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2023 Oregon Inbound Commingled Recycling Composition Study

Part of the 2023 Oregon Waste and Recycling Composition Studies

DEQ

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Executive summary

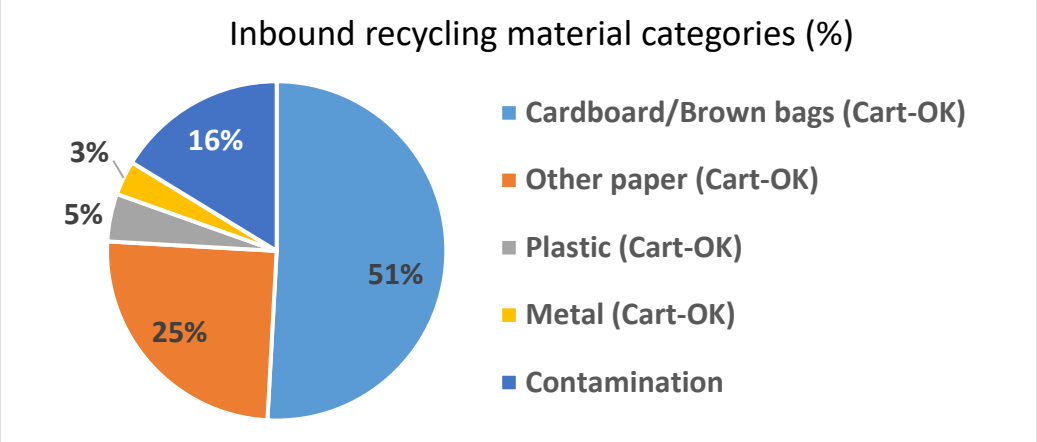
The inbound commingled recycling study is one of three related waste composition studies conducted by the Oregon Department of Environmental Quality in 2023, with the other two being the composition of waste disposed from Oregon and the composition of the outbound commodities and waste streams produced by the facilities that sort and market commingled materials.

The inbound commingled recycling study had two main goals:

- To collect information on the quantity of different materials and contaminants delivered to Oregon commingled recycling processing facilities as part of a commingled recycling mix, and
- To gather data on the percent of commingled recyclable material is covered product under the Recycling Modernization Act - Oregon's new producer responsibility legislation - for packaging, printed paper, and food serviceware, for the purpose of determining how much of the cost of transporting recyclables and managing contaminants would be borne by the producers of these materials.

Key findings of the study include:

- The level of contamination found in commingled recycling has substantially increased compared to results from multiple studies conducted from 2004 to 2014. In earlier studies, contamination levels averaged on the order of 9 to 10 percent. In the 2023 study, contamination levels averaged 15.48 percent, based on the list of what was acceptable in commingled collection at that time. This difference is highly significant statistically.
- As in past studies, paper dominates the material recycled through commingled recycling. Cardboard made up 51 percent of the combined residential and commercial statewide commingled stream, while other recyclable material made up 25%. Recyclable plastic made up 4.6%, recyclable metal 3.5%, and the rest was contaminating material that should not have been set out for commingled recycling.



Inbound Commingled Recycling Composition

- There have been huge changes in the composition of commingled recycling in the last two decades. In particular, all types of printing and writing paper are down substantially compared to earlier studies, as people move more and more to electronic media. Newspaper in particular is much reduced in the commingled stream, down about 90 percent compared to studies from two decades ago.
- In contrast, there is much more cardboard in the residential commingled stream now than there had been prior to the COVID pandemic, likely due to increased home delivery of goods purchased over the Internet. However, the amount of cardboard collected through residential commingled collection is a relatively small portion of the total amount of cardboard recycled each year, and that total has not changed greatly from year to year.
- For deposit aluminum cans and plastic bottles, roughly 15 times more deposit bottles and cans were redeemed for deposit than were recycled through curbside programs.
- Of the acceptable recyclable material collected commingled, 96.8 percent is covered product under the Recycling Modernization Act, and 3.2% is material that is not covered product under the Act.
- Of the contamination in the commingled recycling, 46.6 percent was covered product under the Recycling Modernization Act, and 53.4 percent was not covered product, based on what are defined as contaminants under the Uniform Statewide Collection List adopted under that Act.

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Inbound Commingled Recycling Composition

Background

Introduction

In 2023, the Oregon Department of Environmental Quality conducted composition studies of three different waste and recycling streams:

- Disposal Site Study: The composition of disposed waste received at transfer stations and landfills.
- Inbound Commingled Recycling Study: The composition of commingled recycling loads collected directly from recycling route trucks and other sources arriving at commingled recycling processing and reload facilities, and the subject of this document.
- Outbound Commingled Recycling Study: The composition of the commodities and waste streams produced by commingled recycling processing facilities.

Purpose

Oregon law ORS 459A.035 requires Oregon DEQ to conduct a waste composition study at least every 6 years, and allows flexibility in what is included in the study. The last full waste composition study was conducted in 2016/2017, and looked only at the composition of disposed waste. The 2009/2010 studies were similar to the 2023 study in that they included the composition of disposed waste as well as the composition of collected commingled recycling and the commodities and waste streams produced by the processing facilities. The 2009/2010 studies are available on the DEQ Waste Composition Study webpage. Originally, DEQ was planning on conducting only a disposal composition study in 2023, but with passage of the Recycling Modernization Act (Senate Bill 582, 2021 session), DEQ needed data on the composition of commingled recycling to determine such factors as the level of contamination in the collected material and the percentage of both the recyclable material and the contaminants that are covered products under the Recycling Modernization Act. The main purposes of this inbound recycling composition study were:

- To determine the percentage of recyclable material collected commingled that is covered product under the Recycling Modernization Act, and to do the same for contaminants in the commingled recycling stream, part of development of factors for payment of transportation reimbursement and contamination management fees under the Act.
- To determine how contamination rates have changed since previous studies, and set a baseline to measure how contamination rates change based on the contamination management activities under the Recycling Modernization Act.
- To determine the composition of recyclables that make up the current commingled collections, and compare to past studies.

Background on Recycling Collection in Oregon

Ever since passage of the Recycling Opportunity Act in 1983 and its implementation in 1986, the large majority of Oregon cities with populations larger than 4,000 have had on-route collection provided to their residents. Originally materials were collected separately, but between 2000 and 2010, almost all programs switched to collecting most materials commingled together – usually in large roll carts. Unlike programs in the rest of the country though, almost all Oregon programs collect glass separately on-route or at depots rather than commingled, as broken glass shards contaminate other materials and can cause significant problems in processing facilities and at paper mills. Over the

years, the areas served by these on-route collection program have expanded, as smaller cities and unincorporated areas have piggy-backed on the programs established in the larger cities. Currently, a little more than 80 percent of Oregon's population lives in areas where on-route recycling collection is provided, although some people living in multifamily housing or who do not have garbage service may not be provided with recycling collection. In most areas, on-route recycling is provided to commercial businesses too.

Methodology

DEQ has been conducting similar disposed waste composition studies since 1992 and recycling composition studies since 2004. All three 2023 studies were designed by DEQ using methodology similar to methodology used in those past studies with some tweaks to aspects such as the definition of material categories and some additional data gathering to provide more useful information for implementing the Recycling Modernization Act. Field work for the disposal site study and the inbound commingled recycling study was carried out by Sky Valley Associates with assistance from Cascadia Consulting as a subcontractor and Stina in identifying unmarked plastic resins. Fieldwork for the outbound commingled recycling study was carried out by Cascadia Consulting as a subcontractor to Sky Valley Associates.

This report presents results of the inbound commingled recycling study – looking at the composition of commingled recycling collected from residences and businesses throughout Oregon.

Inbound commingled recycling study design

The inbound recycling study looked at samples of commingled recyclables from route trucks and a few depots as the loads are unloaded at recycling transfer stations or commingled recycling processing facilities. The sample selection methodology involved pre-selecting route trucks to be sampled based on previous truck/route recycling records at the facility, chosen in a manner to be representative of the recycling received at that facility. In all, eight commingled recycling processing facilities and 28 transfer station or recycling reload facilities participated in the study, which includes all of the larger facilities and a number of smaller facilities chosen to represent more rural parts of the state. Every facility that DEQ approached to participate in the study agreed to do so, and they all played a major role in carrying out this study. This included providing data on each of the route trucks expected to be dumping at their facilities on the days the Sky Valley crew would be there to collect samples, allowing the crew to come on-site to collect and/or sort the samples, using their equipment to help the crew capture each sample, using their spotters to make sure that pre-selected trucks would be diverted to a place in the facility where a sample could be taken, and sometimes holding pre-selected trucks or loads that were dumped in the middle of the night so that the crew could collect a sample when arriving the next morning.

Figure 1. Excavating equipment dropping a commingled recycling sample on a tarp outdoors in snowy conditions. It was atypical to select sample outdoors, but occurred occasionally due to indoor space limitations. Sorting occured indoors at this location.

The recycling collectors also played an important role, confirming that the pre-selected trucks would be dumping at the facility when the crew was there or letting us know if because of a breakdown or some other reason, a different truck would be running the selected route and would be available to be sampled.

For this study, 351 samples of commingled recycling were selected from both commercial and residential commingled recycling route trucks, and in a few cases from commingled recycling drop boxes from depots or large commercial customers. Each sample weighed approximately 200 pounds. Marion and Lane Counties contributed to the study by

purchasing additional samples within their jurisdictions so as to have more information on local collection programs. Metro also purchased an additional 28 residential-only samples as part of a study on residential recycling in the Metro area, giving us 379 samples total. Table 1 shows the number of commingled recycling samples collected in different areas of Oregon.

Table 1. Number of samples collected in each jurisdiction.

Jurisdiction	# Samples
Metro Tri-County Area	151 + 28 residential-only
Marion County	49 samples
Lane County	50 samples
Rest of Oregon:	100 samples, including the following
Deschutes County	20 samples
Other Willamette Valley	31 samples
Coastal counties	20 samples
SW Oregon counties	19 samples
Eastern Oregon counties	11 samples
Total	**351 + 28 residential-only**

Each sample was sorted into 87 separate material categories, and then each material category was weighed and recorded. Definitions for material categories are found in Appendix B. In addition, counts were made of film plastics for 30 samples, randomly chosen, in order to determine the average weight of each piece of film plastic. Work was conducted between January 2023 and December 2023, with 3 make-up samples collected in January 2024.

To calculate the overall composition of commingled recycling in Oregon, the composition of commingled recycling in each of the 8 areas listed in Table 1 were calculated by sorting and categorizing samples, and then used the total weight of commingled recycling collected in each area each year to properly weight the contribution to the statewide total from each area. Because the Metro area had 28 extra samples collected specifically as residential samples, we separately analyzed the residential samples versus commercial and other samples and combined the two based on the estimate of the residential vs. commercial and other commingled recycling route truck tonnage in the Metro area. A full discussion of methodology, including how samples were selected, is found in Appendix A.

Categorizing contaminants

One of the main purposes of this study was to determine the contamination levels of commingled recycling based on the Uniform Statewide Collection List established by the Recycling Modernization Act (see Oregon Revised Statutes 459A.914). When the law is fully implemented, the USCL will standardize what materials can be mixed together in commingled recycling throughout the state. However, when this study was conducted in 2023, the list of materials that would be on the USCL had not yet been established. Since the USCL list was not yet known, DEQ chose to use the Metro list of acceptable commingled materials that had been in effect for more than a decade as the best approximation of what would likely be on the USCL when implemented in 2025. The only exceptions were scrap metal categories, where we used what eventually would be the USCL maximum size of scrap metal items that could be put in commingled recycling (maximum 10 pounds or 18 inches) instead of the Metro 2023 maximum size (30 pounds or 30 inches). The list of what the sorters sorted as acceptable in commingled carts is referred to in this document as the 2023 list. Table 2 outlines the major difference between the 2023 acceptable material list and the USCL. There are also

some additional minor differences between the lists, not included below, that have little impact on the results from analyzing the commingled composition data.

Table 2. Differences between the Uniform Statewide Collection List (2025) and the 2023 list of acceptable materials for commingling.

Material	USCL acceptable materials (2025)	2023 Acceptable materials
All forms of shredded paper	Not acceptable	Acceptable, except shredded paper in a plastic bag was not acceptable
Rigid plastic tubs and bottles	Minimum acceptable size is 2″ by 2″ For most, only PET, HDPE, and PP resins are acceptable	Minimum acceptable size is 6 ounces All plastic resins are acceptable
Plastic flowerpots	Minimum acceptable size is 2″ by 2″. Only HDPE and PP resins are acceptable	Minimum acceptable size is 4″ pots, but excluded thin, crinkly pots (mainly polystyrene) not accepted
Empty aerosol cans	Not acceptable	Acceptable
Aluminum pet food cans, foil, and foil-formed containers	Aluminum pet food cans are acceptable, but aluminum foil and foil-form containers are not acceptable	All are acceptable

Adjustments to estimate contamination under the Uniform Statewide Collection List as of July 1, 2025

Most of the tables giving results from this study give estimates for contamination under both the 2023 list and the USCL. To derive a contaminate estimate under the USCL from the actual measured contamination under the 2023 contaminant list, the following adjustments were made:

- All shredded paper and all empty aerosol cans were reclassified as contaminants
- For the category of aluminum pet cans and aluminum foil and foil-formed containers, we did not have data on what percentage was cans vs. foil, but estimated that each made up a substantial share, assigning 50% as acceptable (the pet food cans) and 50% contamination (the foil).
- For the rigid plastics bottles and tubs and the plastic flowerpots, we did not make any adjustments. We had no data on which to make an adjustment, and assumed that some of the differences between the lists probably partially canceled out other differences. For example, DEQ assumed that the 2″ by 2″ minimum size under the USCL would probably result in slightly less objects being classified as contaminants

compared to the 6-ounce minimum size under the 2023 list, but the restrictions on acceptable resins under the USCL would result in more items being classified as contaminants, partially cancelling the minimum size difference.

Use of the 2023 Contamination List instead of local contamination lists

In many parts of the state in 2023, some of the materials such as plastic tubs are not accepted in the local programs. This study uses the 2023 list, which is very similar to the Metro list of acceptable materials rather than the local list even for those samples collected in the local jurisdictions, for the following reasons:

- A main purpose of the study was to estimate what contamination levels will be under the USCL. When the USCL is fully implemented, the materials that can be collected commingled will be the same in all areas of Oregon.
- We used the Metro list as a basis for the 2023 list, with the exception of the maximum size of scrap metal items that can be commingled, as we believed it likely that the final USCL would be closer to the Metro list than the lists from other jurisdictions.
- A very large proportion of the recyclable material collected throughout the state is shipped to the large commingled recycling processing facilities in the Portland area, and those facilities sort out items for recycling such as plastic tubs regardless of whether those tubs are on the list of what is collected in the originating jurisdiction.
- More than 60% of all commingled recyclables collected in Oregon come from the Metro area.
- It would have been difficult for the crew to keep changing categories based on what is accepted in local programs, especially at facilities that receive commingled recycling from multiple jurisdictions.

Sources of error

Like polls, waste composition studies are sampling studies, and thus subject to random "sampling" error. Sampling error is reduced in proportion to the square root of the number of samples collected. Based on standard statistical methods, the size of sampling errors can be estimated, and this was done for inbound recycling. Table 3 shows the 95% confidence interval for each material based on the inbound recycling sorting results and random sampling error. Besides normal sampling error, however, there are other potential sources of error, including the following:

1. Self-sorting of material in recycling piles, where small heavy items like glass tend to drift down to the bottom of a pile and light materials like plastic bottles tend to float to the top, may have led to samples not representing the full composition of the pile. This may have particularly been an issue for inbound recycling. If the facility operator scooped up a sample from the middle of the pile, that scoop might miss much of the glass which had sunk to the bottom of the pile. Also, as the vehicle is crossing the facility with the samples over to where the sorters are, the glass continues to sift down in the scoop. If only part of the scoop is needed for the sample, the glass might still remain in the bottom of the scoop and not end up in the sample.
2. Sorting into incorrect/inconsistent categories. A crew of 5 often would often have as many as 14 samples to sort in a day, split between disposal site samples and inbound recycling samples. This requires each sorter to sort very fast, spending little time on each item. Occasionally an item they are sorting could be dropped or blown into the wrong sorting container. Also, fast judgement is required when sorting quickly, and sometimes it is not quickly obvious which category an item should be sorted into. For example, a carton for a toothpaste tube without fluoride would be sorted into the “low grade packaging paper” category, but if it is a fluoride toothpaste, the toothpaste would legally be a drug and the carton should be sorted into the exempt recyclable paper packaging category since it is drug packaging – something that might be missed as the sorter is quickly sorting paper.

Results

As of the date of this publication, full results of the inbound recycling study are published as an Excel file with separate sheets for each jurisdiction and other files located on the Oregon DEQ Waste Composition webpage. At that site you will find:

- Percent composition and tons of each material category for 2023 from commingled recycling only for the statewide results based on 379 samples sorted into 87 material categories. The tonnage number is derived from multiplying the percent composition from this composition study with the total tonnage of commingled recyclables collected in each jurisdiction in 2023 (as reported in the 2023 Oregon Material Recovery Survey data).
- Composition of commingled recycling for each of the following counties or sets of counties:
    - Portland Metro Tri-county area
    - Marion County
    - Lane County
    - Rest of Oregon (all but the Metro Tri-county area and Marion and Lane Counties)
    - Downstate (all but the Metro Tri-county area)
    - Deschutes County (part of "Rest of Oregon)
    - Willamette Valley and similar counties combined (part of "Rest of Oregon)
    - Oregon coastal counties (part of "Rest of Oregon)
    - Southwest Oregon counties (part of "Rest of Oregon)
    - Eastern Oregon counties (part of "Rest of Oregon")
- Separate composition of Metro-area residential samples vs commercial and other samples
- Separate composition of residential, commercial, and mixed route truck commingled recyclables for the state as a whole
- Lists of all 36 facilities where we captured samples, and the number of samples collected from each.
- Definitions for each of the 87 material categories used in the 2023 study

Preliminary analysis showed statistically significant difference in the contamination levels in the subgroups under "Rest of Oregon" (including each jurisdiction group above with labeled as part of "Rest of Oregon"), so we published results include these subgroups even though the number of samples for each is fairly low.

