for calculating segregated rates were statistically sound and consistent with those used by other beverage deposit programs.

Appendix F. Health and Safety Plan

Cascadia Consulting Group's Health and Safety Plan is provided below.

Responsibility & Compliance

Cascadia supervisors, project managers, and crew managers are responsible for implementing and maintaining safe working practices in their work areas and for answering worker questions about the Health and Safety Plan. A copy of this Health and Safety Plan is provided to all Cascadia Consulting Group employees and reviewed with new employees during the onboarding process and again during field work training. The Cascadia Consulting Group Health and Safety Plan will be updated and augmented in accordance to OSHA and MSHA standards as needed. All workers, including supervisors, are responsible for complying with safe and healthful work practices.

General Facility Overviews

As Cascadia's team members will be performing their duties as guests of many different facilities, Cascadia's field team will ensure they obtain, understand, and comply with site safety plans already existing at these facilities. As part of the site coordination process, Cascadia will also inquire about facility site safety requirements to ensure that the field team on site has site-compliant and appropriate personal protective equipment. At sites where facility safety requirements are less stringent than our own, workers will follow Cascadia's health and safety procedures.

Health & Safety Requirements

All employees shall have training and instruction on general and job-specific safety and health practices. Training and instruction are provided:

- To all new workers who will be performing field work.
- Whenever new substances, processes, procedures, or equipment are introduced to the workplace and represent a new hazard.
- Whenever Cascadia Consulting Group, Inc. is made aware of a new or previously unrecognized hazard.
- To supervisors to familiarize them with the safety and health hazards to which workers may be exposed.
- To all workers with respect to hazards specific to each employee's job assignment.

While in the field, the crew manager is responsible for ensuring that all workers have received orientation and training on the safety protocols to be followed in conducting our work. The crew manager is also responsible for:

- Briefing workers on any host site-specific health and safety protocols.
- Ensuring that the procedures in this document are followed for the day's work.
- Being familiar with local emergency services and maintaining a list of emergency phone numbers.
- Conducting “tailgate” health and safety meetings to notify workers of any changes in safety protocol.
- Inspecting personal protective equipment and ensuring proper use of such equipment.
- Monitoring on-site hazards and the early health warning signs (e.g., heat stress/stroke, dehydration, or fatigue) of site personnel.
- Stopping unsafe operations, and summoning emergency services when needed.

Hazard Assessment

On a daily basis, the crew manager must identify and evaluate workplace hazards which may be present at each work site. We routinely encounter the same day-to-day risks when we conduct our work. Yet every facility is different, and some may present unique hazards. These are some possible hazards that may occur during our work:

Physical hazards

- Cuts and punctures
- Lifting
- Slipping and falling
- Heat stress and fatigue
- Traffic or heavy equipment movement
- Noise exposure
- Animal and/or insect bites

Airborne contaminants

- Dust and windblown debris

Chemical hazards:

- Liquid spills from containers
- Household and hazardous chemicals

Biological hazards

- Household hazardous wastes
- Medical wastes
- Blood/body fluid contaminated items
- Hypodermic needles

Employee Guidelines

During the conduct of our field work, the following personnel health and safety guidelines are to be followed:

- Be in good physical condition, maintain a current tetanus booster and hepatitis B shot, and not be over-sensitive to odors and dust.
- Be able to communicate in English and be able to read warning signs/labels.
- Routinely check personal protective equipment (see below section) and work clothing for proper fit and condition; replace or repair defective items immediately.
- Always look at what you are picking up or sorting – the most effective way to prevent cuts and punctures is to see what you are handling. Use a small rake or shovel to move material around for sorting.
- Lift properly and ask for assistance when lifting heavy or bulky items.
- Be on the lookout for slipping and tripping hazards.
- Do not attempt to identify unknown chemical substances in unlabeled containers; never sniff anything to see what it is.
- Wash hands and face before eating or drinking.
- Smoke only in designated areas.
- Consume plenty of fluids during hot days and watch for signs of heat-related illness, both in yourself and your crewmates.
- Be aware of your surroundings and alert to the possibility of unexpected hazards.
- Alert your supervisor if you feel ill, overly fatigued, or injured.
- Treat even minor cuts and injuries immediately.

Personal Protective Equipment (PPE)

Cascadia Consulting Group provides its workers with the proper safety equipment for performance of duties associated with sampling and sorting materials in the field. Required items include:

- Rubber gloves and liners
- Safety glasses
- Reflective safety vests
- Hard hats and liners

Cascadia also provides the following additional PPE for its employees in the field:

- Coveralls or protective outer wear
- Lower back support apparatus

- Hearing protection
- Knee pads

Container Handling Techniques

Cascadia’s field team will adhere to the following container handling techniques:

- Do not handle containers, particularly broken containers, without rubber gloves and liners.
- Do not reach into baskets, garbage cans, or other material storage without ensuring that the contents are visible and that there are no broken glass, sharp plastic shards, or other potential physical hazards.
- Use a flashlight to improve visibility at the bottom of baskets, garbage cans, or other material storage if the contents are not readily visible before reaching inside.
- When sampling and sorting loads that contain broken beverage containers, begin by removing the largest fragments first.
- Set down—do not drop—baskets or garbage cans that contain glass beverage containers or other items that may break with rough handling.

Hazard Correction

Timely corrective action will be taken to remedy an unsafe condition, practice, or procedure. When an imminent hazard exists that cannot be immediately abated without endangering employee(s) and/or property, we will remove all exposed workers from the area.

Appendix G. Detailed Results

The following figures present the distribution of segregated rate per customer by material subtype. The horizontal axis shows the segregated rate rounded to the nearest integer and the vertical axis shows the number of samples with that segregated rate.

Figure 18: Distribution of Segregated Rate per Customer: Aluminum Containers

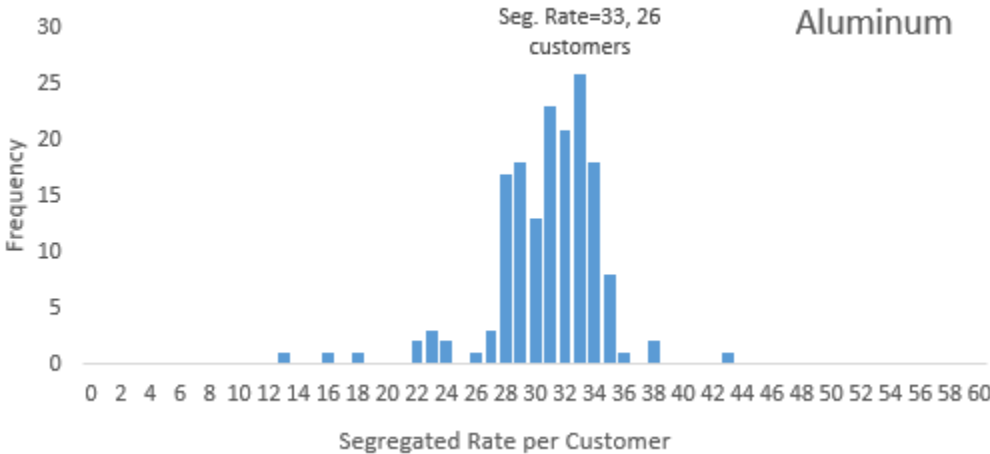


Figure 19: Distribution of Segregated Rate per Customer: Bi-metal Containers

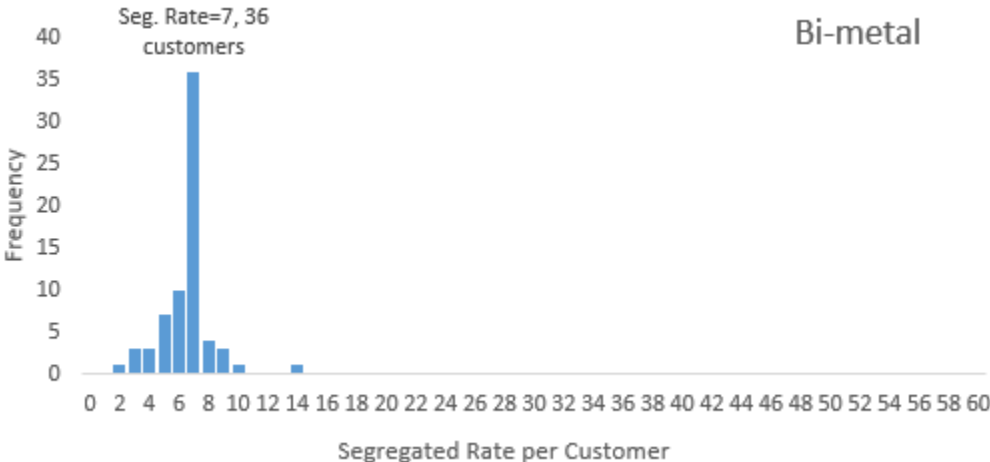


Figure 20: Distribution of Segregated Rate per Customer: Glass Containers

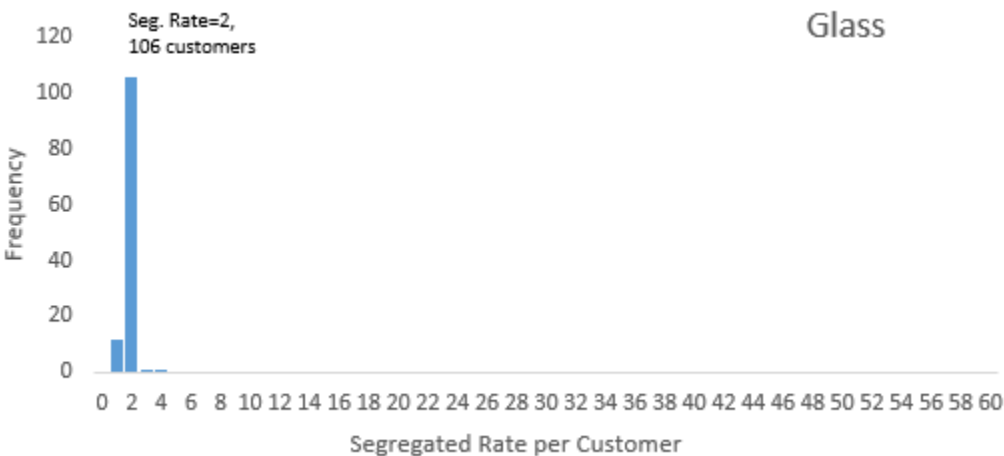
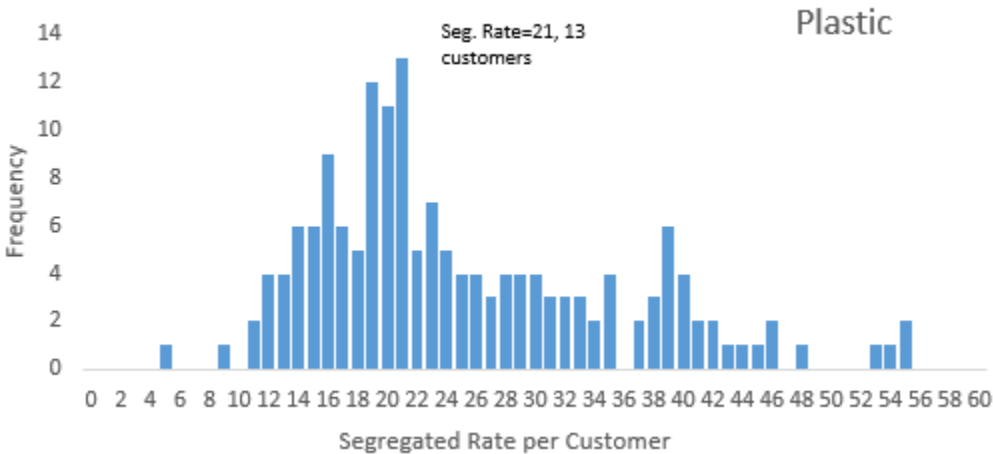


Figure 21: Distribution of Segregated Rate per Customer: Plastic Containers



The following figures present a different visualization of the segregated rate per customer. Each dot represents a single customer, the height of the dot above the horizontal axis represents the segregated rate for that customer, and the solid black line illustrates the mean segregated rate.

Figure 22: Distribution of Segregated Rate per Customer: All Aluminum Containers Except Partial

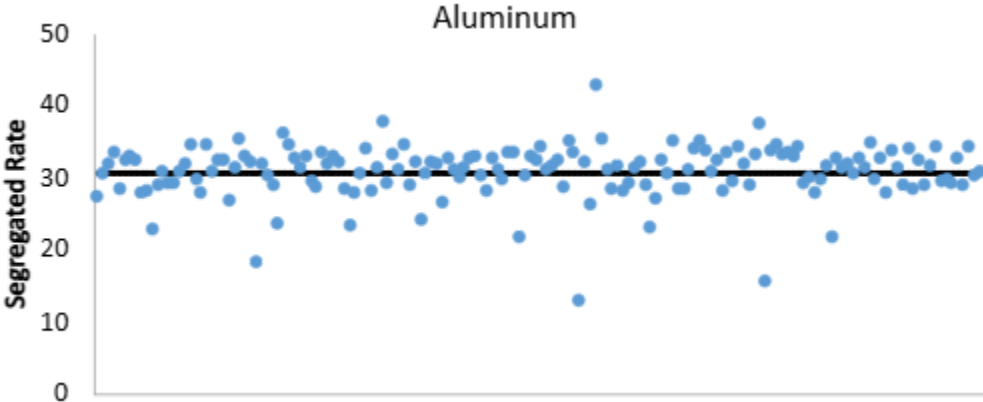


Figure 23: Distribution of Segregated Rate per Customer: All Bi-metal Containers Except Partial