This report summarizes results and analysis of the inbound recycling composition study, as well as comparison to past studies. To view the tables with full results for all 87 material categories results in the eight jurisdictions and statewide, visit the Oregon DEQ Waste Composition webpage.

Figure 2. Statewide percent of inbound recycling materials, using USCL.

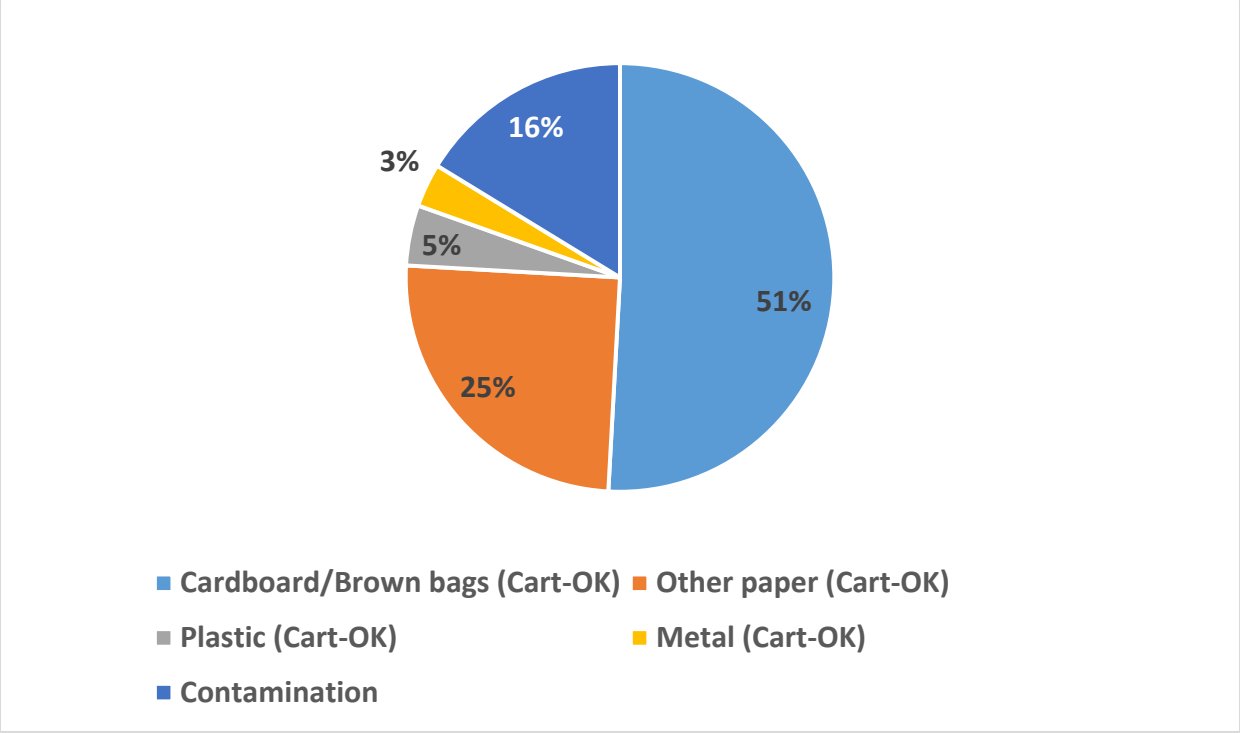


Table 3 and Figure 2 illustrate the statewide results of sorting 379 samples of inbound commingled recycling received at the 36 facilities that participated in the study.

Table 3 shows that paper, especially cardboard, dominates the tonnage of commingled recycling collected throughout the state. Acceptable paper made up 75.9% (USCL) or 76.5% (2023 list) of all commingled material set out for recycling including the contaminants, and 90.6% (USCL) or 90.5% (2023 list) of the all the acceptable material set out. In contrast, acceptable plastic makes up only 4.6% of all commingled material and 5.4% of the acceptable material (both lists), and acceptable metal made up only 3.3% (USCL) or 3.5% (2023 list) of the total and 4.0% (USCL) or 4.1% (2023 list) of all acceptable material.

Table 3. Statewide composition of commingled recycling.

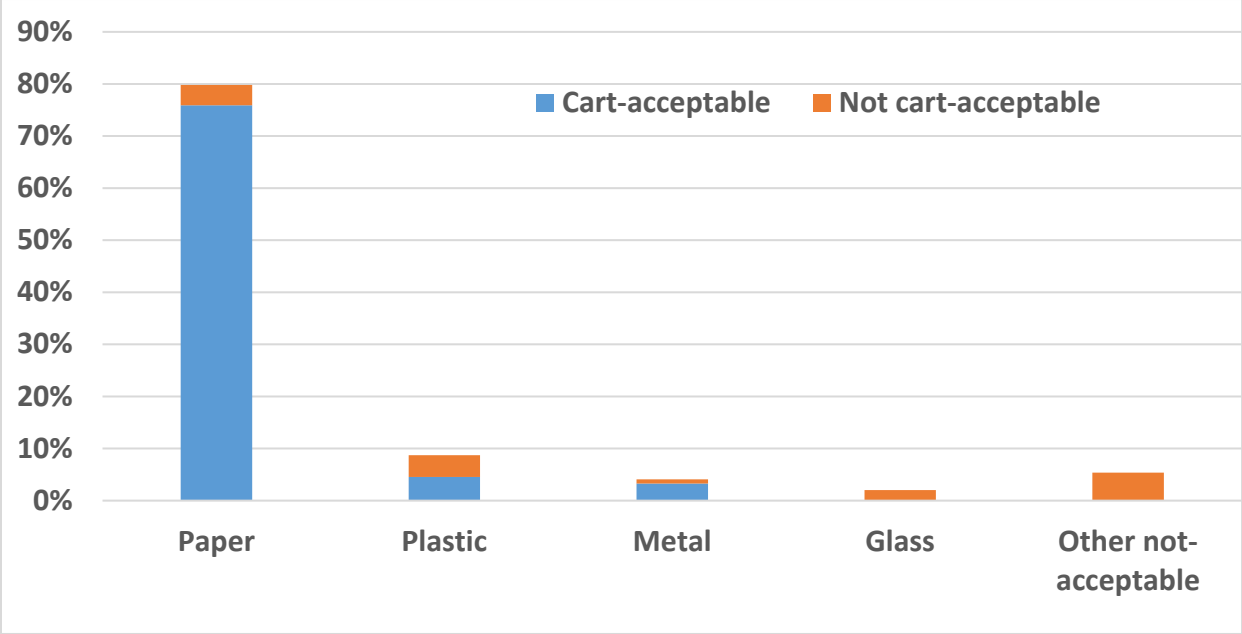
Material	Percent (95% conf. Int)	Tons (95% conf. Int)	% Samples where material is present
Cardboard	50.88% (49.18-52.54%)	148,535 (143,559-153,374)	100.00%
Other cart-acceptable paper**	25.05% (23.91-26.16%)	73,025 (69,796-76,361)	100.00%
Plastic Bottles 6 oz to 5 gallons	3.83% (3.64-4.03%)	11,194 (10,623-11,770)	98.42%
Plastic tubs, pails: cart-acceptable	0.71% (0.55-0.92%)	2,085 (1,616-2,676)	90.24%
Aluminum beverage cans	0.44% (0.40-0.48%)	1,277 (1,162-1,399)	94.72%
Aluminum foil, food trays, pet cans*	0.19% (0.17-0.21%)	544 (483-610)	89.45%
Other aluminum: cart-acceptable	0.02% (0.01-0.03%)	55 (31-83)	11.35%
Tinned cans excluding aerosols	2..07 (1,92-2.23%)	6,038 (5,603-6,510)	97.63%
Other scrap metal cart-acceptable	0.67% (0.55-0.79%)	1,952 (1,619-2,312)	72.56%
Paper not cart-acceptable**	3.90% (3.35-4.59%)	11,377 (9,773-13,393)	98.42%
Rigid plastic not cart-acceptable	3.02% (2.84-3.20%)	8,809 (8,277-9,349)	99.47%
Film plastic	1.17% (1.04-1.34%)	3,416 (3,036-3,915)	98.94%
Empty aerosol cans**	0.09% (0.06-0.14%)	268 (175-418)	41.16%
Other scrap metal not cart-acceptable	0.60% (0.42-0.80%)	1,757 (1,237-2,343)	45.65%
All glass	2.03% (1.74-2.36%)	5,935 (5,069-6,886)	87.60%
Food, yard debris, and wood	1.35% (1.11-1.62%)	3,942 (3,252-4,722)	92.88%
Disposable diapers	0.11% (0.07-0.17%)	328 (192-505)	22.16%
Cloth textiles	0.68% (0.55-0.81%)	1,991 (1,620-2,377)	81.79%
Other non-hazardous nonrecyclables	0.78% (0.62-0.97%)	2,291 (1,822-2,846)	80.47%
Medical waste	0.00% (0.00-0.01%)	12 (2-28)	2.64%
Sharps	0.00% (0.00-0.00%)	1 (0-3)	1.58%
All batteries	0.02% (0.01-0.03%)	50 (22-93)	17.68%
All other hazardous materials	0.03% (0.01-0.06%)	96 (24-189)	3.69%
Bagged garbage	2.38% (1.90-2.93%)	6,945 (5,536-8,549)	49.08%
All acceptable in cart (USCL)	83.73% (82.66-84.79%)	244,433 (241,298-247,522)	100.00%
All acceptable in cart (2023 list)	84.52% (83.49-85.49%)	246,744 (243,736-249,577)	100.00%
All not acceptable in cart (USCL)	16.27% (15.21-17.34%)	47,489 (44,391-50,618)	100.00%
All not acceptable in cart (2023 list)	15.48% (14.51-16.50%)	45,178 (42,345-48,181)	100.00%
Total tons 2023		291,922	379 samples

*Aluminum foil recyclable under 2023 list but not USCL. Row lightly shaded as part is not acceptable under USCL. Under USCL, we lacked data so arbitrarily split the category as 50% acceptable and 50% not acceptable.

** Empty aerosol cans and shredded paper not in a plastic bag both acceptable under 2023 list but not USCL.

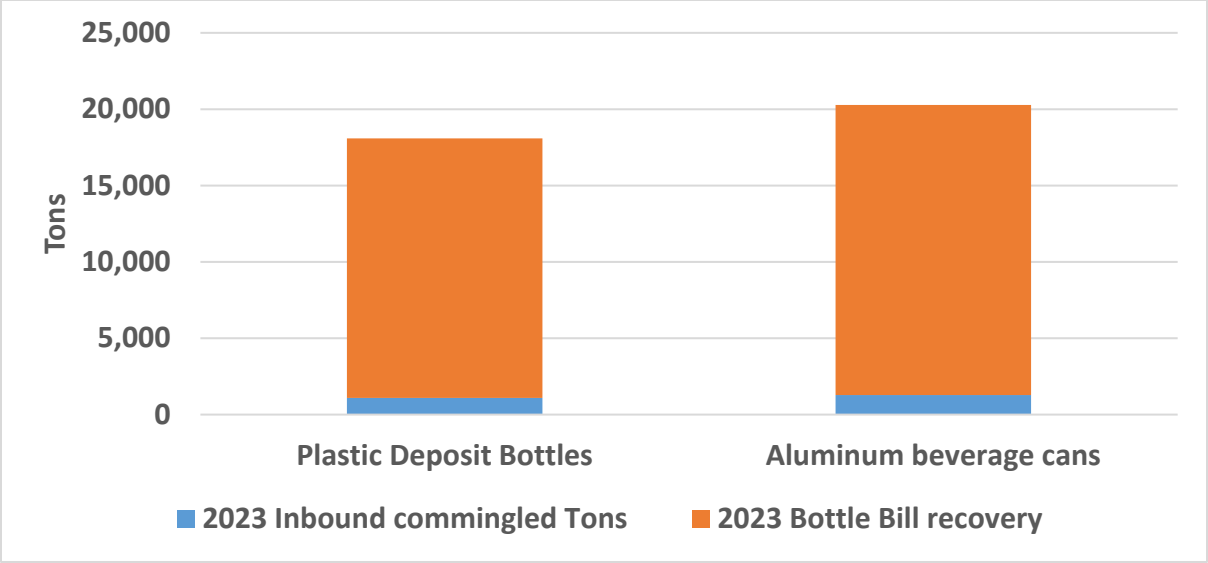
Contaminant (not included in USCL) rows are shaded gray.

Figure 3. Inbound recycling composition by acceptability and material category.



A major reason why aluminum cans and plastic bottles are so low in Oregon's commingled recycling is that most of these are recycled in Oregon through the Bottle Bill. Oregon's Material Recovery Survey shows that in 2023, more than 19,000 tons of aluminum cans and 17,000 tons of plastic beverage bottles were recycled under the Bottle Bill. In contrast, Table 3 shows that only about 1,277 tons of aluminum cans and 11,194 tons of all plastic bottles were recycled from commingled recycling collection

Figure 4. Inbound commingled tons of deposit containers recycled through the Bottle Bill vs. commingled recycling.



Further detail for plastic bottles shows that of the approximately 11,194 tons recycled through commingled recycling, only about 1,089 tons were deposit bottles covered under the bottle bill. Thus, for both aluminum cans and plastic bottles covered under the bottle bill, bottle bill collections exceeded curbside commingled collection by better than a 15 to 1 margin.

Contamination in commingled recycling

Statewide, of all the material set out commingled for recycling, 84.5% by weight was material that belonged in the recycling cart, but 15.5% was contaminants that are not accepted in any commingled collection program in Oregon, based on the 2023 lists. This contamination level is substantially higher than contamination in all past DEQ and Metro studies, as can be seen in Table 4 and Figure 5.

Table 4. Contamination levels from past Oregon commingled recycling studies.

Year	Container Type	Generator type	Contamination (90% conf. interval)*	Study ref.
2004/2005	15-gallon bins	Statewide Residential	2.52% (2.07 - 2.98%)	1
2004/2005	Rollcarts	Statewide Residential	9.94% (7.86 - 12.02%)	1
2009/2010	Rollcarts	Statewide All	9.40% (8.44 - 10.36%)	2
2014	Rollcarts	Metro Residential	8.86% (8.42 - 9.30%)	3
2023 (2023 list)	Rollcarts	Statewide All	15.48% (14.65 - 16.34%)	4
2023 (2023 list)	Rollcarts	Metro Residential	17.79% (16.60 - 18.99%)	4

* While most tables in this report publish 95% confidence intervals, this table used 90% confidence intervals for 2023 results to be consistent with the other study confidence intervals

Study references:

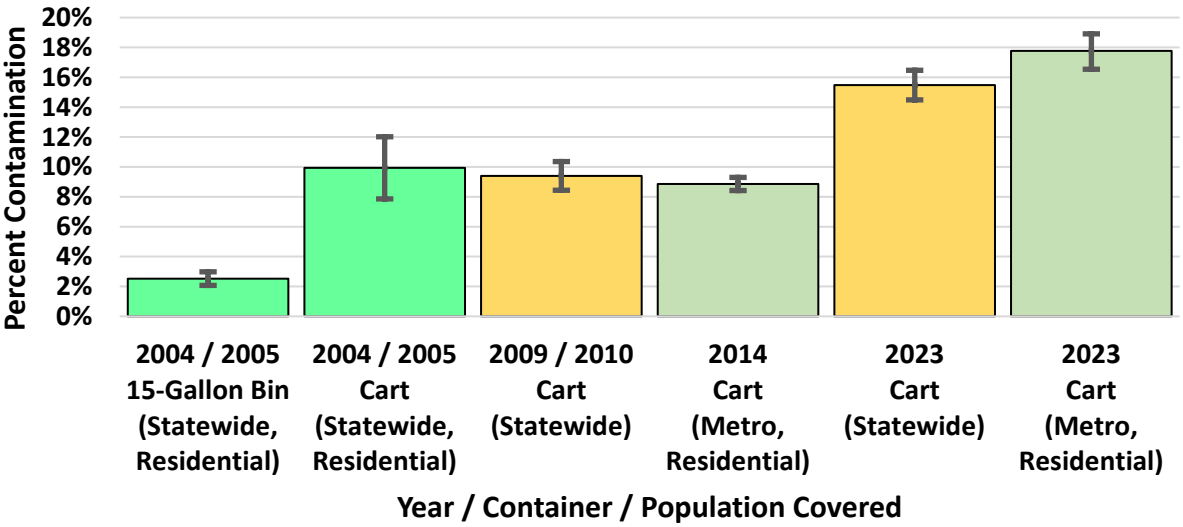
1 Oregon DEQ: Oregon Recycling Composition Study 2004 - 2005

2 Oregon DEQ: Composition of Commingled Recyclables Before and After Processing https://www.oregon.gov/deq/FilterDocs/CommingledRecyclablesBAProcessing.pdf

3 Metro: Single Family Recycling and Waste Composition Studies 2014-15 https://www.oregonmetro.gov/single-family-recycling-and-waste-composition-studies-2014-15

4 This 2023 study

Figure 5. Changes in contamination from 2005 to 2023.



In 2005, many Oregon programs were transitioning from using 15-gallon bins to 60 or 90 gallon rollcarts for collecting recyclables. Although contamination significantly increased as programs switched, DEQ's 2004-2005 study showed that the quantity of acceptable recyclables collected (excluding contaminants) also increased substantially. But now that people had large roll-carts for recycling, they were more likely to do "wishful recycling" – putting items in the recycling bin in hopes they would be recycled. For at least the next decade, residential recycling contamination levels changed little. There was no statistically significant change in contamination levels in roll carts between the 2004, 2009, or 2014 studies. The current study, however, show a substantial increase in contamination since 2014 that statistically was highly significant.