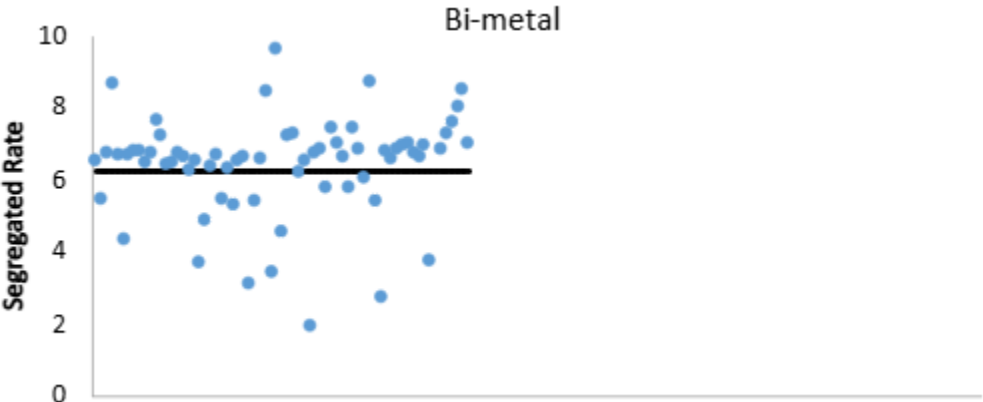


Figure 24: Distribution of Segregated Rate per Customer: All Glass Containers Except Partial

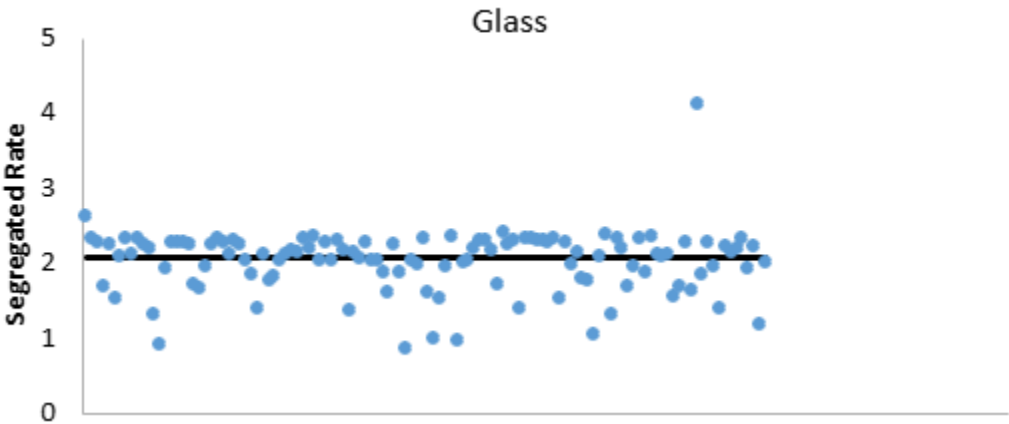
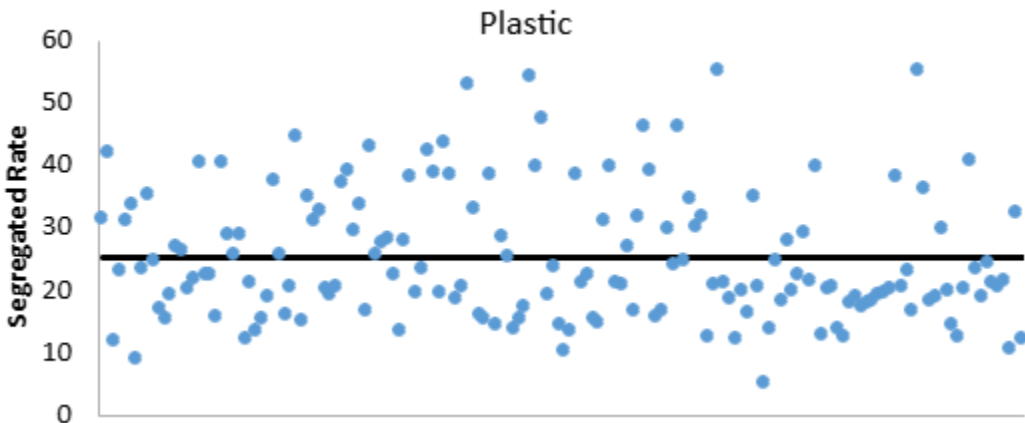


Figure 25: Distribution of Segregated Rate per Customer: All Plastic Containers Except Partial



The following figures compare the segregated rate calculated from each day of field work to the cumulative segregated rate over the course of the study.

Figure 26: Daily Segregated Rate vs. Cumulative Segregated Rate: Aluminum Containers

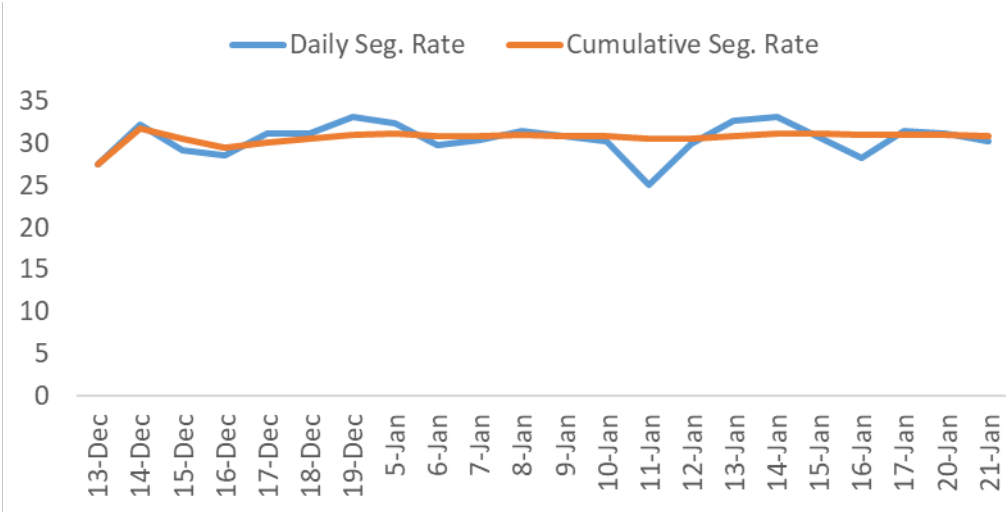


Figure 27: Daily Segregated Rate vs. Cumulative Segregated Rate: Bi-metal Containers

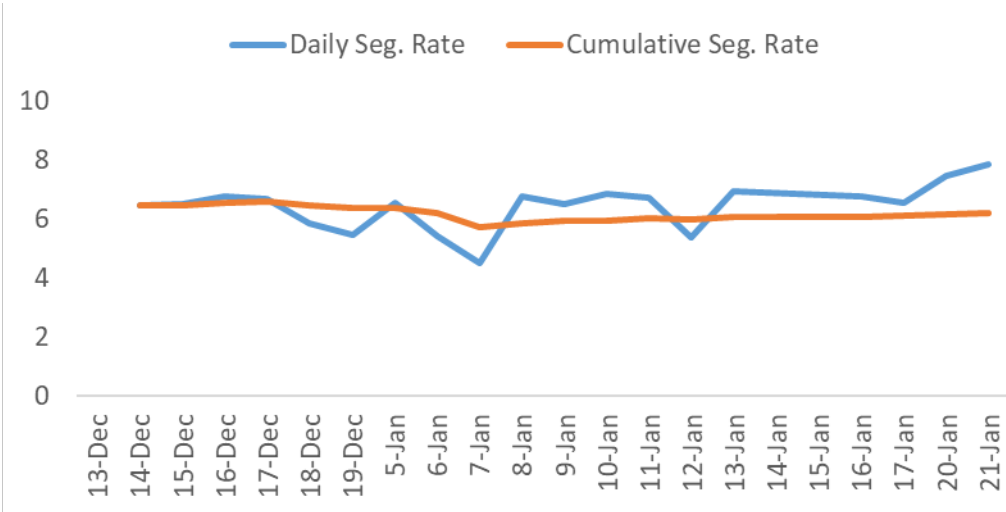


Figure 28: Daily Segregated Rate vs. Cumulative Segregated Rate: Glass Containers

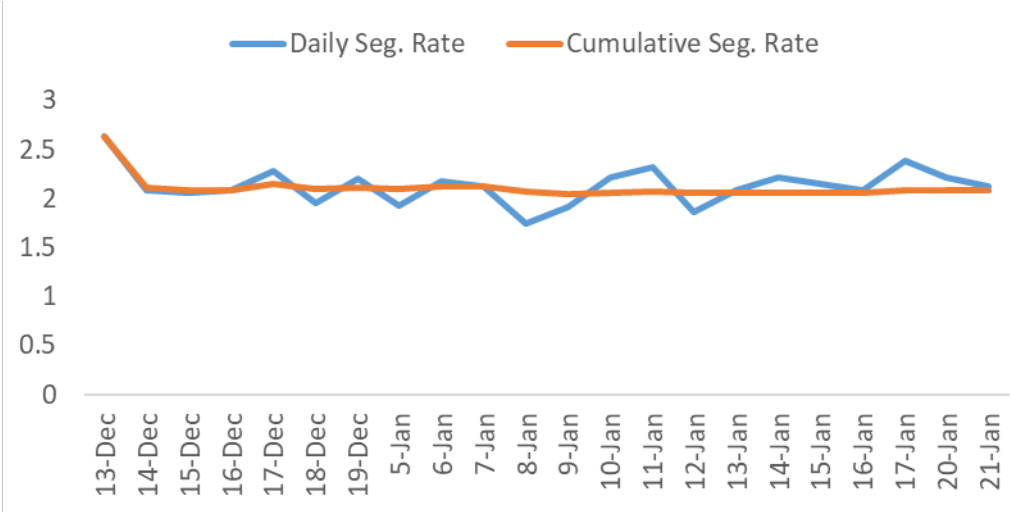
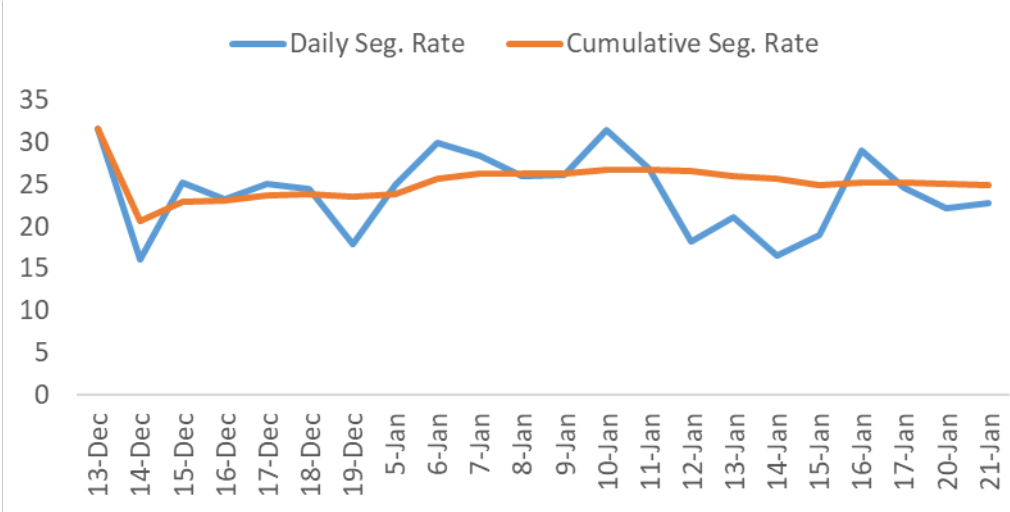


Figure 29: Daily Segregated Rate vs. Cumulative Segregated Rate: Plastic Containers



Appendix H. Graph Data

Table 2: Sample Data for All CRCs (All Non MRF Sites)

Material	Size	Count	Net (lb)	Seg. Rate	VMR	Seg. Rate +/-
Aluminum Overall	Combined	70,834	2,310.46	30.7	10.35	7.1%
Aluminum	<5 oz.	0	0.00	0.0	n/a	n/a
Aluminum	5 - 10 oz.	3,181	77.54	41.0	11.33	8.4%
Aluminum	10 - 15 oz.	61,560	1,940.27	31.7	0.36	1.3%
Aluminum	15 - 24 oz.	5,338	249.61	21.4	4.15	6.4%
Aluminum	24 - 34 oz.	755	43.03	17.5	2.82	8.4%
Aluminum	>34 oz.	0	0.00	0.0	n/a	n/a
Bi-metal Overall	Combined	5,013	804.98	6.2	0.64	5.7%
Bi-metal	<5 oz.	0	0.00	0.0	n/a	n/a
Bi-metal	5 - 10 oz.	689	63.17	10.9	1.19	7.7%
Bi-metal	10 - 15 oz.	225	38.36	5.9	0.38	7.0%
Bi-metal	15 - 24 oz.	3,868	615.48	6.3	0.12	2.6%
Bi-metal	24 - 34 oz.	55	30.37	1.8	n/a	n/a
Bi-metal	>34 oz.	176	57.60	3.1	0.01	1.6%
Glass Overall	Combined	11,313	5,434.57	2.1	0.08	2.8%
Glass	<5 oz.	4	0.96	4.2	0.01	19.2%
Glass	5 - 10 oz.	949	430.41	2.2	0.06	3.8%
Glass	10 - 15 oz.	9,188	4,052.11	2.3	0.06	2.6%
Glass	15 - 24 oz.	722	455.94	1.6	0.05	3.7%
Glass	24 - 34 oz.	240	247.95	1.0	0.02	3.6%
Glass	>34 oz.	210	247.21	0.9	0.02	8.5%
Plastic Overall	Combined	48,184	1,901.54	25.3	6.61	6.3%
Plastic	<5 oz.	48	1.27	37.9	1.24	14.9%
Plastic	5 - 10 oz.	978	18.65	52.4	19.54	11.7%
Plastic	10 - 15 oz.	2,557	116.32	22.0	4.08	6.9%
Plastic	15 - 24 oz.	38,916	1,219.58	31.9	5.05	5.1%