Contamination levels in different areas of Oregon

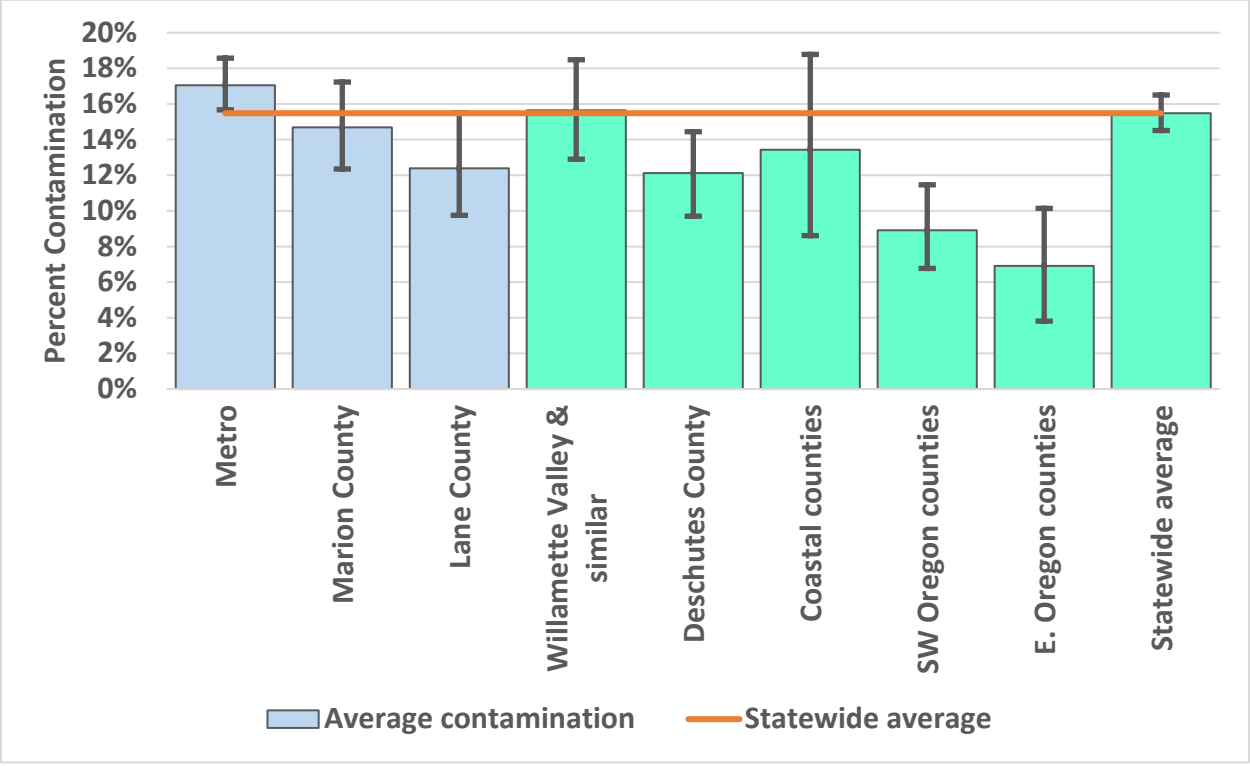
Originally DEQ was planning on publishing separate results for just Metro, Marion, and Lane counties – jurisdictions that purchased additional samples to reach a total of about 50 samples each (Lane and Marion) or at least 100 residential samples (Metro). All other counties were to be lumped together as "Rest of Oregon" under the assumption that no other jurisdiction would have enough samples to be statistically significant. However, when we analyzed samples from different parts of "Rest of Oregon", we found that there were statistically significant differences in that both Eastern Oregon and Southwest Oregon had less contamination than most other parts of the state, in spite of the small sample size and thus very broad confidence intervals, as can be seen in Table 5 and Figure 6.

Table 5. Contamination levels and tons of commingled recycling collected.

Jurisdiction	Average contamination	95% Conf. Interval	# Samples	Tons collected 2023*
Metro	17.05%	(15.67-18.57%)	179	178,272
Marion County	14.69%	(12.35-17.23%)	49	19,459
Lane County	12.39%	(9.75-15.50%)	50	30,567
Willamette Valley and similar counties	15.64%	(12.90-18.48%)	31	26,136
Deschutes County	12.12%	(9.70-14.44%	20	13,126
Coastal counties	13.43%	(8.61-18.78)	20	9,110
Southwest Oregon counties	8.91%	(6.77-11.46%)	19	9,010
Eastern Oregon counties	6.91%	(3.81-10.14%)	11	6,242
Statewide average or total	15.48%	(14.51-16.50%)	379	291,922

* Tons are based on direct collections of commingled materials as reported in the 2023 Oregon Material Recovery Survey

Figure 6. Contamination levels of inbound commingled recycling collected in different areas of Oregon, using the 2023 list.



Changes in composition over time

There have been considerable changes in the composition of the commingled recycling stream over the past couple of decades, as shown in Table 6 and Table 7. Here are some of the larger changes:

Table 6. Comparing statewide commingled recycling composition in percent 2023 vs. 2009.

Material	OK in Cart (2023)	2023 Percent	2023 95% Conf. Interval	2009 Percent	2009 90% Conf. Interval
TOTAL PAPER	**most**	**79.79%**	**(78.71-80.84%)**	**84.27%**	**(83.27-85.27%)**
Cart-acceptable paper	**yes**	**76.50%**	**(75.36-77.61%)**	**82.27%**	**(81.18-83.36%)**
Cardboard/Brown Bags	yes	50.88%	(49.18-52.54%)	25.33%	(23.18-27.49%)
Newspaper	yes	2.55%	(2.29-2.81%)	23.48%	(22.03-24.93%)
Magazines	yes	3.67%	(3.31-4.06%)	8.23%	(7.54-8.92%)
Gable top (milk) cartons	yes	0.34%	(0.32-0.37%)	0.30%	(0.26-0.34%)
Aseptic drink boxes	yes	0.14%	(0.12-0.16%)	0.03%	(0.02-0.03%)
All other recyclable paper	yes	18.92%		24.90%	
Not cart-acceptable paper	**no**	**3.29%**	**(2.94-3.70%)**	**2.00%**	**(1.76-2.25%)**
TOTAL PLASTIC	**part**	**8.74%**	**(8.32-9.18%)**	**7.44%**	**(6.86-8.02%)**
Cart-acceptable plastic	**yes**	**4.55%**	**(4.29-4.85%)**	**4.54%**	**(4.24-4.84%)**
Plastic deposit beer/soft drink	yes	0.13%	(0.11-0.14%)	0.18%	(0.16-0.19%)
Plastic deposit water	yes	0.11%	(0.10-0.12%)	0.26%	(0.23-0.29%)
Other plastic beverage bottles (some deposit 2018)	yes	1.72%		1.95%	
Other plastic bottles	yes	1.87%	(1.75-2.00%)	1.56%	(1.43-1.69%)
Cart-acceptable plastic tubs, pails	yes	0.71%	(0.55-0.92%)	0.60%	(0.52-0.68%)
Not cart-acceptable plastic	**no**	**4.19%**	**(3.94-4.45%)**	**2.90%**	**(2.37-3.43%)**
Not cart-acceptable rigid plastic	No	3.02%	(2.84-3.20%)	1.85%	
Film plastic	no	1.17%	(1.04-1.34%)	1.05%	(0.65-1.45%)
TOTAL METAL	**most**	**4.07%**	**(3.76-4.40%)**	**4.08%**	**(3.70-4.46%)**
Aluminum	**most**	**0.69%**	**(0.62-0.78%)**	0.43%	
Deposit alum. beer, soft drink, water	yes	0.42%	(0.38-0.46%)	0.23%	(0.21-0.25%)
Juice and other alum. beverage cans	yes	0.02%	(0.01-0.02%)	0.04%	(0.03-0.05%)
Aluminum foil, food trays, pet food cans	yes	0.19%	(0.17-0.21%)	0.13%	(0.11-0.15%)
Other aluminum cart-acceptable	yes	0.02%	(0.01-0.03%)	0.03%	(0.01-0.06%)
Large aluminum not cart-acceptable	no	0.05%	(0.01-0.12%)	0.00%	(0.00-0.01%)
Tinned and empty aerosol cans	**yes**	**2.16%**	**(2.00-2.34%)**	**2.41%**	**(2.20-2.61)**
Steel/Bimetal Beverage Cans	yes	0.01%	(0.01-0.01%)	0.02%	(0.01-0.03%)
Other tinned +empty aerosol cans	yes	2.15%	(1.98-2.32%)	2.38%	(2.19-2.58%)
Other ferrous+mixed metal cart-OK	yes	0.61%		0.94%	(0.64-1.23%)
Other ferrous+mixed metal/matl. not cart-acceptable	no	0.46%		0.25%	(0.10-0.40%)
Used Oil Filters	no	0.00%	(0.00-0.00%)	0.00%	(0.00-0.00%)
Nonferrous metal cart-acceptable	yes	0.06%	(0.04-0.08%)	0.02%	(0.00-0.03%)
Non-ferrous not cart-acceptable	no	0.09%	(0.03-0.20%)	0.03%	(0.00-0.06%)
All cart-acceptable metal	*yes*	*3.47%*	*(3.25-3.71%)*	*3.79%*	*(3.42-4.16%)*
All metal not cart-acceptable	*no*	*0.60%*	*(0.42-0.80%)*	*0.29%*	*(0.14-0.44%)*
TOTAL GLASS	**no**	**2.03%**	**(1.74-2.36%)**	**1.01%**	**(0.81-1.21%)**
Deposit beverage glass	no	0.37%	(0.31-0.44%)	0.23%	(0.15-0.31%)

Material	OK in Cart (2023)	2023 Percent	2023 95% Conf. Interval	2009 Percent	2009 90% Conf. Interval
No Deposit beverage glass	no	0.96%	(0.76-1.18%)	0.49%	(0.34-0.63%)
Other glass containers	no	0.57%	(0.49-0.65%)	0.23%	(0.19-0.28%)
All other glass	no	0.14%	(0.10-0.18%)	0.06%	(0.03-0.10%)
ALL OTHER NOT-CART-ACCEPTABLE	**no**	**5.36%**	**(4.66-6.14%)**	**3.20%**	
Food, wood, and yard debris	no	1.35%		0.48%	(0.38-0.58%)
Other non-hazardous not cart-acceptable	no	1.58%		1.43%	(1.06-1.81%)
Medical waste	no	0.00%	(0.00-0.01%)	0.00%	(0.00-0.00%)
All batteries	no	0.02%	(0.01-0.03%)	0.02%	(0.00-0.04%)
All other hazardous materials	no	0.03%	(0.01-0.06%)	0.04%	
Bagged garbage	no	2.38%	(1.90-2.93%)	1.22%	(0.94-1.51%)
All acceptable in cart	***yes***	***84.52%***	***(83.49-85.49%)***	***90.60%***	***(89.64-91.55%)***
All not acceptable in cart	***no***	***15.48%***	***(14.51-16.50%)***	***9.40%***	***(8.44-10.36%)***
Bagged Recyclables to be re-sorted		*0.62%*	*(0.45-0.79%)*	*0.48%*	*(0.29-0.66%)*

Table 7: Comparing tons of each material collected commingled 2023 vs. 2009.

Material	2023 Tons	2023 tons 95% Conf. Interval	2009 Tons	2009 tons 95% Conf. Interval
TOTAL TONS COMMINGLED	**291,922**		**288,599**	
TOTAL PAPER	**232,937**	**(229,776-235,990)**	**243,212**	**(239,752-246,649)**
Cart-acceptable paper	**223,330**	**(220,007-226,569)**	**237,426**	**(233,672-241,190)**
Cardboard/Brown Bags	148,535	(143,558-153,373)	73,112	(65,685-80,549)
Newspaper	7,432	(6,683-8,204)	67,762	(62,763-72,764)
Magazines	10,708	(9,658-11,854)	23,739	(21,374-26,134)
Gable top (milk) cartons	1,007	(928-1,088)	865	(728-1,004)
Aseptic drink boxes	406	(348-470)	77	(54-88)
All other recyclable paper	55,242		71,871	
Not cart-acceptable paper	**9,607**	**(8,569-10,799)**	**5,786**	**(4,942-6,631)**
Hardcover Books	591	(324-916)	460	(186-738)
All other not cart-acceptable paper	9,015		5,326	
TOTAL PLASTIC	**25,504**	**(24,294-26,784)**	**21,461**	**(19,474-23,474)**
Cart-acceptable plastic	**13,279**	**(12,509-14,165)**	**13,095**	**(12,069-14,138)**
Plastic deposit beer/soft drink	371	(325-421)	510	(452-556)
Plastic deposit water	329	(297-362)	741	(649-856)
Other plastic beverage bottles	5,033		5,616	
Other plastic bottles	5,461	(5,115-5,832)	4,498	(4,055-4,951)
Cart-acceptable plastic tubs, pails	2,085	(1,616-2,676)	1,730	(1,456-2,008)
Not cart-acceptable plastic	**12,225**	**(11,498-12,986)**	**8,366**	**(6,542-10,198)**
Not cart-acceptable rigid plastic	8,809	(8,277-9,349)	5,343	
Film plastic	3,416	(3,036-3,915)	3,023	(1,652-4,411)
TOTAL METAL	**11,892**	**(10,983-12,856)**	**11,772**	**(10,465-13,086)**

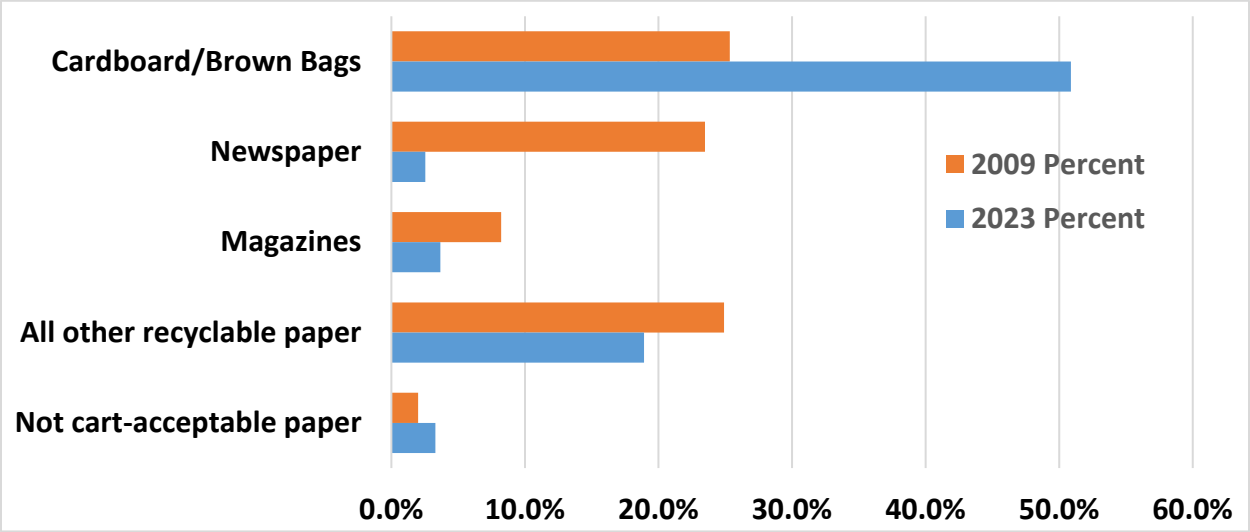
Material	2023 Tons	2023 tons 95% Conf. Interval	2009 Tons	2009 tons 95% Conf. Interval
Aluminum	**2,024**	**(1,822-2,263)**	1,255	
Deposit alum. beer, soft drink, water	1,219	(1,108-1,336)	661	(595-733)
Juice and other alum. beverage cans	58	(49-67)	109	(82-151)
Alum. foil, food trays, pet food cans	544	(483-611)	374	(306-444)
Other aluminum cart-acceptable	55	(31-83)	99	(15-188)
Large aluminum not cart-acceptable	147	(19-337)	11	(0-32)
Tinned and empty aerosol cans	**6,307**	**(5,825-6,826)**	**6,948**	**(6,232-7,646)**
Steel/Bimetal Beverage Cans	34	(24-44)	70	(21-90)
Other tin cans+empty aerosol cans	6,272	(5,780-6,773)	6,878	(6,211-7,557)
Other ferrous +mixed metal - cart-OK	1,775		2,704	(1,680-3,715)
Ferrous+mixed metal/matl. not cart-OK	1,340		732	(202-1,237)
Used Oil Filters	5	(0-11)	0	
Nonferrous metal cart-acceptable	177	(122-237)	43	(0-95)
Non-ferrous not cart-acceptable	265	(77-584)	90	(0-189)
All cart-acceptable metal	*10,135*	*(9,473-10,825)*	*10,939*	*(9,662-12,214)*
All metal not cart-acceptable	*1,757*	*(1,237-2,343)*	*833*	*(320-1,355)*
TOTAL GLASS	**5,935**	**(5,069-6,886)**	**2,926**	**(2,223-3,602)**
Deposit beverage glass	1,090	(908-1,278)	662	(388-940)
No Deposit beverage glass	2,791	(2,225-3,447)	1,405	(899-1,899)
Other glass containers	1,658	(1,422-1,908)	673	(524-834)
All other glass	396	(295-516)	186	(67-309)
ALL OTHER NOT CART ACCEPTABLE	**15,654**	**(13,616-17,934)**	**9,224**	
Food, wood, and yard debris	3,942		1,388	(1,040-1,730)
Other non-hazardous not cart-acceptable	4,609		4,141	(2,848-5,435)
Medical waste	12	(2-30)	5	
All batteries	50	(22-93)	56	(0-127)
All other hazardous materials	96	(24-189)	102	
Bagged garbage	6,945	(5,536-8,549)	3,532	(2,553-4,519)
All acceptable in cart	***246,744***	***(243,736-249,577)***	***261,461***	***(258,162-264,749)***
All not acceptable in cart	***45,178***	***(42,345-48,181)***	***27,135***	***(23,816-30,231)***
Bagged Recyclables to be re-sorted	*1,800*	*(1,322-2,303)*	*1,382*	*(731-2,007)*

Decline of newsprint and other printing and writing paper.