Material	Size	Count	Net (lb)	Seg. Rate	VMR	Seg. Rate +/-
Plastic	24 - 34 oz.	3,237	293.61	11.0	0.48	3.1%
Plastic	>34 oz.	2,448	252.11	9.7	0.42	3.2%
PET Overall	Combined	48,091	1,896.69	25.4	6.61	6.3%
PET	<5 oz.	48	1.27	37.9	1.24	14.9%
PET	5 - 10 oz.	971	18.36	52.9	19.34	11.6%
PET	10 - 15 oz.	2,487	113.62	21.9	4.10	6.9%
PET	15 - 24 oz.	38,914	1,219.41	31.9	5.05	5.1%
PET	24 - 34 oz.	3,237	293.61	11.0	0.48	3.1%
PET	>34 oz.	2,434	250.42	9.7	0.47	3.3%
HDPE Overall	Combined	92	4.78	19.3	5.20	19.6%
HDPE	<5 oz.	0	0.00	0.0	n/a	n/a
HDPE	5 - 10 oz.	7	0.30	23.7	6.08	85.3%
HDPE	10 - 15 oz.	69	2.63	26.2	0.69	10.8%
HDPE	15 - 24 oz.	2	0.16	12.3	2.43	198.6%
HDPE	24 - 34 oz.	0	0.00	0.0	n/a	n/a
HDPE	>34 oz.	14	1.69	8.3	1.88	31.9%
Other Plastic Overall	Combined	1	0.06	15.6	n/a	n/a
Other	<5 oz.	0	0.00	0.0	n/a	n/a
Other	5 - 10 oz.	0	0.00	0.0	n/a	n/a
Other	10 - 15 oz.	1	0.06	15.6	n/a	n/a
Other	15 - 24 oz.	0	0.00	0.0	n/a	n/a
Other	24 - 34 oz.	0	0.00	0.0	n/a	n/a
Other	>34 oz.	0	0.00	0.0	n/a	n/a

*Overall weight does not include partial container, non-redeemable container, or container cap weights

Table 3: Sample Data from CRCs and the MRF

All Non MRF Sites

Material	Size	Count	Net (lb)	Seg. Rate	VMR	Seg. Rate +/-
Aluminum Overall	Combined	70,834	2,310.46	30.66	10.35	7.1%
Plastic Overall	Combined	48,184	1,901.54	25.34	6.61	6.3%

*Overall weight does not include partial container, non-redeemable container, or container cap weights

MRF

Material	Size	Count	Net (lb)	Seg. Rate	VMR	Seg. Rate +/-
Aluminum Overall	Combined	6,397	186.16	34.36	0.20	5.6%
Plastic Overall	Combined	3,522	185.31	19.01	3.26	27.7%

*Overall weight does not include partial container, non-redeemable container, or container cap weights

Table 4: MRF Sample Data

Material	Size	Count	Net (lb)	Seg. Rate	VMR	Seg. Rate +/-
Aluminum Overall	Combined	6,397	186.16	34.36	0.20	5.6%
Aluminum	<5 oz.	0	0.00	0.00		
Aluminum	5 - 10 oz.	504	11.88	42.43	0.00	0.6%
Aluminum	10 - 15 oz.	5,350	153.77	34.79	0.16	5.0%
Aluminum	15 - 24 oz.	511	18.73	27.28	0.10	4.9%
Aluminum	24 - 34 oz.	32	1.78	18.02		
Aluminum	>34 oz.	0	0.00	0.00		
Plastic Overall	Combined	3,522	185.31	19.01	3.26	27.7%
Plastic	<5 oz.	0	0.00	0.00		
Plastic	5 - 10 oz.	31	0.82	37.76	13.73	44.3%
Plastic	10 - 15 oz.	215	11.91	18.05	0.03	3.1%
Plastic	15 - 24 oz.	2,527	94.79	26.66	1.02	13.1%
Plastic	24 - 34 oz.	318	27.63	11.51	0.01	2.0%
Plastic	>34 oz.	431	50.16	8.59	0.01	2.9%
PET Overall	Combined	3,522	185.31	19.01	3.26	27.7%
PET	<5 oz.	0	0.00	0.00		

Material	Size	Count	Net (lb)	Seg. Rate	VMR	Seg. Rate +/-
PET	5 - 10 oz.	31	0.82	37.76	13.73	44.3%
PET	10 - 15 oz.	215	11.91	18.05	0.03	3.1%
PET	15 - 24 oz.	2,527	94.79	26.66	1.02	13.1%
PET	24 - 34 oz.	318	27.63	11.51	0.01	2.0%
PET	>34 oz.	431	50.16	8.59	0.01	2.9%

*Overall weight does not include partial container, non-redeemable container, or container cap weights

Figure 1: Material Subtype Proportions by Weight

Ounces	Aluminum	Bi-metal	Glass	Plastic
<10 oz.	4%	14%	8%	2%
10 oz. - 15 oz.	87%	4%	81%	5%
15 oz. - 24 oz.	8%	77%	6%	81%
>24 oz.	1%	5%	4%	12%

Figure 2: Material Subtype Proportions by Count

Ounces	Aluminum	Bi-metal	Glass	Plastic
<10 oz.	3%	8%	8%	1%
10 oz. - 15 oz.	84%	5%	75%	6%
15 oz. - 24 oz.	11%	76%	8%	64%
>24 oz.	2%	11%	9%	29%

Figure 3: CRC and MRF Mean Segregated Rate and 90% Confidence Intervals

Material	CRC CPP	CRC +/-	CRC High	CRC Low	MRF CPP	MRF +/-	MRF High	MRF Low
Aluminum Overall	30.66	7.1%	32.83	28.49	34.36	5.6%	36.30	32.42
Plastic Overall	25.34	6.3%	26.94	23.74	19.01	27.7%	24.28	13.74

Figure 4: Aluminum Subtype Proportions for CRCs and MRF by Count

Ounces	Non-MRF	MRF
<10 oz.	4%	8%
10 oz. - 15 oz.	87%	84%
15 oz. - 24 oz.	8%	8%
>24 oz.	1%	1%

Figure 5: Plastic Subtype Proportions for CRCs and MRF by Count

Ounces	Non-MRF	MRF
<10 oz.	2%	1%
10 oz. - 15 oz.	5%	6%
15 oz. - 24 oz.	81%	72%
>24 oz.	12%	21%

Figure 6: Alternative Redemption Rates for Current and Proposed Segregated Rates

Material	Current Seg. Rate	Proposed Seg. Rate
Aluminum	59%	57%
Bi-Metal	70%	72%
Glass	51%	45%
Plastic	43%	49%
Overall	52%	53%

Figure 7: Aluminum Individual Container Data

Size (oz)	Count
1	0
2	1
3	0
4	0
5	26
6	6
7	10

Size (oz)	Count
8	218
9	1
10	1
11	145
12	2435
13	0
14	0
15	5
16	221
17	32
18	0
19	43
20	10
21	0
22	107
23	8
24	76
25	60

Figure 8: Glass Individual Container Data

Size (oz)	Count
1	0
2	0
3	4
4	0
5	0
6	2
7	39
8	9
9	71
10	53
11	226
12	1266
13	35
14	33
15	3



Size (oz)	Count
16	112
17	40
18	0
19	0
20	1
21	16
22	19
23	0
24	10
25	28
26	0
27	0
28	2
29	0
30	0
31	0
32	7
33	0
34	9
35	0
36	0
37	0
38	0
39	0
40	12
41	0
42	0
43	0
44	0
45	0
46	0
47	0
48	4
49	0
50	0
51	1