As seen in Table 7, the total amount of commingled material collected only increased by about 1 percent between 2009 and 2023, and if contaminants are not included, the total tons of acceptable material decreased even though Oregon's population grew by 12.6 percent during that same time period. There isn't any indication that people are less likely to recycle in 2023 as compared to 2009, but the amount of paper of certain types available to be recycled has changed. Printing and writing paper used to make up the majority of all commingled recycling by weight. In 2004, nearly 44% of the material that households in Oregon set out in their commingled recycling bins and carts was newspaper. Adding in magazines, office paper, and junk mail, about 80% of what households put in their recycling bins

was printing and writing paper. Since then, Oregon has seen a steady decline of printing and writing paper in both the commingled recycling stream and the disposal stream, as people and advertisers have continued to shift to using online media for communication. As seen in Table 6 and Figure 7, newsprint was still a major component of Oregon's total commingled recycling stream (including residential, commercial, and institutional) in 2009, making up about 23% of all commingled material by weight. But since then, newspapers have gotten considerably thinner, and in 2013, Oregon's largest newspaper moved to only providing home delivery 4 days per week. This current study found that newsprint made up only 2.55% of the entire commingled stream – close to 90 percent lower than in 2009.

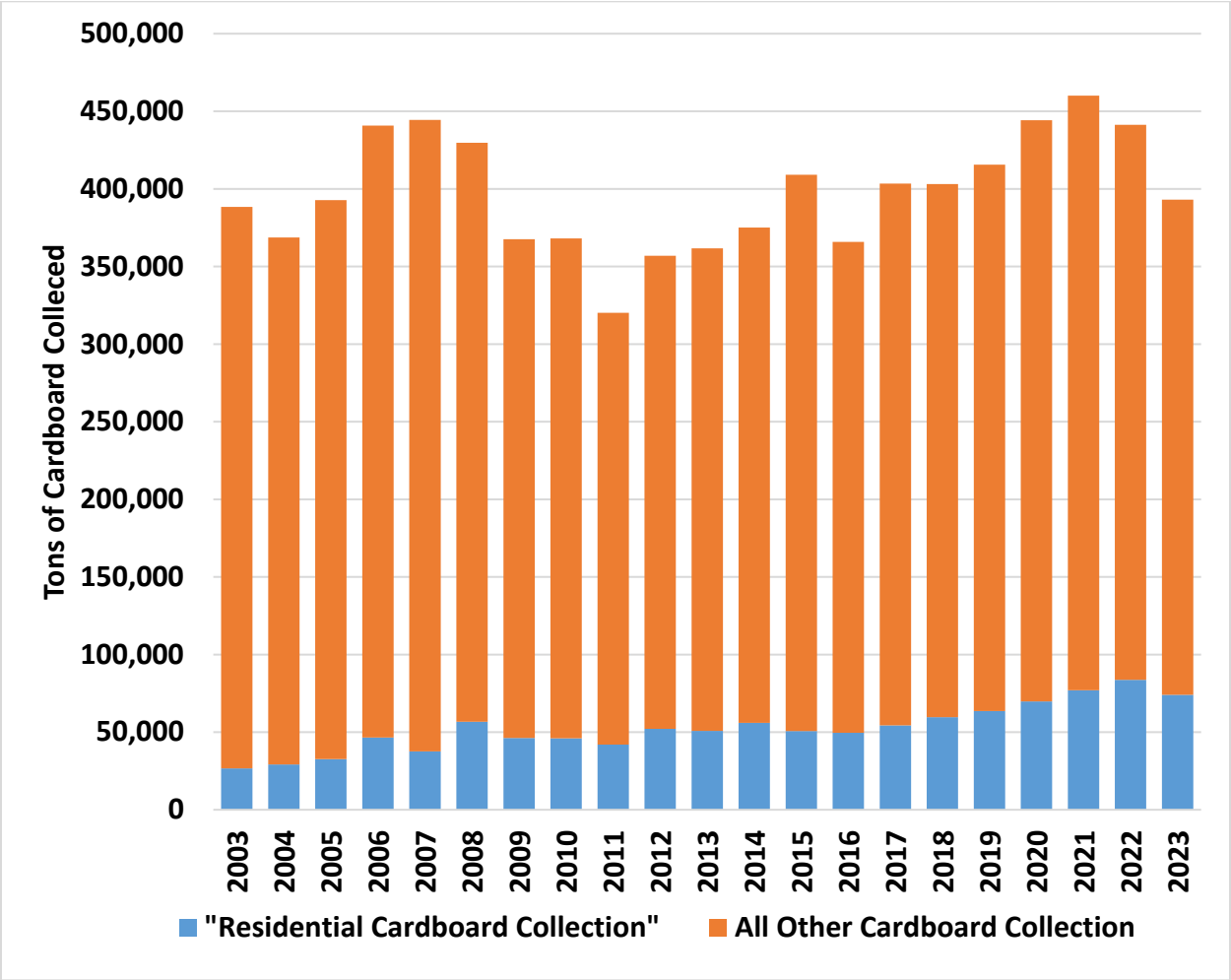
Figure 7. Change in paper sub-categories from 2009 to 2023, using the 2023 list. Excluding gable top (milk) cartons, aseptic drink boxes, and hardcover books sub-categories due to relatively low percentage.



Increase in cardboard in residential commingled collection.

While printing and writing paper has declined, corrugated cardboard has increased at least in the residential commingled stream. Corrugated cardboard made up about 25% of the entire statewide commingled recycling stream in 2009, but that climbed to more than 50% by this 2023 study. One of the reasons cardboard went up on a percentage basis is because newspaper and other printing and writing paper went down, so cardboard proportionally increased. But much of the increase was real tonnage as seen in Table 7, as Oregonians turned more to online shopping and having packages delivered to their homes. Figure 8 shows data from Oregon's Material Recovery Survey on the recycling of corrugated cardboard in Oregon since 2003. During that time period, the total amount of cardboard recycled remained fairly constant, with a dip from 2009 through 2012 following the 2008/2009 recession. Most of the cardboard recycled in Oregon is done through private recyclers such large retail marketers selling cardboard directly to paper mills. Many solid waste collection companies also offer separate collection of cardboard to their customers. Cardboard from residential commingled collection was relatively small, but has increased significantly in recent years.

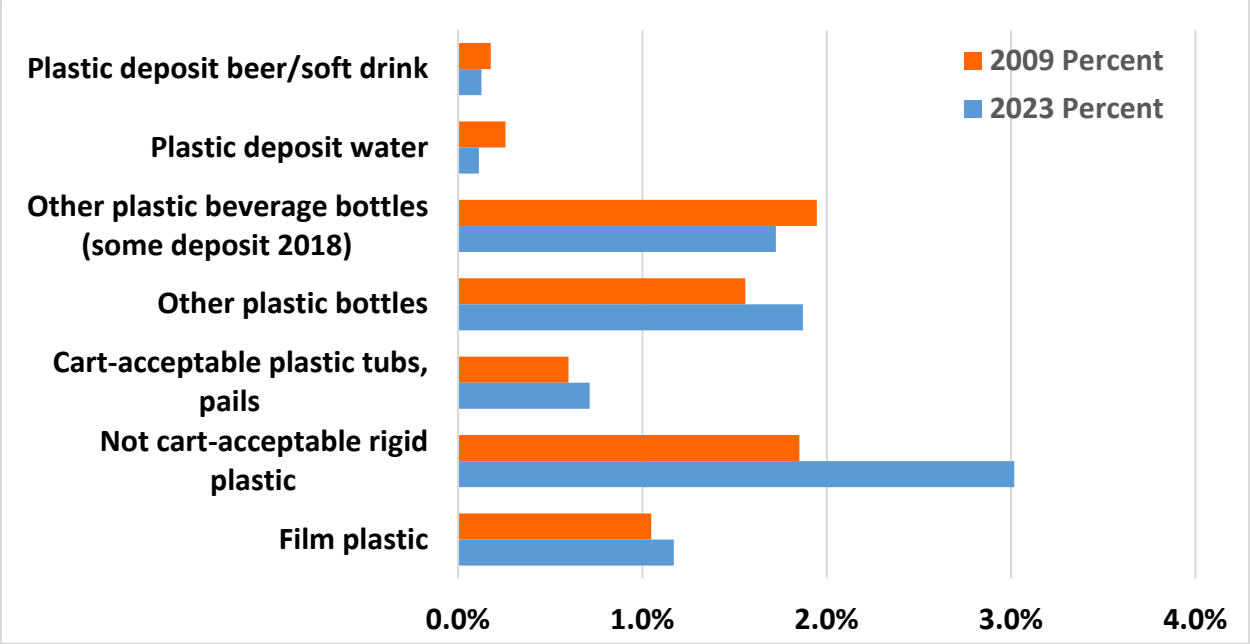
Figure 8. Collection of cardboard from commingled residential collection vs. all other sources.



Plastics, Metals, and Glass

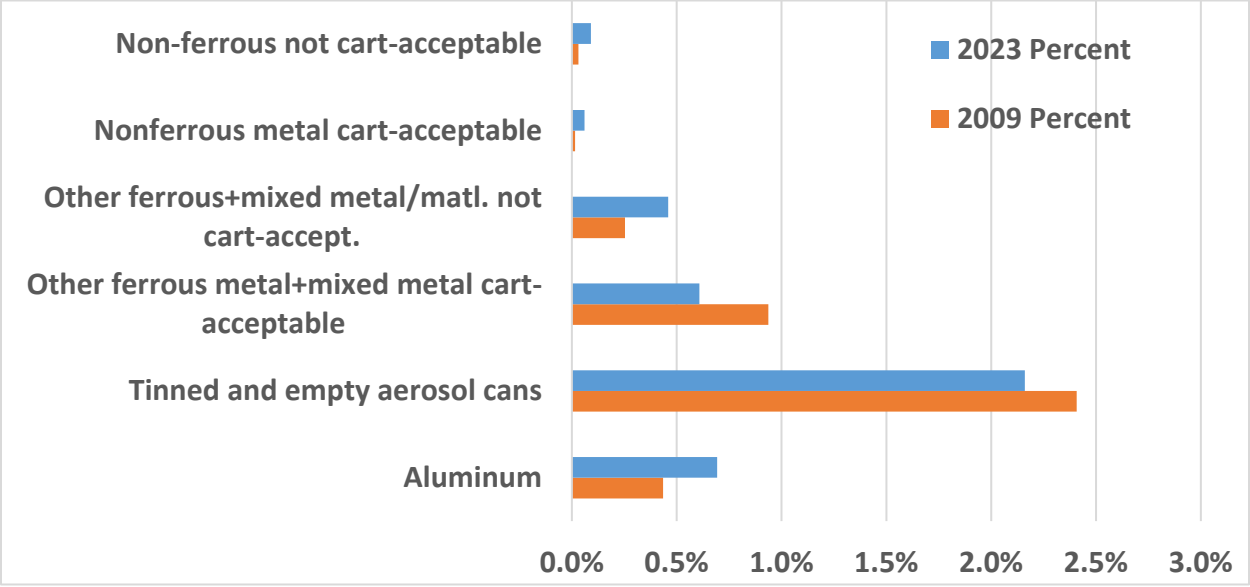
Unlike paper, there has been relatively little change in plastics and metal since 2009. Total plastic increased in the commingled stream, but that increase can be attributed almost entirely to increased contamination by types of plastic not acceptable in commingled recycling, as the tons of acceptable plastic was nearly unchanged. Plastic beverage containers currently covered under the Oregon Bottle Bill did decline substantially, likely due to more containers being recycled under the Bottle Bill following the doubling of container refund values in 2017 and the addition of juices, teas, energy drinks, and many other beverages to the bottle bill in 2018.

Figure 9. Change in plastic sub-categories from 2009 to 2023, using the 2023 list.



Although total metal was nearly unchanged, surprisingly, aluminum can tonnage increased substantially in commingled recycling. This is in spite of the fact that aluminum can recycling has also increased under the bottle bill at a faster rate than the sales of aluminum cans, according to data from the Oregon Liquor and Cannabis Commission.

Figure 10. Change in metal sub-categories from 2009 to 2023, using the 2023 list.



There was also an increase in scrap ferrous metal items that are too large to be acceptable for commingled recycling, and a decrease in acceptable scrap metal items. However, this could either partly or fully be because we used a different standard in 2023 of the size of metal items acceptable in commingled recycling. In 2009, metal items up to 30 pounds or 30 inches long were acceptable. For the 2023 study though, we used what are now the USCL standards that anything over 10 pounds or 18 inches is not acceptable.

Glass also showed an increase in commingled recycling in 2023 compared to 2009. In both studies, any glass was considered a contaminant in commingled loads. However, for reasons discussed in the 2009 report and in the earlier section of this report on sources of error, the amount of glass in commingled recycling may have been underestimated in 2009.

Film Plastic Counts

DEQ designated 30 randomly chosen samples of inbound recycling that for the film plastic categories, in addition to weighing each category after sorting, the sort crew would count each item of plastic film. In addition, the crew counted as well as weighed all beverage pouches and plastic carry-out merchandise bags. The purpose of this was to develop conversion factors to allow someone to estimate the number of pieces of film plastic present based on the weight. Note that any conversion factor developed here is only applicable to plastic film collected commingled with other material. It would not be appropriate to use these factors for other plastic film collection, such as collecting shrink wrap and mattress bags from stores, where individual pieces of plastic are likely to be much heavier. The overall average weight of film plastic pieces in commingled recycling in 2023 was. 0.0415 pounds per piece, as seen in Table 8.

Table 8. Average weight of film plastic in commingled recycling.

	Average weight (pounds)	Samples where present	Total count	Total weight (pounds)
All film plastic	0.0415			
Beverage pouches	0.0261	62/379	103.7	2.705
Merchandise bags	0.0761	280/379	1636	124.46
Recyclable film packaging and FSW	0.0339	29/30	716	24.27
Garbage bags	0.1126	18/30	46	5.18
Other non-recyclable film packaging and FSW	0.0326	29/30	625	20.355

When determining the average weight of all film plastic categories combined, both beverage pouches and merchandise bags were weighted to how many were present in the 30 designated samples, so as to not bias the average towards merchandise bags and beverage pouches since so many more samples of those were counted. In the 30 designated samples there were 3 categories of film plastic for which there were too few pieces present to make any reasonable estimate of average item weight for that category. These categories were “Recyclable film product” (none present in the 30 designated samples), “Nonrecyclable film product” (present in only 2 samples of the 30), and “Exempt Film Plastic” (present in only one sample of the 30).

More discussion

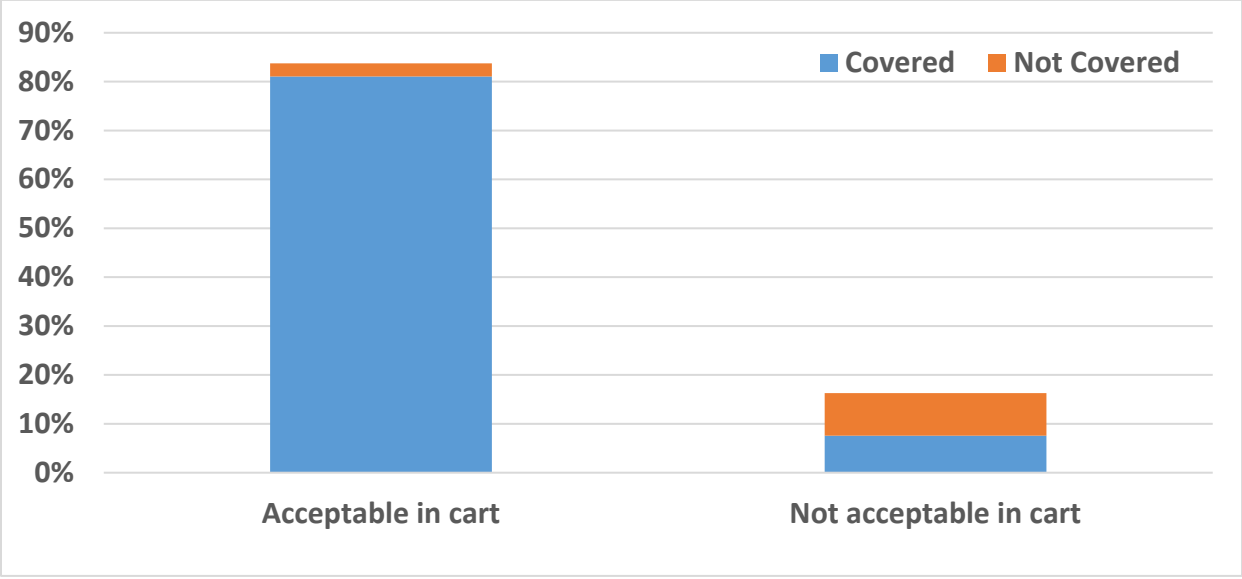
Percent of recyclables and contaminants that are covered products under the Recycling Modernization Act

One of the main reasons for conducting a study of the composition of inbound recycling was to determine what percentage of recyclable material and percentage of contaminants are "covered products" under the Recycling Modernization Act. Under the Recycling Modernization Act, the Circular Action Alliance needs to pay for transportation of recyclable materials from the point of collection to the nearest commingled recycling processing facility if more than 50 miles, but they only need to pay for the portion of the load which is covered product (generally packaging, printing and writing paper, and food serviceware). Similarly, Circular Action Alliance must pay a contamination management fee to the commingled recycling processing facilities, but only for the portion of contaminants which is covered products.

Table 9. Percent of recyclable material and percent of contaminants that are covered products under the Recycling Modernization Act.