Figure 9: Bi-metal Individual Container Data

Size (oz)	Count
1	0
2	0
3	0
4	0
5	3
6	99
7	3
8	168
9	1
10	1
11	62
12	0
13	0
14	0
15	0
16	0
17	0
18	1129
19	0
20	0
21	0
22	73
23	0
24	0
25	0
26	0
27	0
28	0
29	0
30	0
31	0
32	0
33	0
34	0
35	0
36	0



Size (oz)	Count
37	0
38	0
39	0
40	0
41	0
42	0
43	0
44	0
45	0
46	69

Figure 10: Plastic Individual Container Data

Size (oz)	Count
1	0
2	31
3	0
4	0
5	0
6	1
7	0
8	88
9	0
10	29
11	31
12	155
13	0
14	22
15	5
16	15
17	1233
18	1
19	5
20	225
21	0
22	7
23	1
24	25
25	1
26	1
27	0
28	38
29	0
30	0
31	0
32	15
33	0
34	173
35	0
36	0

Size (oz)	Count
37	0
38	0
39	0
40	0
41	1
42	1
43	0
44	0
45	0
46	13
47	0
48	5
49	2
50	16
51	81
52	9
53	0
54	0
55	0
56	0
57	0
58	0
59	2
60	0
61	0
62	0
63	1
64	10
65	0
66	0
67	0
68	25

Figure 18: Distribution of Segregated Rate per Customer: Aluminum Containers

CPP Bucket	# of Customers
0	0

CPP Bucket	# of Customers
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	1
14	0
15	0
16	1
17	0
18	1
19	0
20	0
21	0
22	2
23	3
24	2
25	0
26	1
27	3
28	17
29	18
30	13
31	23
32	21
33	26
34	18
35	8
36	1
37	0
38	2

CPP Bucket	# of Customers
39	0
40	0
41	0
42	0
43	1
44	0
45	0
46	0
47	0
48	0
49	0
50	0
51	0
52	0
53	0
54	0
55	0
56	0
57	0
58	0
59	0
60	0

Figure 19: Distribution of Segregated Rate per Customer: Bi-metal Containers

CPP Bucket	# of Customers
0	0
1	0
2	1
3	3
4	3
5	7
6	10
7	36
8	4
9	3
10	1

CPP Bucket	# of Customers
11	0
12	0
13	0
14	1
15	0
16	0
17	0
18	0
19	0
20	0
21	0
22	0
23	0
24	0
25	0
26	0
27	0
28	0
29	0
30	0
31	0
32	0
33	0
34	0
35	0
36	0
37	0
38	0
39	0
40	0
41	0
42	0
43	0
44	0
45	0
46	0
47	0
48	0

CPP Bucket	# of Customers
49	0
50	0
51	0
52	0
53	0
54	0
55	0
56	0
57	0
58	0
59	0
60	0

Figure 20: Distribution of Segregated Rate per Customer: Glass Containers

CPP Bucket	# of Customers
0	0
1	12
2	106
3	1
4	1
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	0



CPP Bucket	# of Customers
21	0
22	0
23	0
24	0
25	0
26	0
27	0
28	0
29	0
30	0
31	0
32	0
33	0
34	0
35	0
36	0
37	0
38	0
39	0
40	0
41	0
42	0
43	0
44	0
45	0
46	0
47	0
48	0
49	0
50	0
51	0
52	0
53	0
54	0
55	0
56	0
57	0
58	0

CPP Bucket	# of Customers
59	0
60	0

Figure 21: Distribution of Segregated Rate per Customer: Plastic Containers

CPP Bucket	# of Customers
0	0
1	0
2	0
3	0
4	0
5	1
6	0
7	0
8	0
9	1
10	0
11	2
12	4
13	4
14	6
15	6
16	9
17	6
18	5
19	12
20	11
21	13
22	5
23	7
24	5
25	4
26	4
27	3
28	4
29	4
30	4

CPP Bucket	# of Customers
31	3
32	3
33	3
34	2
35	4
36	0
37	2
38	3
39	6
40	4
41	2
42	2
43	1
44	1
45	1
46	2
47	0
48	1
49	0
50	0
51	0
52	0
53	1
54	1
55	2
56	0
57	0
58	0
59	0
60	0

Figure 22: Distribution of Segregated Rate per Customer: All Aluminum Containers Except Partial

X Axis	Per Customer	Overall
1	27.5	30.66
2	30.48	30.66
3	31.93	30.66

4	33.5	30.66
5	28.45	30.66
6	32.49	30.66
7	32.93	30.66
8	32.56	30.66
9	27.94	30.66
10	28.13	30.66
11	22.81	30.66
12	29.02	30.66
13	30.85	30.66
14	29.37	30.66
15	29.29	30.66
16	30.88	30.66
17	31.91	30.66
18	34.47	30.66
19	29.91	30.66
20	27.86	30.66
21	34.51	30.66
22	30.8	30.66
23	32.59	30.66
24	32.44	30.66
25	26.89	30.66
26	31.4	30.66
27	35.26	30.66
28	32.95	30.66
29	32.32	30.66
30	18.36	30.66
31	31.87	30.66
32	30.32	30.66
33	28.97	30.66
34	23.75	30.66
35	36.19	30.66
36	34.51	30.66
37	32.78	30.66
38	31.32	30.66
39	32.98	30.66
40	29.47	30.66
41	28.86	30.66
42	33.61	30.66

43	31.94	30.66
44	33.12	30.66
45	32.3	30.66
46	28.48	30.66
47	23.34	30.66
48	28	30.66
49	30.72	30.66
50	34.01	30.66
51	28.2	30.66
52	31.42	30.66
53	37.66	30.66
54	29.37	30.66
55	33.19	30.66
56	31.24	30.66
57	34.48	30.66
58	29.11	30.66
59	32.24	30.66
60	24.29	30.66
61	30.56	30.66
62	32.26	30.66
63	31.94	30.66
64	26.54	30.66
65	32.77	30.66
66	31.21	30.66
67	30.19	30.66
68	31.35	30.66
69	32.74	30.66
70	32.95	30.66
71	30.43	30.66
72	28.11	30.66
73	32.67	30.66
74	31.18	30.66
75	29.78	30.66
76	33.42	30.66
77	33.62	30.66
78	21.92	30.66
79	30.42	30.66
80	33.04	30.66
81	32.5	30.66

82	34.25	30.66
83	31.14	30.66
84	31.58	30.66
85	32.53	30.66
86	28.86	30.66
87	35.13	30.66
88	33.58	30.66
89	13.1	30.66
90	32.28	30.66
91	26.27	30.66
92	42.85	30.66
93	35.46	30.66
94	31.04	30.66
95	28.44	30.66
96	31.72	30.66
97	28.32	30.66
98	29.16	30.66
99	31.26	30.66
100	32.26	30.66
101	29.01	30.66
102	23.01	30.66
103	27.09	30.66
104	32.4	30.66
105	30.65	30.66
106	35.07	30.66
107	28.4	30.66
108	28.43	30.66
109	31.21	30.66
110	34.07	30.66
111	35.09	30.66
112	33.74	30.66
113	30.77	30.66
114	32.49	30.66
115	28.12	30.66
116	33.48	30.66
117	29.53	30.66
118	34.32	30.66
119	31.96	30.66
120	28.88	30.66