	Covered	Not covered	% covered
Acceptable in the cart: USCL	81.05%	2.69%	96.79%
Not acceptable in the cart: USCL	7.58%	8.69%	46.58%
Acceptable in the cart: 2023 list	81.84%	2.69%	96.82%
Not acceptable in the cart: 2023 list	6.79%	8.69%	43.84%

Figure 11. Inbound recycling composition, by cart-acceptability and RMA coverage using USCL (2023).



Residential Versus Commercial Composition

For every route truck sampled as a part of this study, Sky Valley would ask the driver what percent of the load came from households, what percent from multifamily apartments or condos, and what percent from businesses. If a load was 90% or more residential (both single and multifamily) it was classified as a residential route truck. If 90% or more was from commercial sources, it was classified as a commercial route truck. Anything in between was classified as a mixed route truck. In the large majority of cases, mixed route trucks resulted from trucks that picked up both

multifamily and commercial waste. Table 10 shows the percentage of single family, multifamily, and commercial commingled recycling in each type of route truck. For mixed route trucks, the driver survey showed that 37.1% of the recycling was from multifamily apartments and condos (5-plex or more), and only 11.7% was from single-family up to 4-plexes. Table 10 also shows the percentage of route truck recycling that originated from single-family, multifamily, and commercial sources based on tonnage reports from collection service providers as part of DEQ's 2023 annual material recovery survey. Those numbers show that the collection service providers reported higher amounts of commercial commingled recycling and lower amounts of multifamily commingled recycling than we found based on our random sampling of trucks and driver interviews. It is possible that the collection service providers underestimate multifamily recycling and overestimate commercial recycling since so much multifamily-recycling is collected on their commercial route trucks. Appendix A which describes methodology further discusses differences between the material recovery survey data and this study's results.

Table 11 show a summary of the composition of residential, commercial, and mixed route trucks. For residential waste, we could not produce separate results for single-family versus multifamily waste, as only two of our 351 randomly-chosen samples were more than 90% from multifamily. Two of the samples were also from depots, but those are not represented in Table 10 or Table 11.

Table 10. Average percent of single-family, multifamily, and commercial waste in each load type.

Load Type	Number of samples	Single-family (to 4-plex)	Multifamily (5-plex or more)	Commercial
Residential Route Truck*	241	96.4%	2.7%	0.8%
Mixed Route Truck	57	11.7%	37.1%	51.2%
Commercial Route Truck	51	2.5%	2.9%	94.6%
Total Route Trucks	349	68.9%	8.4%	22.8%
Material Recovery Survey Tons		62.5%	4.5%	33.1%

* Excludes the 28 Metro samples chosen specifically to be single family residential

Table 11. Residential, Mixed, and Commercial Route Truck Composition for Inbound Commingled Recycling.

Material	Residential Routes Percent (95% Conf. Int.)	Mixed Routes Percent (95% Conf. Int.)	Commercial Routes Percent (95% Conf. Int.)
Cardboard	45.52% (44.15-46.85%)	55.46% (49.25-61.21%)	72.04% (68.21-75.75%)
Other cart-acceptable paper	28.47% (27.42-29.53%)	20.73% (17.39-24.65%)	12.90% (10.07-16.00%)
Plastic Bottles 6 oz to 5 gallons	4.56% (4.36-4.78%)	2.70% (2.24-3.18%)	1.85% (1.38-2.35%)
Plastic tubs, pails: cart-acceptable	0.68% (0.58-0.79%)	0.87% (0.37-1.54%)	0.65% (0.13-1.62%)
Aluminum beverage cans	0.54% (0.49-0.59%)	0.27% (0.19-0.38%)	0.13% (0.08-0.18%)
Aluminum foil, pet food cans *	0.25% (0.22-0.28%)	0.08% (0.06-0.11%)	0.04% (0.02-0.06%)
Other aluminum: cart-acceptable	0.02% (0.01-0.04%)	0.01% (0.00-0.01%)	0.01% (0.00-0.03%)
Tinned cans excluding aerosols	2.38% (2.22-2.55%)	1.77% (1.33-2.24%)	0.94% (0.64-1.28%)
Other scrap metal cart-acceptable	0.86% (0.69-1.03%)	0.31% (0.18-0.45%)	0.25% (0.13-0.39%)
Paper not cart-acceptable	3.67% (3.39-3.99%)	4.56% (2.67-7.52%)	3.93% (1.93-6.40%)
Rigid plastic not cart-acceptable	3.46% (3.25-3.67%)	2.22% (1.75-2.71%)	1.75% (1.25-2.28%)
Film plastic	1.33% (1.15-1.57%)	0.87% (0.69-1.06%)	0.78% (0.54-1.08%)
Empty aerosol cans**	0.09% (0.07-0.10%)	0.16% (0.03-0.40%)	0.04% (0.01-0.07%)

Material	Residential Routes Percent (95% Conf. Int.)	Mixed Routes Percent (95% Conf. Int.)	Commercial Routes Percent (95% Conf. Int.)
Other scrap metal not cart-OK	0.74% (0.50-1.01%)	0.44% (0.14-0.83%)	0.21% (0.07-0.39%)
All glass	2.30% (1.94-2.71%)	2.10% (1.35-3.05%)	0.68% (0.30-1.12%)
Food, yard debris, and wood	1.31% (1.06-1.64%)	1.77% (1.14-2.50%)	0.95% (0.36-1.74%)
Disposable diapers	0.13% (0.07-0.21%)	0.07% (0.02-0.13%)	0.03% (0.01-0.06%)
Cloth textiles	0.74% (0.60-0.91%)	0.62% (0.32-0.98%)	0.42% (0.15-0.78%)
Other non-hazardous nonrecyclables	0.81% (0.65-0.98%)	1.03% (0.45-1.82%)	0.37% (0.17-0.62%)
Medical waste	0.00% (0.00-0.00%)	0.02% (0.00-0.05%)	none
Sharps	0.00% (0.00-0.00%)	0.00% (0.00-0.00%)	none
All batteries	0.02% (0.01-0.05%)	0.00% (0.00-0.00%)	0.01% (0.00-0.03%)
All other hazardous materials	0.04% (0.01-0.08%)	0.01% (0.00-0.04%)	none
Bagged garbage	2.08% (1.63-2.56%)	3.95% (2.19-6.32%)	2.04% (1.20-3.00%)
All acceptable in cart (USCL)	83.16% (82.15-84.15%)	82.15% (78.11-85.64%)	88.78% (85.79-91.53%)
All acceptable in cart (2023 list)	83.74% (82.75-84.71%)	84.20% (80.65-87.31%)	88.90% (85.92-91.65%)
All not acceptable in cart (USCL)	16.84% (15.85-17.85%)	17.85% (14.36-21.88%)	11.22% (8.46-14.21%)
All not acceptable in cart (2023 list)	16.26% (15.29-17.25%)	15.80% (12.69-19.35%)	11.10% (8.35-14.08%)

Contaminant rows are shaded gray

* Aluminum foil and foil-form containers were cart-acceptable (Metro) in 2023 but not on the USCL, but aluminum pet food cans are on both lists. Lacking data, half this category was included in "cart acceptable" and the other half not acceptable.

** Empty aerosol cans were acceptable on the 2023 but not on the USCL list
Only shredded paper in plastic bags was listed as not acceptable in 2023, but all shredded paper is not on the USCL list.

Table 11 shows many statistically significant differences between residential and commercial recycling. Corrugated cardboard was highest in commercial loads, next highest in mixed route loads, and lowest (but still high compared to studies in previous years) in residential loads. There was no overlap in 95% confidence intervals for any of the categories, indicating that the differences were statistically significant. The reverse was true for other paper, with residential being the highest and commercial being the lowest. Plastic bottles, aluminum cans, aluminum foil, and tinned cans were also significantly higher in residential loads than in commercial loads, but plastic tubs and pails were similar in both residential and commercial loads.

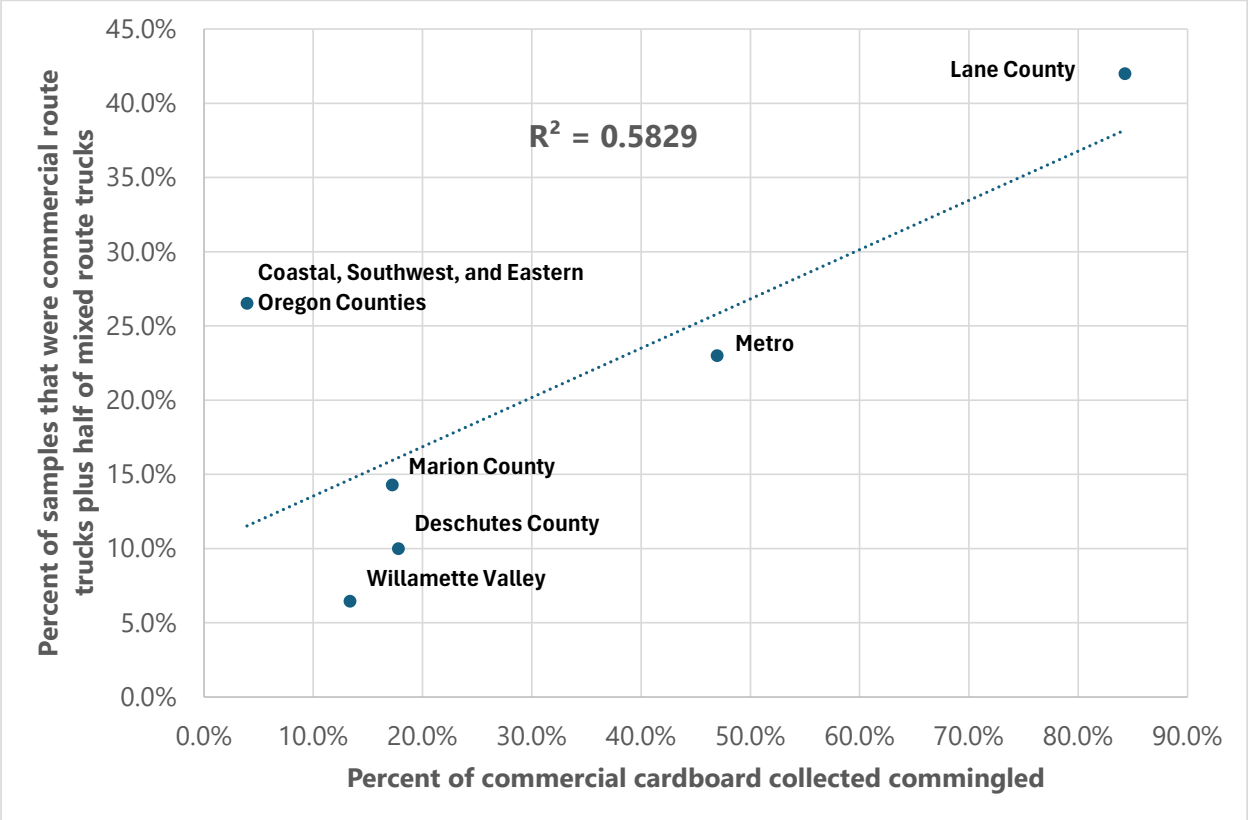
Regarding contaminants, residential loads had significantly more contamination than commercial loads. This was true for unacceptable rigid plastics, film plastic, unacceptable scrap metal, glass, diapers, and an assortment of other non-hazardous contaminants. Paper contaminants were similar in residential and commercial loads. For contaminants that were higher in residential than commercial loads though, it could be that the large amount of cardboard in commercial loads diluted out the other contaminants, but some of the materials such as aluminum cans and plastic bottles are likely generated in larger quantities in residential rather than commercial settings

Unclear on How Commercial Collection Method Affects Composition

Almost all of the residential recycling collected by collection service providers is collected through commingled recycling. For commercial collection though, in many jurisdictions there are more tons of recycling collected through

commercial cardboard-only routes than is collected through commingled recycling. This would be expected to affect the composition of recyclables in the jurisdictions since if cardboard is collected on separate routes, there will be far less cardboard available to be collected through commingled recycling. However, our study gave contradictory results.

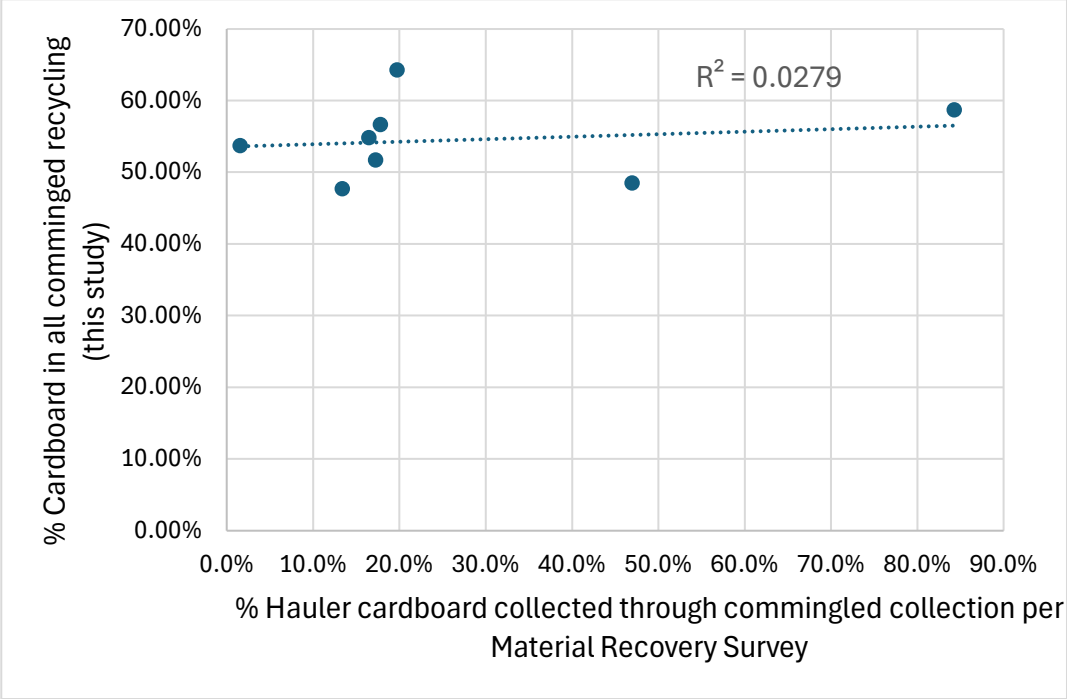
Figure 12. Jurisdictions that have separate cardboard-only collection routes have fewer commercial commingled routes.



One result to be expected is that in jurisdictions with extensive separate cardboard routes, there should be fewer commercial commingled recycling route trucks. The results shown in Figure 13 tend to back this up. The horizontal axis of Figure 13 is the percentage of cardboard that is collected through commingled collection in different jurisdictions by collection service providers, as opposed to separate cardboard collection by those collectors, based on data from Oregon's 2023 Material Recovery Survey. The vertical axis is the percentage of route truck selected for sampling in this study that were commercial route trucks, plus half of the percentage for mixed route trucks. As can be seen, there is a positive correlation between the two, with more than half of the variance in percentage of commercial route trucks selected in each jurisdiction or set of jurisdictions being explained by the percentage of commercial cardboard in those jurisdictions that is collected through commingled collection. Partly because of the small sample size (number of jurisdictions), the correlation was just barely statistically significant at the .05 level with a one-tailed test.

Although there appears to be a positive correlation between the percentage of samples we collected in each jurisdiction that were from commercial routes and the percentage of cardboard reported by haulers as being collected commingled, per Oregon's annual material recovery survey data, surprisingly, there wasn't any observed correlation between the amount of cardboard found in the total commingled stream for a jurisdiction and the percentage of cardboard that came from commingled recycling as reported by haulers for each jurisdiction in Oregon's annual material recovery survey. This is shown in Figure 14, where the line of best fit is almost flat.

Figure 13. Little correlation between percent cardboard in the commingled stream and the percent of commercial cardboard that haulers collect commingled.



As of the date of this publication, we have not yet analyzed the beverage container count data to estimate how many beverage containers of each type are being recycled through commingled recycling or done a comparison of the residential composition calculated in this study with the results of direct collection of samples from households done by DEQ in a 2004-2005 study. That work is scheduled for a future update of this report.

Acknowledgements

First, DEQ would like to acknowledge the significant contribution that Brad Anderson of Sky Valley Associates made regarding waste composition work in Oregon for more than thirty years, who has since passed away after completing work on this study. Brad was integrally involved in every disposed waste composition study conducted by DEQ since 1992, and has been the main contractor for DEQ's 1998, 2000, 2002, 2005, 2009/10, 2016/17, and the current 2023 study. He brought to this work a huge amount of experience, a stable and well-trained sort crew, many of whom also had participated in numerous DEQ studies, and exceptional relationships with recycling facilities and collection companies. Special mention should also be given to Paul Winn, the sort crew leader for the current study who has also worked on every DEQ disposed waste composition study since 2002. Paul always worked hard to make sure that he and the crew knew what we were expecting in the study and would deliver what we needed.

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- WestRock Recycling – Wayne Jackson, Jerry Hartley, Tonya Allison, Rock Faaopega
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- Beaver Hill Transfer Station – Jessica Johnson, Robert Stewart
- Canby Transfer Station – Nicholas Sharp, Michael Smith, Kris Wright, Scott Carnes
- Coffin Butte Landfill - Broc Keinholz
- City of Roses – Alando Simpson, Jasmine Ramirez, Dylan Lomato
- Columbia County Transfer Station – Jacob Anderson, Kanale Tumlinson
- County Transfer + Recycling, Florence – Brian Enochian
- Crook County Landfill – Aaron Reihart, Jacquie Davis
- Delta Sand and Gravel – Shawn Leatham
- Dry Creek Landfill and Rogue Transfer Station, Medford – Scott Fowler, Laura Leebrick, Denise Barnes, Jenifer Stuber
- Environmentally Conscious Recycling – Steven Desemple, Vince Gilbert
- Forest Grove Transfer Station + Waste Management– Greg Johnson, Jason Brown, Darin Flaig, Andrew Bluder, Kelly Shaner, Cari Saxe
- Greenway Recycling – Terrell Garnett
- Gresham Sanitary Transfer Station, Tod Ronson, Larry Head, Jamie Stuart
- Hillsboro Garbage – Chris Ridgeway, Tony Rinck
- Hood River Transfer Station – Jim Winterbottom, Heather Bucher, Robert Mendez, James Loomis
- Josephine Transfer Station – Brett Turner, Nikole Nance
- Klamath Falls Demo Landfill – Thomas Crist
- Klamath Falls Transfer Station – Thomas Crist, Ben Hirenge
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- Thomas Creek Landfill, Lake County – David Berman
- Marion Resource Recovery Facility - Jamie Pedersen, Rich Dysinger
- McMinnville Transfer Station- Ernest Martin, Christopher Carey
- Metro Central Transfer Station – Oscar Alamo, Jose Plascencia
- Metro South Transfer Station – Scott Hess, Phil Lerum, Mike Carney

- Newberg Transfer Station – Gary Nelson, Dave Huber
- Oakland Transfer Station and Sutherlin Sanitation – Grant Fahey
- Ontario Sanitary Service – Nate Wilson
- Pendleton Sanitary Transfer Station – Mike McHenry, Amanda Coy, Denise Hodson
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- Recology Suttle Road
- Republic Services Bend- Ron Shearer, Jeramy Cummings, Forrest Cary, Bradford Miller, Abie Burkus
- Republic Services Woodburn – Luba Toran, Joshua Harvey
- Roseburg Landfill and Transfer Station – Nick Frisinger, Josh Klein
- Sandy Transfer Station
- Short Mountain Landfill, Glenwood Receiving Station, Florence Transfer Station, Veneta Transfer Station – Jeff Orlandini, Tim Cogswell
- Source Recycling, Albany – Amie Morgan, Julie Jackson, Tasha Leal, Joshua Walesby, Monte Riggs, Bruce Edwards
- Southern Oregon Sanitation, Grants Pass – Trent Carpenter, Tanner Hageman, Scott Stockton
- The Dalles Transfer Station
- Thompson's Transfer Station, Newport – Aimee Thompson, Rob Thompson, Ken Riley, Jason Collard
- Tillamook Transfer Station - Justin Weiss
- Toledo Transfer Station – Dave Larmouth
- Troutdale Transfer Station – Tom Nino, Kathleen Borgun
- Tualatin Valley Waste Recovery – John Cunningham
- Valley View Transfer Station, Ashland – Gary Blake, Eric Ahnmark
- Wasco Landfill – Nancy Mitchell, Jim Winterbottom, Christopher Rippy, Heather Bucher
- Waste Management Klamath Falls - Ben Hirenge, Barry Thompson
- Waste Pro Transfer Station, La Grande – Darin Larvik, Amber
- West Coast Transfer Station, Coos Bay – Angela Mott, Bill Richardson
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- Apex Disposal – Sam Miller, Alishia
- Cascade Recycling – Paarth Patel, Ernie Swetnam
- City Sanitary Service, Tillamook – Ron Walker, Bobby Walker
- Clackamas Garbage – Keith Miller
- D&O Garbage – Derek Neliton, Dave Marxer
- Garbarino Disposal – Jeff Patton
- Heiberg Garbage Service – Jessi Heiberg
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- Pacific Sanitation – Kyle Ritchey
- Portland Disposal and Recycling – Matt Gatto
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Department of Environmental Quality

Peter Spendelow and Daniel Redick – Report authors. Gretchen Sandau and Eric Boone – assistance with logistics and sample selection. Data analysis by Peter Spendelow

Appendix

Appendix A: Methodology

This study was based on samples of commingled recycling collected directly from recycling route trucks when they unloaded their materials and recycling transfer facilities or commingled recycling processing facilities.

Sample Selection

Overall, we collected samples directly at 28 recycling reload/transfer facilities and 8 commingled recycling processing facilities. The number of samples collected at each facility was roughly proportional to the commingled recycling directly collected at that facility, excluding loads transferred in from other facilities, based on the tonnage recyclers reported on their annual material recovery survey. We did not sample all small rural facilities though but instead collected at just a few of them to represent the whole class of small rural transfer operations. In our partner jurisdictions that paid for additional sampling within their jurisdiction, we did increase the number of samples at each facility, but used weighting when combining the compositions in each jurisdiction when calculating statewide results. We collected samples in the Metro area twice each quarter at roughly 45-day intervals, in Marion, Lane, and Deschutes counties and the Willamette Valley quarterly at roughly 90-day intervals, and in more rural jurisdictions at least once during the warm season months of April through September and again at least once during the months of October through March.

Samples at each facility were selected to be representative of all commingled recycling directly received at that facility using a protocol described below to randomly pre-select the routes/trucks to be sampled such that the chance of a specific load being selected was directly proportional to the weight of that load, so any pound of recycling would be equally likely to be picked. The general protocol was as follows:

- Roughly a week before when the sort crew was scheduled to collect samples at a facility, we would request that the facility provide us with a list of all the vehicles that collected and then directly unloaded commingled recycling on the same day of the week that the crew would be there, but exactly two weeks before the scheduled sample collection date. Transfer trailers were excluded from the list. Information requested included:
    - Company name
    - Truck number
    - Net weight of the load
    - If available, the time each load of the truck arrived
    - If available, whether the truck was on a residential or commercial route

Appendix Table A1. Example of sample selection at one facility.

RES or COM	Company	Truck	Time or ticket #	Load net weight (lbs)	Running total	Load selected	Randomly selected pound
Commercial	Company B	10177	10:23 AM	3440	3,440		
Commercial	Company C	417427	3:17 PM	420	3,860		
Commercial	Company D	34	10:31 AM	5040	8,900		
Commercial	Company D	43	10:32 AM	7220	16,120	1st of 1	9,151
Commercial	Company D	67	10:32 AM	4300	20,420		
Commercial	Company D	135	10:48 AM	5360	25,780		
Commercial	Company E	10408	2:55 PM	440	26,220		

Commercial	Company E	11433	2:57 PM	2860	29,080		
Commercial	Company F	1156	10:36 AM	1920	31,000	1st of 1	30,094
Commercial	Company F	1209	10:20 AM	4460	35,460		
Commercial	Company F	1211	10:26 AM	7600	43,060		
Commercial	Company F	1213	10:23 AM	8700	51,760	1st of 1	51,036
Commercial	Company H	211778	3:22 PM	8440	60,200		
Commercial	Company H	214450	10:02 AM	9140	69,340		
Commercial	Company H	313563	10:00 AM	2420	71,760		
Commercial	Company H	363523	9:48 AM	3780	75,540	1st of 1	71,979
Residential	Company A	295	T 438288	3900	79,440		
Residential	Company B	18	T 438290	1700	81,140		
Residential	Company B	21	T 438292	5000	86,140		
Residential	Company B	10186	T 438289	3980	90,120		
Residential	Company B	10192	T 438279	340	90,460		
Residential	Company B	96695	T 438245	3620	94,080	1st of 1	92,921
Residential	Company G	1	T 438247	200	94,280		
Residential	Company H	104349	T 438241	6000	100,280		
Residential	Company H	104349	T 438268	5000	105,280		
Residential	Company H	104478	T 438260	9960	115,240	1st of 1	113,864
Residential	Company H	104809	T 438261	8680	123,920		
Residential	Company H	104813	T 438246	7080	131,000		
Residential	Company H	104820	T 438264	5420	136,420	1st of 1	134,806
Residential	Company H	152824	T 438269	4640	141,060		
Residential	Company H	152825	T 438232	4080	145,140		
Residential	Company H	152868	T 438258	6780	151,920		
Residential	Company H	152871	T 438248	3080	155,000		
Residential	Company H	152871	T 438257	4220	159,220	2nd of 2	155,749
Residential	Company H	152884	T 438259	2140	161,360		
Residential	Company H	152885	T 438267	6180	167,540		

167,540.00	Total weight (pounds)
8	Number of samples to collect
20,942.50	Total pounds divided by # samples
9,151.09	Random number chosen between 0 and 20,942.5 pounds: Sample 1
30,093.59	add 20,942.5 to the random number above: Sample 2
51,036.09	add 20,942.5 to the number for Sample 2: Sample 3
	continue adding 20,942.5 to preceding number for samples 4-8

DEQ would then sort that list by whether the truck was commercial or residential, by company name, by truck number, and then by time or ticket number. Appendix Table A1 shows an actual example of load selection at one facility. After lining the loads up in this order, we would make a column with a running total of the pounds collected (6th column in Appendix Table A1). In the case shown in Appendix Table A1, we wanted to collect 8 random samples at the facility that day. The first step was to divide the total pounds (167,540) by the number of samples desired (8), giving a result of 20,942.5 pounds. We then used a random number generator to pick a random number between 0 and 20.942.5 pounds. The random number chosen in this case was 9,151.09. We then compared this random number to the column of the table with the running total of pounds to see which truck was carrying pound 9,151 – in this case it was Company D truck number 48. We would then move to the second interval by adding that 20,942.5 pounds to that random number 9,151.09, giving a total of 30,093.59. That pound of recycling arrived at the facility in Company F truck 1156. We would the continue down the list in this manner until all 8 trucks were selected.

Although we were doing this by truck numbers, in fact what we were doing was selecting the collection routes from which we would get our sample on sample-collection day. After choosing the whole list, we would contact the companies involved to confirm that we would want to collect a sample from that truck and load when it arrived at the facility on sample collection day, and to ask them to do the following:

- Let the driver know that their truck and specific load was selected for sampling and what would be involved, including where to find the crew
- Tell us if that truck would be expected to run that same route on sample collection day. If not, ask them what truck would be covering that same route, because again we wanted the sample to be from the selected route. We also asked them to let us know if a selected truck breaks down on collection day and to tell us what truck or trucks would be finishing that route.
- We would also give the list of selected loads to the facility. Facility staff were very helpful in making sure the selected loads were directed to where we could collect the sample.

If we had many samples to sort at a facility, we would ask if we could sort at that facility, and all facilities were very accommodating even though many had little space available. If it was a small facility and we only needed a few samples, the crew would often send a person out with a trailer to collect the samples and bring them back to the facility where the crew is sorting or will be sorting the next day.

Sample sorting

When a selected load arrived at the facility, the driver was directed to an area where they would dump the load and the crew could get a sample. A member of the Sky Valley crew would interview the driver to obtain information such as what percentage of the load came from households, from apartments or condos, or from commercial sources. Usually, the facility would assist by having one of their staff bring over one of their pieces of equipment that could scoop out a sample weighing 200 pounds or more. When DEQ provided the list of samples to be collected at each facility, we would also give a randomly chosen number from 1 to 12 for each sample. That random number would designate where in the unloaded pile that the sample was to come from, designating if it was from the front, middle, or back, from the left side or the right side, and if it was from near the bottom of the pile or higher up.

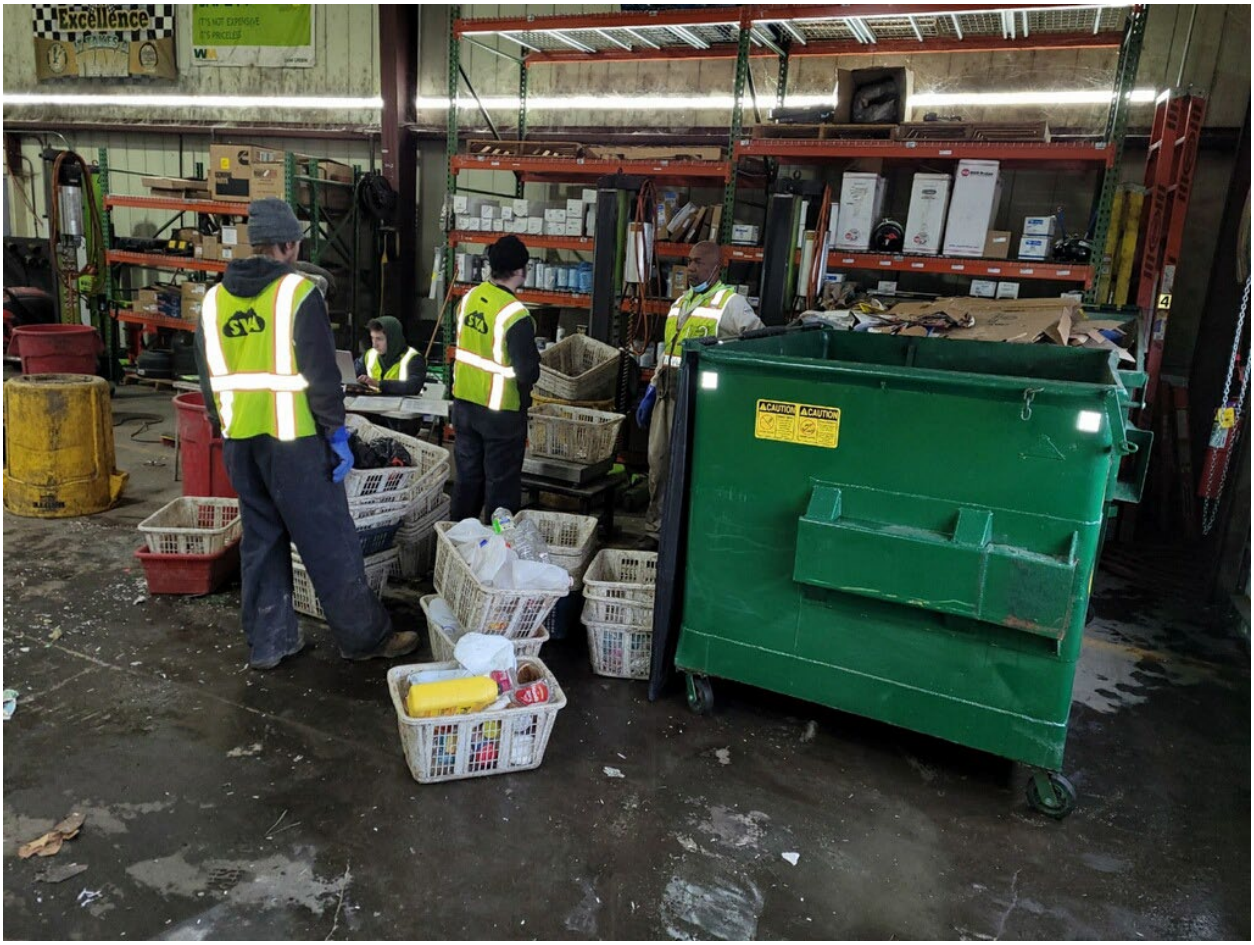
Appendix A Figure 1. Crew hauling a sample into the Waste Management Klamath Falls shop for sorting.

Once the sample was scooped up, it was dumped on a tarp and covered up until the sort crew got to sort it. For most samples, and initial sort would separate cardboard, other paper, plastic, metal, and other materials into separate piles, and then crew members who specialize in each type would sort the materials into individual categories using pre-weighed laundry baskets or plastic garbage cans to hold each category of material.

Appendix A Figure 2. Initial sort of a sample in the Waste Management Klamath Falls shop.

Then each container of material would be weighed and the net weight recorded in a Microsoft Access database provided by DEQ. In addition to weight, all beverage containers were counted by both beverage type and material, as were oil filters, film plastic merchandise bags, cell phones, and sharps, the count of the latter being estimated if it was not safe to be counted individually such as if in a container. The crew would then run a pre-program quality control check to flag any issues such as missing information, total sample weights that were too light, or counts of beverage containers that were inconsistent with the weights. The crew would then correct anything that needed correction. If in rare cases a sample was too light, the crew would capture make-up weight from a different vehicle that ran a route similar to the originally-selected vehicle.

Appendix A Figure 3. Weighing out each material after sorting is complete.



Data analysis

When sample collection and sorting was complete for each week of field work, the Sky Valley crew would email the data file to DEQ. DEQ would also do quality control checks on the data and then combine those data with all previously gathered data. For analysis, DEQ would first convert each separate material weight into percentages of the entire sample weight, so each sample would be weighted equally. Then DEQ would find the average percentage of each material in each of the eight separate jurisdictions listed in Table 5 of the main report. The eight separate compositions were then combined into a total statewide composition by weighting each jurisdiction's composition by the total weight of commingled material collected in that jurisdiction in 2023 as reported through the annual Oregon Material Recovery Survey. Confidence intervals were calculated using the Bootstrap method- a Monte Carlo method that involved randomly pulling samples from each jurisdiction or substream with replacement, up to the same number of samples as originally captured, and then analyzing this "bootstrapped" sample in the same manner as the original samples and recording the results. We did 10,001 repetitions of bootstrapped samples and calculated the averages for each. The 95% confidence interval then had an upper limit of the 250th largest of the bootstrapped averages, and the lower limit was the 250th lowest bootstrap averages, thus leaving 95% of the bootstrapped averages within these upper and lower limits. We also calculated confidence intervals using normal parametric methods as a double-check, and results were always close. At the time of this publication, we have not yet analyzed the beverage container count data to estimate how many beverage containers of each type are being recycled through commingled recycling or

done a comparison of the residential composition calculated in this study with the results of direct collection of samples from households done by DEQ in a 2004-2005 study. That work is scheduled for a future update of this report.

Appendix B: Material categories

Field sorting categories – disposal site garbage samples

The individual material categories as sorted and weighed in the field are **bold**, preceded by numbers below, and followed by descriptions. "Counted" indicates that counts of the items in this category were recorded (mainly for beverage containers). "Acceptable in curbside" uses the **Metro Curbside List 2010 - 2021** with slight modifications.