121	33.25	30.66
122	37.52	30.66
123	15.75	30.66
124	33.7	30.66
125	34.49	30.66
126	33.19	30.66
127	33.41	30.66
128	33.06	30.66
129	34.26	30.66
130	29.13	30.66
131	29.93	30.66
132	28.02	30.66
133	29.9	30.66
134	31.58	30.66
135	21.83	30.66
136	32.67	30.66
137	31.27	30.66
138	31.98	30.66
139	30.6	30.66
140	32.62	30.66
141	31.3	30.66
142	34.81	30.66
143	29.88	30.66
144	32.67	30.66
145	27.89	30.66
146	33.7	30.66
147	31.43	30.66
148	29.09	30.66
149	34.16	30.66
150	28.42	30.66
151	32.54	30.66
152	28.88	30.66
153	31.77	30.66
154	34.44	30.66
155	29.43	30.66
156	29.69	30.66
157	29.29	30.66
158	32.77	30.66
159	28.9	30.66

160	34.44	30.66
161	30.2	30.66
162	30.88	30.66

Figure 23: Distribution of Segregated Rate per Customer: All Bi-metal Containers Except Partial

X Axis	Per Customer	Overall
1	6.56	6.23
2	5.46	6.23
3	6.74	6.23
4	8.7	6.23
5	6.7	6.23
6	4.34	6.23
7	6.72	6.23
8	6.79	6.23
9	6.8	6.23
10	6.48	6.23
11	6.76	6.23
12	7.67	6.23
13	7.25	6.23
14	6.44	6.23
15	6.48	6.23
16	6.74	6.23
17	6.64	6.23
18	6.27	6.23
19	6.52	6.23
20	3.7	6.23
21	4.87	6.23
22	6.37	6.23
23	6.71	6.23
24	5.49	6.23
25	6.35	6.23
26	5.33	6.23
27	6.54	6.23
28	6.65	6.23
29	3.15	6.23
30	5.4	6.23
31	6.6	6.23
32	8.44	6.23

33	3.45	6.23
34	9.65	6.23
35	4.59	6.23
36	7.25	6.23
37	7.31	6.23
38	6.25	6.23
39	6.53	6.23
40	1.98	6.23
41	6.77	6.23
42	6.86	6.23
43	5.8	6.23
44	7.47	6.23
45	7.05	6.23
46	6.67	6.23
47	5.8	6.23
48	7.46	6.23
49	6.87	6.23
50	6.04	6.23
51	8.72	6.23
52	5.43	6.23
53	2.74	6.23
54	6.81	6.23
55	6.59	6.23
56	6.87	6.23
57	6.98	6.23
58	7	6.23
59	6.77	6.23
60	6.67	6.23
61	6.96	6.23
62	3.79	6.23
63	14.08	6.23
64	6.89	6.23
65	7.3	6.23
66	7.61	6.23
67	8.04	6.23
68	8.51	6.23
69	7.05	6.23

Figure 24: Distribution of Segregated Rate per Customer: All Glass Containers Except Partial

X Axis	Per Customer	Overall
1	2.63	2.08
2	2.35	2.08
3	2.29	2.08
4	1.69	2.08
5	2.25	2.08
6	1.53	2.08
7	2.1	2.08
8	2.33	2.08
9	2.13	2.08
10	2.34	2.08
11	2.26	2.08
12	2.21	2.08
13	1.34	2.08
14	0.92	2.08
15	1.93	2.08
16	2.28	2.08
17	2.29	2.08
18	2.3	2.08
19	2.25	2.08
20	1.74	2.08
21	1.68	2.08
22	1.98	2.08
23	2.25	2.08
24	2.35	2.08
25	2.29	2.08
26	2.14	2.08
27	2.31	2.08
28	2.25	2.08
29	2.06	2.08
30	1.85	2.08
31	1.42	2.08
32	2.14	2.08
33	1.78	2.08
34	1.83	2.08
35	2.05	2.08
36	2.14	2.08

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X Axis	Per Customer	Overall
37	2.18	2.08
38	2.16	2.08
39	2.34	2.08
40	2.22	2.08
41	2.36	2.08
42	2.04	2.08
43	2.29	2.08
44	2.06	2.08
45	2.32	2.08
46	2.17	2.08
47	1.39	2.08
48	2.16	2.08
49	2.08	2.08
50	2.28	2.08
51	2.05	2.08
52	2.05	2.08
53	1.88	2.08
54	1.63	2.08
55	2.27	2.08
56	1.9	2.08
57	0.87	2.08
58	2.05	2.08
59	1.99	2.08
60	2.34	2.08
61	1.62	2.08
62	1.01	2.08
63	1.53	2.08
64	1.96	2.08
65	2.37	2.08
66	0.99	2.08
67	2.03	2.08
68	2.05	2.08
69	2.21	2.08
70	2.31	2.08
71	2.31	2.08
72	2.19	2.08
73	1.73	2.08
74	2.41	2.08

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X Axis	Per Customer	Overall
75	2.25	2.08
76	2.31	2.08
77	1.41	2.08
78	2.33	2.08
79	2.33	2.08
80	2.32	2.08
81	2.32	2.08
82	2.29	2.08
83	2.35	2.08
84	1.55	2.08
85	2.28	2.08
86	1.99	2.08
87	2.16	2.08
88	1.81	2.08
89	1.78	2.08
90	1.05	2.08
91	2.1	2.08
92	2.4	2.08
93	1.33	2.08
94	2.35	2.08
95	2.21	2.08
96	1.69	2.08
97	1.97	2.08
98	2.33	2.08
99	1.88	2.08
100	2.36	2.08
101	2.12	2.08
102	2.09	2.08
103	2.12	2.08
104	1.57	2.08
105	1.71	2.08
106	2.28	2.08
107	1.64	2.08
108	4.13	2.08
109	1.85	2.08
110	2.3	2.08
111	1.97	2.08
112	1.42	2.08

X Axis	Per Customer	Overall
113	2.24	2.08
114	2.15	2.08
115	2.2	2.08
116	2.34	2.08
117	1.94	2.08
118	2.23	2.08
119	1.2	2.08
120	2.03	2.08

Figure 25: Distribution of Segregated Rate per Customer: All Plastic Containers Except Partial

X Axis	Per Customer	Overall
1	31.62	25.34
2	42.25	25.34
3	12.21	25.34
4	23.29	25.34
5	31.12	25.34
6	33.79	25.34
7	9.13	25.34
8	23.69	25.34
9	35.46	25.34
10	24.8	25.34
11	17.36	25.34
12	15.61	25.34
13	19.43	25.34
14	27.2	25.34
15	26.52	25.34
16	20.36	25.34
17	21.92	25.34
18	40.68	25.34
19	22.52	25.34
20	22.64	25.34
21	16.01	25.34
22	40.4	25.34
23	29.02	25.34
24	25.94	25.34
25	28.91	25.34
26	12.36	25.34