Paper

1. **Gable top beverage cartons**. Poly-coated bleached paperboard boxes that contain ready-to-drink beverages such as milk or orange juice. May include plastic pour spouts as part of the carton. Counted.
   - Excludes cream, half and half boxes (see Polycoat Paper).
2. **Aseptic drink boxes**. Paper/foil/plastic laminate boxes used to package juice and other ready-to-drink beverages. Counted.
   - Excludes aseptic containers used to package non-beverages (see Polycoat Paper).
3. **Wine bag-in-boxes**. Corrugated outer box with a plastic film bag inside used as a container for wine. Counted.
4. **Corrugated cardboard and kraft paper (Old Corrugated Containers)**. Unwaxed kraft linerboard and containerboard cartons and shipping boxes with corrugated paper medium. This category includes boxes shrink-wrapped in plastic and unbleached kraft (brown) paper bags, and pizza boxes.
   - Excludes waxed and plastic-coated cardboard (plastic coating bonded to the cardboard), solid boxboard, and multi-walled bags that are not pure unbleached kraft. Cardboard kitty scratching boxes go in low-grade recyclable paper products (in #15).
5. **Waxed corrugated cardboard**. OCC that is saturated with wax, commonly used for grocery produce boxes.
6. **High-grade office/printing/writing paper (uncoated high grades)**. Printing, writing and computer papers, including mainly thermo-chemical pulps. Both virgin pulp substitutes and high-grade de-ink fibers are included. This category is composed of high-grade paper, which includes white ledger, colored ledger, computer printouts, computer tab cards, bond, copy machine, and carbonless paper. Includes white and pastel envelopes without windows, and high-grade reports wrapped in shrink-wrap packaging.
   - Excludes glossy coated paper such as magazines, pure groundwood publications such as catalogs, astro-brights and other unbleachables, and glue-bound publications.
   - Excludes shredded paper (in #10).
   - Excludes scattered sheets such as in residential junk mail (in #9).
7. **Newspaper (Old Newspapers)**. Printed ground-wood newsprint (minimally bleached fiber); commonly referred to as #1 news. This category includes glossy paper typically used in newspaper insert advertisements, if believed to be distributed with newspapers.
8. **Magazines**. Includes other glossy publications such as some catalogs.
   - Excludes newspaper glossy inserts (in #7).

9. **Low-grade printing and writing paper**. This includes junk mail, glossy and uncoated advertising sheets, envelopes (except those included under high-grade and brown unbleached kraft envelopes), construction paper, used envelopes with sticky labels and/or plastic windows, greeting cards, sticky notes, phone books, uncoated groundwood catalogs and advertisements. Includes paper bound with fasteners including spiral-bound notebooks.
    - Excludes shredded paper (in #10).
10. **Shredded paper**. Any type of printing and writing paper which has been shredded into strips or small pieces.

    (11. used only in inbound recycling study: shredded paper in a plastic bag)

    (12. used only in inbound recycling study: shredded paper in a paper bag)

    (13. used only in inbound recycling study: loose shredded paper)

11. **Low-grade packaging paper and recyclable food serviceware paper**. Includes any recyclable packaging paper, paper bags other than brown unbleached bags, and also file folders and packaging tissue. Drug packaging, although excluded from being a covered material under Senate Bill 582, is included here for the disposal site study, but is separated into new categories for the inbound recycling study as discussed in that section.
    - Excludes paper cups and paper plates (in #16).
12. **Low-grade recyclable paper products**. Any other recyclable paper product that is not printing and writing paper, packaging paper, or food serviceware, such as kitty scratching boxes. Also includes the following paper items that are excluded from being covered materials under SB 582: paperback books and also recyclable cores and wraps for rolls of packaging sold by a mill to a packaging converter or food processor.
13. **Polycoated paper, freezer boxes, cups and take-out containers**. Includes poly-coated cardboard, poly-coated bleached and unbleached paperboard used for ice cream, frozen TV dinners, and many other frozen food boxes. Includes multi-walled bags that are poly-coated or have a plastic layer (watch out for very thin polycoat layers). Includes non-drink box aseptic and gable-top packaging such as soup cartons and cream cartons. Change from 2016: Includes all paper cups and plates take-out containers (and any other marginally recyclable food serviceware including paper straws)) regardless of if they have a plastic layer. Woody bamboo plates go under wood packaging and food serviceware.
14. **Hard-covered books**. Books with hard covers. Excludes paperbacks.
15. **Compostable nonrecyclable paper products**. Facial tissue, paper towel, napkins. Does not include any covered products under SB 582. Does not include molded paper plant pots.
    - Excludes recyclable paper. Excludes all covered products under Recycling Modernization Act - SB582 from 2021.
16. **Compostable nonrecyclable paper packaging, printing and writing paper, and food serviceware**. Includes molded paper flowerpots.
17. **Non-compostable, non-recyclable paper products**. Includes only paper products that are not covered products under RMA (SB 582). Examples include playing cards, wallpaper, solid paper gameboards, photos, carbon paper, products made from a mixture of paper and other materials where paper is the majority or plurality of the weight.

18. **Non-compostable, non-recyclable paper packaging, food serviceware, and printing and writing paper**. Paper not included above that is not easily recyclable in the United States, and which is not acceptable in composting programs, and which generally is a covered material under RMA (SB 582). Includes mixed paper and materials packaging and food serviceware, old blueprint paper made with the ammonia process, juice and oil cans, foil containing wrapping paper and cards, foil lined fast food papers, microwave paper food trays used in frozen dinners, individual cigarette packages, paper with large thick plastic windows, paper containers that held hazardous products, thin bound reports with plastic covers. Paper-bound 3-ring binders go here, but the paper contained goes in the appropriate grade.

22. used only in inbound recycling study – recyclable "exempt" paper packaging and printing/writing paper.

23. used only in inbound recycling study – non-recyclable "exempt" paper packaging and printing/writing paper.

24. (reserved)

Plastics (see additional component information)

25. **Deposit beer and soft drink plastic beverage bottles**. Any beverage container up to 3 liters in size with an Oregon deposit for beer, soft drink, carbonated water and carbonated juice. Counted.
    - Does not include soft drink syrup containers.
26. **Deposit plastic water bottles**. Only includes still waters and flavored waters added to the bottle bill as of 2009, up to 3 liters in size. Counted.
27. **Other deposit plastic beverage bottles**. This include all beverages that became deposit containers in 2018 and 2019, that are at least 4 oz in size and no greater than 1.5 liters. Kombucha is included in any size up to 3 liters. Examples include juices, energy drinks, teas, and coffee.
    - Does not include beer, soft drink, or water plastic bottles.
    - Does not include distilled liquor, wine, dairy or plant-based milks, and infant formula that is a container.
    - Does not include pouches or cups. Counted.
28. **No-deposit plastic beverage bottles (RPCs)**. 8-oz to 5 gallons plastic beverage bottle *without* an Oregon deposit. This includes dairy and plant-based milks, wine, distilled liquor, and infant formula. It also includes juice, tea, or other no-deposit beverages in bottles larger than 1.5 liters, plus beer, soft drink, and water bottles that are over 3 liters in size or that are from out-of-state that are not marked with the Oregon refund value. Counted.
    - Does not include cream, half and half, syrups, and powdered beverages. "Beverage" includes only ready-to-drink beverages, not concentrates or flavorings.
    - Small juice cups (with foil lids) go in "Other Rigid Plastic Packaging" (in #38).
29. **No-deposit very small plastic beverage bottles**. Plastic bottles less than 8 oz that hold ready-to-drink beverages. Mainly small liquor bottles. Counted.
30. **No-deposit very large plastic beverage bottles**. Plastic bottles greater than 5 gallons that hold ready-to-drink beverages. Mainly large water bottles, plastic beer kegs. Counted.
31. **Other plastic bottles**. All non-beverage bottles 8 oz-to-5 gallons used for non-beverage food, medicines, vitamins, hair and bath products, laundry supplies, antifreeze, oil. Also include plastic jars with necks narrower than the body (blow-molded plastic).

32. **>2 Gallon to 5 Gallon buckets, flowerpots**. Large plastic buckets and flowerpots or other rigid plastic containers (non-bottle) larger than 2 gallons up to 5 gallons in size.

33. **Other plastic tubs, pails acceptable in curbside**. Tubs, pails (buckets), flowerpots 4" or larger, from 8 oz up to 2 gallons in size made from plastic and meeting the definition in Oregon Revised Statute 459A.650 for Rigid Plastic Container.

    - Does not include trays or clamshells.

34. **Other plastic tubs, and trays that meet Rigid Plastic Container definition but are not acceptable in curbside and all cups 8 oz or larger**. Rigid plastic packages with a capacity of from eight ounces to five gallons. Includes cookie trays, trays with sidewalls that can contain at least 8 oz., all plastic clamshells including take-out containers, all plastic cups that are 8 oz or larger, and flowerpots <4" that are 8 oz. or larger, foam coolers 5 gallons or less used for packaging.

    - Excludes tubs/pails that are acceptable in curbside, or any bottles. Excludes lids, unless the lid is attached or is itself a rigid plastic container.
    - Excludes flexible tubes like bathroom caulk, toothpaste.
    - Excludes blister-pack (Plastic dome adhering to a paper card. A clamshell with a paper card inside capable of holding 8 oz or more is a rigid plastic contain and not a blister pack).

35. **Small plastic tubs acceptable in curbside**. Includes the plastic tubs and yogurt containers that are at least 6 oz in size, but less than 8 oz.

36. **Bulky plastic packaging**. Includes all-plastic large crates, totes, and containers except beverage bottles larger than five gallons. Also includes large non-decorative flowerpots used for sale of large plants if over 5 gallons in size. Minimum size for most bulky packaging is equivalent in volume to just larger than a 2-gallon bucket (for non-rigid plastic containers) or just greater than a 5-gallon bucket (for containers). Also includes large lids for storage tubs and 5-gallon buckets.

    - Excludes all RPCs.
    - Excludes block foam plastic packaging (goes in block foam plastic packaging (#37).
    - Excludes beverage bottles larger than five gallons (in #30).
    - Excludes plastic pallets (in #39).

37. **Block foam plastic packaging Block foam plastic regardless of resin, plus polystyrene (or other resin) foam coolers larger than 5 gallons**.

    - Does not include packaging peanuts, or foam clamshells, food trays, or other food serviceware. Does not include foam plastic used as a marine float, or plastic foam insulation boards, toys, or other products.
    - Foam clamshells, cups 8 oz or larger, foam coolers 5 gallons and smaller used as packaging and any other foam container meeting the definition of "rigid plastic container" goes in 34.
    - Foam dishware, food trays, and cups smaller than 8 oz go under 41 Rigid Plastic Food Serviceware.
    - Foam peanuts go under 38 Other Rigid Plastic Packaging.
    - Foam housing insulation board, foam marine float, and foam toys or other products go under #40 other rigid plastic products regardless of size.

38. **Other rigid plastic packaging**. Includes plastic packaging that does not meet the definition of rigid plastic container, or bulky plastic packaging (36), or block foam plastic packaging (37) This includes expanded polystyrene peanuts and food trays that are not rigid plastic containers (i.e. holding less than 8 oz). Includes plastic lids and caps from plastic, glass, metal, or paper containers, and plastic containers such as yogurt cups or small juice cups that are less than 6 ounces in size.

- Excludes all rigid plastic containers.
- Excludes block foam (#37).
- Excludes bulky plastic packaging as defined in #36.
- Excludes foam insulation board (#40) and other products.

39. **Bulky rigid plastic products**. Includes larger all-plastic items such as plastic garbage cans, toys, bins, baskets, lawn furniture, Minimum size about the equivalent of just larger than a 2-gallon bucket in size. Change from 2016: Includes plastic pallets but not plastic slip-sheets.

- Excludes fiberglass-containing plastic and foam plastics such as marine floats, house insulation board, foam toys and other plastic foam products (they go in #40 Other rigid plastic products, regardless of size).

40. **Other rigid plastic products not food serviceware**. Plastic household items, small toys thermoset plastic products, and "fiberglass" (mainly plastic) boat parts, corrugated roofing, and similar products. Includes foam products such as foam cushions, marine floats, foam housing insulation boards, and plastic fiberglass such as is used in boat hulls, regardless of size.

- Excludes polyurethane carpet pad (its own category).

41. **Rigid plastic food serviceware excluding rigid plastic containers and all cups 8 oz or larger**. Dishware and utensils, including plastic cups that are smaller than 8 oz, cup lids, plates, plastic straws, stirrers, small sauce containers and their lids.

- Excludes clamshells that meet the definition of "rigid plastic container" even if used for take-out.
- Excludes plastic cups 8 oz or larger.

42. **Rigid Mixed plastics/materials packaging and food serviceware**. Packaging and food serviceware whose predominant material is plastic but is combined with other material. Examples include paint cans with metal rims and blister-pack that is mostly plastic but with firmly attached paper or foil. Note that much blister-pack is more paper than plastic.

43. **Rigid Mixed plastics/materials products**. Plastic products that are not food serviceware whose predominant material is plastic, but is combined with other material, such as kitchen ware, toys, plastic pens, car parts with other components, floor tiles and coverings that have canvas, paper, or other types of backing material or significant non-plastic components, etc.
(44. used only in inbound recycling study: "Exempt" recyclable rigid plastic containers)

(45. used only in inbound recycling study: "Exempt" non-recyclable rigid plastic containers)

(46. used only in inbound recycling study: "Exempt" recyclable small containers)

(47. used only in inbound recycling study: "Exempt" non-recyclable small containers)

48. **Plastic beverage pouches**. Includes ready-to-drink beverages only. Counted.

49. **Plastic grocery/merchandise bags**. Single-use plastic shopping bags and thicker solid polyethylene bags used to carry merchandise out of a store. Includes dry cleaner bags intended for one-time use. Include even if used as a garbage bag. Count only in inbound recycling study.

- Does not include produce bags (in #50 if polyethylene, #53 if not).

50. **"Recyclable" polyethylene film plastic packaging and food serviceware**. Includes newspaper bags, bread bags, produce bags (excluding biodegradable bags), product wrap (for example used on paper towels, tissue, diapers, and water bottles), zip-close bags, pallet-wrap, shrink wrap, fertilizer/peat/feed bags, furniture and mattress wrap, bubble wrap, woven lumber wrap, roofing material wrap, insulation wrap, commercial bags and liners, commercial parts packaging, building wrap, and parts bags.
    - Excludes plastic grocery/merchandise bags, any film that is not polyethylene, biodegradable bags, any film that is laminated to other materials (limited tape/labels are OK), any bag used as a garbage bag (can liners and tied-off garbage bags), bags contaminated with food and other sticky/contaminating materials on the inside, frozen vegetable bags, stand-up pouches, and plastic sheeting used for ground cloths or masking, if contaminated. Count a subsample only in inbound recycling study. (change from 2016 – exclude polypropylene film).
51. **"Recyclable" polyethylene film plastic products**. Includes clear and white polyethylene sheeting, hay sleeves and silage bags. Count a subsample only in inbound recycling study.
52. **Plastic garbage bags**. Includes any bag that was originally sold to as a trash can liner or to hold garbage. Count a subsample only in inbound recycling study.
    - Does not include bags originally sold/provided for other purposes that are used for garbage. These go in #53.
53. **Other nonrecyclable film plastic packaging and food serviceware**. All other plastic bags and flexible plastic film including chip bags and other bags with a thin metallic layer, stand-up pouches, plastic twine and strapping, green bio bags, and other flexible plastic items used for packaging or as food serviceware. Also include any plastic bag other than grocery/merchandise bags or garbage bags that are used as a garbage bag. Count a subsample only in inbound recycling study.
54. **Other nonrecyclable plastic film products**. Includes polypropylene woven tarps, black plastic sheeting, shower curtains, plastic used as ground cover, plastic gloves (non-medical) Count a subsample only in inbound recycling study.

    (55. used only in inbound recycling study: "Exempt" plastic film packaging. Count a subsample only in inbound recycling study).

    (56-60: reserved)

Other organic wastes

"Organic" used in the "carbon-containing" (or burnable) sense.

Yard Debris: natural vegetative material

61. **Grass clippings**. Grass clippings and leaves can be weighed together, and the weight allocated by estimate to grass vs. leaves/weeds. Grass does not include sod (goes soil/dirt/sand).
62. **Leaves/weeds**. Herbaceous plant material excluding grass clippings.
63. **Small prunings less than 2" diameter**. Natural woody material from trees, plants, and shrubs. Could be chipped with a small chipper for home composting.
64. **Large prunings more than 2" in diameter**. This category is composed of trees and large branches greater than 2" diameter and small stumps/roots less than 1' in diameter and less than 100 pounds. Not easily home-composted due to its size, weight and composition.
65. **Stumps**. Stumps too large to be ground by most commercial composters due to size, without use of special stump-splitting devices (greater than 1' diameter or 100 pounds).