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X Axis	Per Customer	Overall
27	21.21	25.34
28	13.6	25.34
29	15.63	25.34
30	19.19	25.34
31	37.79	25.34
32	25.85	25.34
33	16.26	25.34
34	20.62	25.34
35	44.66	25.34
36	15.19	25.34
37	35.01	25.34
38	31.32	25.34
39	32.92	25.34
40	20.25	25.34
41	19.42	25.34
42	20.81	25.34
43	37.2	25.34
44	39.12	25.34
45	29.64	25.34
46	33.81	25.34
47	16.75	25.34
48	42.98	25.34
49	25.82	25.34
50	27.61	25.34
51	28.31	25.34
52	22.63	25.34
53	13.74	25.34
54	27.97	25.34
55	38.42	25.34
56	19.62	25.34
57	23.6	25.34
58	42.38	25.34
59	38.83	25.34
60	19.69	25.34
61	43.86	25.34
62	38.72	25.34
63	18.78	25.34
64	20.81	25.34

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X Axis	Per Customer	Overall
65	52.9	25.34
66	33.35	25.34
67	16.4	25.34
68	15.71	25.34
69	38.52	25.34
70	14.8	25.34
71	28.79	25.34
72	25.66	25.34
73	14.14	25.34
74	15.75	25.34
75	17.57	25.34
76	54.3	25.34
77	39.81	25.34
78	47.72	25.34
79	19.46	25.34
80	23.8	25.34
81	14.81	25.34
82	10.54	25.34
83	13.59	25.34
84	38.6	25.34
85	21.5	25.34
86	22.51	25.34
87	15.63	25.34
88	14.96	25.34
89	31.22	25.34
90	39.81	25.34
91	21.4	25.34
92	21.04	25.34
93	27.16	25.34
94	16.88	25.34
95	31.93	25.34
96	46.25	25.34
97	39.41	25.34
98	15.85	25.34
99	16.99	25.34
100	30.06	25.34
101	24.4	25.34
102	46.24	25.34

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X Axis	Per Customer	Overall
103	24.93	25.34
104	34.92	25.34
105	30.25	25.34
106	31.98	25.34
107	12.81	25.34
108	20.97	25.34
109	55.3	25.34
110	21.35	25.34
111	18.65	25.34
112	12.38	25.34
113	20.24	25.34
114	16.58	25.34
115	35.19	25.34
116	20.6	25.34
117	5.31	25.34
118	13.93	25.34
119	24.98	25.34
120	18.35	25.34
121	28.23	25.34
122	19.94	25.34
123	22.65	25.34
124	29.32	25.34
125	21.72	25.34
126	39.93	25.34
127	13.15	25.34
128	20.29	25.34
129	20.85	25.34
130	14.16	25.34
131	12.85	25.34
132	18.13	25.34
133	19.21	25.34
134	17.61	25.34
135	18.03	25.34
136	18.55	25.34
137	19.32	25.34
138	19.81	25.34
139	20.43	25.34
140	38.2	25.34

X Axis	Per Customer	Overall
141	20.81	25.34
142	23.42	25.34
143	17	25.34
144	55.2	25.34
145	36.5	25.34
146	18.6	25.34
147	19.2	25.34
148	30.08	25.34
149	20.02	25.34
150	14.72	25.34
151	12.82	25.34
152	20.37	25.34
153	40.74	25.34
154	23.55	25.34
155	19.2	25.34
156	24.59	25.34
157	21.52	25.34
158	20.84	25.34
159	21.57	25.34
160	10.91	25.34
161	32.58	25.34
162	12.42	25.34
163	20.96	25.34
164	14.52	25.34

Figure 26: Daily Segregated Rate vs. Cumulative Segregated Rate: Aluminum Containers

Date	Daily Seg. Rate	Cumulative Seg. Rate
13-Dec	27.5	27.5
14-Dec	32.26	31.87
15-Dec	29.26	30.6
16-Dec	28.66	29.48
17-Dec	31.22	30.18
18-Dec	31.23	30.59
19-Dec	33.12	31.11
5-Jan	32.44	31.17
6-Jan	29.75	30.95

Date	Daily Seg. Rate	Cumulative Seg. Rate
7-Jan	30.46	30.85
8-Jan	31.45	30.97
9-Jan	30.84	30.95
10-Jan	30.23	30.9
11-Jan	25.13	30.62
12-Jan	29.91	30.59
13-Jan	32.69	30.86
14-Jan	33.21	31.17
15-Jan	N/A	31.17
16-Jan	28.36	30.99
17-Jan	31.43	31
20-Jan	31.21	31.01
21-Jan	30.3	30.96

Figure 27: Daily Segregated Rate vs. Cumulative Segregated Rate: Bi-metal Containers

Date	Daily Seg. Rate	Cumulative Seg. Rate
13-Dec	N/A	N/A
14-Dec	6.45	6.45
15-Dec	6.5	6.46
16-Dec	6.76	6.57
17-Dec	6.67	6.62
18-Dec	5.86	6.46
19-Dec	5.45	6.38
5-Jan	6.57	6.4
6-Jan	5.41	6.21
7-Jan	4.53	5.72
8-Jan	6.76	5.88
9-Jan	6.52	5.94
10-Jan	6.87	5.96
11-Jan	6.73	6.04
12-Jan	5.4	5.98
13-Jan	6.95	6.07
14-Jan	N/A	6.07
15-Jan	N/A	6.07
16-Jan	6.76	6.09
17-Jan	6.55	6.1

20-Jan	7.47	6.17
21-Jan	7.85	6.21

Figure 28: Daily Segregated Rate vs. Cumulative Segregated Rate: Glass Containers

Date	Daily Seg. Rate	Cumulative Seg. Rate
13-Dec	2.63	2.63
14-Dec	2.09	2.11
15-Dec	2.06	2.08
16-Dec	2.08	2.08
17-Dec	2.28	2.15
18-Dec	1.96	2.1
19-Dec	2.2	2.11
5-Jan	1.93	2.1
6-Jan	2.18	2.12
7-Jan	2.13	2.12
8-Jan	1.74	2.07
9-Jan	1.92	2.05
10-Jan	2.22	2.06
11-Jan	2.32	2.07
12-Jan	1.86	2.06
13-Jan	2.09	2.06
14-Jan	2.21	2.06
15-Jan	N/A	2.06
16-Jan	2.08	2.06
17-Jan	2.38	2.08
20-Jan	2.22	2.08
21-Jan	2.12	2.08

Figure 29: Daily Segregated Rate vs. Cumulative Segregated Rate: Plastic Containers

Date	Daily Seg. Rate	Cumulative Seg. Rate
13-Dec	31.62	31.62
14-Dec	16.08	20.61
15-Dec	25.31	22.97
16-Dec	23.31	23.09
17-Dec	25.14	23.74
18-Dec	24.52	23.91

Date	Daily Seg. Rate	Cumulative Seg. Rate
19-Dec	17.97	23.59
5-Jan	25	23.81
6-Jan	29.95	25.77
7-Jan	28.51	26.32
8-Jan	25.99	26.27
9-Jan	26.21	26.27
10-Jan	31.48	26.73
11-Jan	26.88	26.74
12-Jan	18.29	26.59
13-Jan	21.06	26.02
14-Jan	16.5	25.64
15-Jan	19	25
16-Jan	29.01	25.19
17-Jan	24.6	25.17
20-Jan	22.26	25.12
21-Jan	22.73	25