Wood: manufactured wood lumber and other wood items (excluding sawdust):

66. **Reusable dimensional lumber - unpainted**. Unpainted solid sawn or engineered lumber products at least 0.75" thick by 3.5" wide, and at least 4 feet long, which is clean (nails and minimal fasteners OK, with more allowed in larger pieces) and not rotted, pest-infested, or damaged, and without significant dirt and no other materials being firmly attached such as wallboard. Also includes at least half-sheets of plywood or oriented strand board at least 3/8 inch thick in good condition.
67. **Clean solid sawn lumber**. Unfinished, unpainted and untreated solid sawn dimensional lumber or wood.
    - Excludes cedar shakes, shingles, reusable dimensional lumber, plywood, oriented strand board, and all other engineered lumber products, and pallets/crates.
68. **Clean engineered wood**. Unfinished, unpainted and untreated engineered wood including plywood, oriented strand board, particleboard, medium density fiberboard, high-density hardboard (pegboard), composite siding, TJI joists. cross-laminated timber, glue-lam beams, laminated veneer lumber, laminated strand lumber/timber strand, finger-jointed lumber or trim, veneered or laminated wood and paneling, melamine coated wood, etc.
    - Excludes reusable dimensional lumber and furniture.
69. **Reusable dimensional lumber - painted**. Same as unpainted reusable dimensional lumber, but is primed, painted, or stained (and not chemically treated). To be included, the entire paint surface must be completely adhering to the wood. No peeling, chalking, flaking, alligatoring, or blistering paint.
70. **Other painted lumber**. Includes any lumber (solid sawn or engineered) that is painted or primed, excluding reusable dimensional lumber, furniture, chemically treated lumber, and mixed wood/materials (split from chemically treated lumber in 2000).
71. **Chemically treated lumber**. Pressure-treated or creosoted lumber or wood treated for either rot or fire resistance.
72. **Wood pallets**. Dimension lumber material used as pallets.
73. **Wood crates and other wood packaging and wood food serviceware**. Includes wood/wire crates with thin slats, if not mixed with plastic and other materials. Also includes woody bamboo plates, and wood popsicle sticks, chopsticks and stirrer sticks and the wood toothpicks that hold sandwiches together.
74. **Cedar shakes or shingles**. Cedar roofing, excluding tar paper and other non-wood components.
75. **Wood furniture**. Includes desks, chairs, bureaus, and other furniture items made from wood.
76. **Other wood products**. Includes pencils, coat hangers, and other objects made of wood that are not used for packaging or construction or as furniture. Does not include wood food serviceware.
77. **Mixed wood/materials**. Mostly wood items combined with plastic, metal, or other materials. Excludes items that are better included in another category.
(78-80: reserved)

Food

81. **Non-packaged bakery goods**. Includes bread, rolls, cake, crackers, donuts, unpackaged dough. "Non-packaged" includes open bags and boxes (easily dumped) but does not include any sealed packaged items.
82. **Packaged bakery goods**. "Packaged" includes sealed containers but not open bags or boxes that are easily dumped.

83. **Non-packaged "edible" other vegetative food**. "Vegetative" contain no animal products other than traces. "Edible" includes any food, even if spoiled, that was originally produced to be eaten.
84. **Non-packaged "non-edible" other vegetative food**. "Non-edible" is limited to items associated with food that are universally accepted as not being edible, such a fruit pits, corn husks, carrot tops, thick peels from fruit, and coffee grounds. For fruits and vegetables that are eaten by many with their peels (such as apples, carrots, and potatoes), peels are considered "edible" even when purposefully removed and discarded.
85. **Packaged other vegetative food**.
86. **Non-packaged "edible" meat, eggs, and dairy**. Non-packaged "edible" food that is mainly meat, animal grease, eggs, or dairy. Excludes bones, shells, and other animal products that are fairly universally accepted as not being edible.
87. **Non-packaged "non-edible" animal food-related products**. Includes only bones, shells, gristle, and other animal products that are fairly universally accepted as not being edible.
88. **Packaged meat or eggs**.
89. **Packaged dairy**.
90. **Mixed unpackaged foods**. Unpackaged foods that were originally prepared as mixtures, that are mainly vegetative by weight, but that contain more than a trace of animal products. Examples include pizzas, pasta with meat sauce, stir-fries with pieces of egg or meat.
91. **Mixed packaged foods**. Packaged foods that are mainly vegetative by weight but that contain more than a trace of animal products.

Other organics (carbon-containing, not "organic" from a biological standpoint)

92. **Disposable diapers**. Disposable diapers, including fecal materials contained within. Cloth diapers are to be sorted under textiles.
93. **Clothing textiles**. Include clothing made only from fabric materials, including natural and synthetic fibers. (cottons, wools, silks, woven nylon, rayon, polyesters, and other materials). Excludes other textiles such as sheets, towels, and curtains, and excludes items such as gloves, belts, and shoes.
94. **Other textiles excluding clothing**. Towels, sheets, curtains, and other material made of fabric (natural and man-made textile materials).
    - Excludes non-fabrics such as dryer sheet, "Swiffer" duster refills – go under "mixed".
95. **Mixed textiles/materials**. Include textiles that have significant amounts of non-textile components, plus shoes, belts, gloves, and similar clothing articles that may have insignificant amount of textile material. Also includes textile-like materials that are not regular fabric, such as most twine, string, rope, dryer sheets and Swiffer duster refills.
    - Polypropylene (baler) twine goes in "other film plastic". Polypropylene rope goes here.
96. **Carpet**. Synthetic and natural fibers attached to a backing intended to be affixed to a floor as a floor covering.
    - Excludes rugs (loose floor coverings) and carpet pads.
97. **Rugs**. Synthetic or natural fibers attached to a backing intended to cover part of a floor without being affixed.
    - Excludes carpet and carpet pad.
98. **Polyurethane foam carpet/rug pads**.

99. **Other carpet/rug pads**. Includes fiber and other pads
    - Excludes polyurethane foam carpet pad, rubber padding (other rubber), and the carpet or rug itself.
100. Reserved
101. **Automotive/truck tires**. Whole tires meeting the definition in ORS 459.705.
102. **Other tires**. Bicycle tires, off-road vehicle tires, cart tires, or other tires not meeting the definition in ORS 459.705. Also included shredded automotive tires.
103. **Other rubber products**. Includes toys, inner tubes, rubber mats, rubber gloves, rubber carpet padding.
104. **Asphalt shingles and tar roofing paper - recyclable**. "Recyclable" asphalt roofing includes tarpaper and regular 3-tab roofing architectural-grade composition shingles, and roll roofing.
105. **Asphalt and tar roofing paper – nonrecyclable**. "Nonrecyclable" asphalt roofing includes such things as built-up asphalt roofing commonly used on flat-roofed commercial buildings.
106. **Mattresses and box springs**. Mattresses, box springs, and futons (excludes water beds) Separate counts for mattresses, for foundations including box springs, and for futons.
107. **Furniture and furnishings**. Includes mixed-material reusable and non-reusable household items that are large such as chairs and tables.
    - Excludes furniture made from a single material (all metal, all plastic, all wood).
108. **Paper composite ceiling tiles**.
109. **Compostable other organics**. Carbon-containing easily compostable wastes not otherwise categorized, including sawdust and organic fines, pet food.
110. **Non-compostable other organics**. Carbon-containing wastes not otherwise categorized including wax, linoleum, vacuum bags, charcoal, cigarette butts, hair, dryer lint, disposable hygiene products, soap, gel pads, and dead animals.

Glass

Container glass

111. **Deposit beer, soft drink, water glass bottles**. Oregon deposit beer, soft drink, carbonated water, carbonated juice, and still water. Counted.
112. **Other deposit glass beverage bottles**. This include all beverages other than beer, soft drink, water, distilled liquor, wine, dairy or plant-based milks, and infant formula that is a container at is at least 4 oz in size and no greater than 1.5 liters, plus kombucha in sizes from 0 up to 3 liters. Examples include juices, energy drinks, teas, coffee, and kombucha. Counted.
113. **Non-deposit beverage glass bottles**. Wine, liquor, and milk/milk substitute glass bottles. Counted.
114. **Other container glass**. Includes glass jars, ketchup/mustard bottles, baby food jars, pickle jars and mayonnaise jars, medicine and other non-beverage bottles, and other container glass that is not a beverage bottle.

(115. Used only in inbound recycling study: "Exempt" glass containers)

Window and other glass

116. **Flat window glass**. Excludes auto glass and mirrors.

117. **Other nonrecyclable glass**. This category includes products such as incandescent light bulbs, glass plates and cups, auto and cooking ware glass and mirrors, but excluding ceramics. This glass is not accepted by glass beverage container manufacturers for recycling, although some can be recycled into other uses.
    - Excludes fiberglass insulation (166).
    - Excludes fluorescent tubes (181) and compact fluorescents (182).
118. Reserved
119. Reserved

Metals (and appliances)

120. **Deposit beer, soft drink, water aluminum cans**. Oregon deposit beer, soft drink, carbonated water, carbonated juice, and still water. Counted.
121. **Other deposit aluminum beverage cans**. Examples include non-carbonated juice, tea, and other deposit beverages except deposit beer, soft drink, and water (above)
    - Excludes wine, liquor, dairy and milk substitutes. Counted.
122. **Other aluminum beverage cans**. No Oregon deposit. Includes wine, liquor, milk, and milk substitutes, and any other beverage that does not have a refund value in Oregon. Counted.
123. **Other aluminum containers and foil**. Aluminum pet food cans, foil-formed trays/containers, and foil.
124. **Other aluminum curbside acceptable**. Includes all other aluminum materials such as cookware and scrap, but exclude material not accepted in a curbside program such as items longer than 18" or weighing more than 10 pounds.
125. **Larger aluminum not acceptable curbside**. Includes other aluminum materials including furniture, house siding, cookware, and scrap that cannot be put in curbside programs due to being more than 18" long or weighing more than 10 pounds or not being pure metal.
126. **Steel/bimetal deposit beer, soft drink and water cans**. Oregon deposit usually imported beer (rare). Counted.
127. **Steel/bimetal other deposit beverage cans**. Juice, tea, and other beverages with deposits. Does not include beer, soft drink, or water (above) or wine, liquor, dairy and milk substitutes (no deposit). Counted.
128. **Steel/bimetal other beverage cans**. Wine, liquor, dairy or milk substitutes, or other beverages not covered under the bottle bill. Counted.
129. **Other tinned cans**. Predominantly steel cans (some with tin or enamel coatings) used to hold food, and non-food items. (Prior to 2005 food and non-food tin cans were measured separately.)
130. **Other non-ferrous metals curbside acceptable**. Metals that are not materials derived from iron, including copper, brass, bronze, lead, pewter, zinc, "stainless steel", and other metals to which a magnet will not adhere.
    - Excludes materials proposed not to be acceptable in curbside recycling containers due to being longer than 18 inches or weighing more than 10 pounds or not being pure metal.
131. **Other non-ferrous not acceptable at curbside**. Includes non-ferrous metal pieces longer than 18" or weighing more than 10 pounds or not being pure metal, such as insulated copper wire or incandescent holiday light strings.
    - Light Emitting Diode holiday light strings go in #148

132. **Other ferrous metals curbside acceptable**. Ferrous and alloyed ferrous scrap materials derived from iron, including household, industrial and commercial products not containing significant contaminants. This category includes scrap iron and steel to which a magnet adheres. Includes all-steel furniture such as bed frames. Does not include appliances, food cans, or other ferrous metal items listed elsewhere.
    - Excludes ferrous metal that may not be acceptable in future curbside programs due to being longer than 18", heavier than 10 pounds, or not being pure metal.
133. **Other ferrous metals not curbside-acceptable**. Ferrous and alloyed ferrous scrap materials derived from iron, including household, industrial and commercial products not containing significant contaminants. Includes only ferrous metal not acceptable in curbside programs due to being longer than 18", heavier than 10 pounds, or not being pure metal.
    - Does not include appliances, food cans, or other ferrous metal items listed elsewhere.
134. **White goods**. This category is composed of discarded stoves, washer, dryers, refrigerators and other large household appliances.
135. **Oil filters**. Used oil filters. Counted. (Moved here from Household Hazardous Waste category.)
136. **Empty or non-hazardous aerosol cans**. Note - aerosol cans still containing hazardous materials such as oil-based paint or pesticides are included in the "hazardous materials" categories. Cans that by weight are more than 50% of a non-hazardous product should be classified in that product category.
137. **Mixed ferrous/non-ferrous curbside acceptable**. Items that are mainly metal, but a mixture of ferrous and non-ferrous, such as electric motors, and small gas engines.
    - Excludes metal not acceptable in curbside programs due to being longer than 28", heavier than 10 pounds, or not being pure metal.
138. **Mixed ferrous/non-ferrous not curbside-acceptable**. Items that are mainly metal, but a mixture of ferrous and non-ferrous, such as electric motors, old lawnmowers, engines and other metal items that weigh more than 10 pounds, are larger than 18", or are not pure metal.
139. **Mixed metals/materials**. Products with mixtures of metal and non-metal items, where the metal weight predominates but where the item would not be recyclable with scrap metal. Generally, if an item is at least 70% ferrous metal or 50% copper or aluminum, it should be classified in one of the recyclable metal categories, not here.

    (140. Used only in inbound recycling study: “Exempt” metal packaging)

Computers, brown goods, other small appliances

141. **Computers monitors**. This category includes both flat screen and cathode ray tube type computer monitors but excludes devices with a 4-inch or less diagonal screen. (2005 study excluded flat screen monitors).
142. **Computer main Central Processing Units**. Includes computers, laptops, cell phones only with a screen larger than 4” diagonal, and tablets (excluding tablets and phones with a 4-inch or less diagonal screen, and excludes separate monitors and peripherals such as mice, keyboard, and printers. Count of cell phones with a screen larger than 4” diagonal.
143. Reserved
144. **Printers**. Desktop printers including all-in-one devices that function as printers, but does not include copiers, scanners, or other separate devices.
145. **Computer mice and keyboards**. Includes only computer mice and keyboards and their cords, and no other peripherals such as separate speakers or video cameras.

146. **TVs**. Includes **Cathode Ray Tubes**, flat screen, and projection TVs.
147. **Microwaves**.
148. **LED lights**. New category Includes all forms: bulbs, LED holiday lights, LED grow lights.
149. Reserved
150. Reserved
151. **Other consumer electronics**. Includes other computer peripherals such as separate computer speakers and scanners, and other electronic devices such as VCR and DVD players, radios, stereos, calculators, digital cameras, computer game systems, cell phones with a 4-inch or less diagonal screen, telephones and other devices with circuit boards. Count of cell phones with a screen 4" diagonal and smaller.
    - Excludes microwaves, computers, TVs, printers, mice, and keyboards – all in categories above.
152. **Non-electronic small appliances**. Includes fans, hair blowers, can openers, kitchen blenders, and shop tools. These may contain small electronic components such as digital readouts and controls, and often will have electric motors, but do not have significant amounts of circuit-board electronics.
153. **E-Cigarettes and vapes**.

(154 to 160: reserved)

Other inorganics

161. **Rock, Concrete, and Brick**. Generally, particle sizes of 0.4" or greater.
162. **Soil, dirt, sand**. Includes sod.
163. **Pet litter, animal feces**.
164. **New gypsum wallboard**. Unpainted scrap and excess gypsum wallboard from new construction or remodeling.
165. **Old gypsum wallboard**. Old painted or other demolition gypsum wallboard.
166. **Fiberglass insulation**.
167. **Other inorganics**. Includes plaster, ash, ceramics, china, and porcelain. Does not include items that contain significant amounts of carbon.
168. Reserved
169. Reserved
170. **Medical waste excluding sharps**. Includes, tubing, gauze, blood-containing, and similar materials, including urine-filled roadside bottles). Also includes medical face masks and COVID test materials. Does not include drugs covered by the Drug Take-back Program (separate category under hazardous materials) Bags and containers with medical waste are not sorted further. Thus, other non-medical waste is weighed as medical waste if it is in a bag or container with other apparent medical waste.
171. **Sharps**. Needles, syringes, lancets, auto-inject pens, and connection needles. Can estimate both count and weight if advisable for safety reasons. Counted or estimate.

Hazardous materials (see additional component information)

172. **Lead-acid batteries**. Only the large batteries from vehicles, boats. Does not include SSLAs (small, sealed lead-acid batteries) sometimes used in camcorders and other electronic equipment.
173. **Dry-cell batteries**. Includes regular alkaline, NiCad, lithium, and similar batteries, and small sealed lead-acid batteries (changed from previous studies). Includes rechargeable flashlights.
174. **Latex paint**. All water-based architectural paints and stains. Includes dried paint in cans.

175. **Oil-based paints**. All oil-based architectural paints and stains. Includes dried paint in cans.

176. **Motor oil**. Includes drain oil, transmission fluid and similar petroleum hydraulic oils.

177. **Other flammables**. Thinners, solvents, fuels (diesel, gasoline, kerosene, lighter fluid), flammable/combustible adhesives, sealants, and strippers, flammable furniture polish, nail polish, flammable hair spray, oil-based hobby/spray paints, lighters.
    - Does not include oil-based architectural paints. (#175).

178. **Pesticides/herbicides**. Chemical products designed/intended to kill plants and/or animals, including fertilizers that contain pesticides, such as "Weed and Feed". Includes mothballs.
    - Does not include fertilizers without pesticides, or antimicrobial cleaners.

179. **Corrosive cleaners**. Any cleaning product with the words "corrosive" or "caustic" or other evidence of strong acid or base content. Could include pool and spa chemicals, household cleaners and disinfectants, oven cleaner, drain cleaner, tarnish remover, strippers, floor and carpet cleaners, etc.

180. **Asbestos**.

181. **Fluorescent light tubes**. Includes individual separate light tubes. Does not include light fixtures/ballasts.

182. **Compact fluorescent lights**. This includes small fluorescent fixtures that are sold as complete units, with both the ballast and tube attached.
    - Does not include regular (full-sized) ballasts commonly used with full-sized fluorescent tubes.

183. **Other mercury-containing items**. Includes mercury thermometers, thermostats, dairy manometers.

184. **Live ammunition and explosives**. Unused bullets and fireworks. Includes flares, dynamite and C-4.

185. **Compressed gas cylinders**. Includes all intact gas cylinders (even helium) including fire extinguishers.
    - Cylinders that are cut in half or have a hole and thus are clearly empty are put in "other ferrous scrap metal" instead of here.

186. **Drugs covered by the Drug Takeback Program**. Includes generally both prescription drugs and non-prescription drugs, as defined in Oregon Revised Statute 689.505, but excludes homeopathic drugs, products that are regulated both as a cosmetic and a drug, and other specified health products. This category includes the drugs themselves, and not the packaging. Drug packaging typically has a "Drug Facts" section and list "Active ingredients". Examples of non-prescription drugs include sunscreens, pain-relief medicines, laxatives, anti-diarrheal medicines, antihistamines, and many others.
    - Does not include vitamins or supplements, which typically have "Supplement Facts" on the label.
    - Does not include herbal-based remedies or homeopathic drugs, products or remedies, or drugs marketed for use as animal medicines (note that these products with have "Drug Facts" and "Active ingredients" on the labeling but homeopathic drugs may be labeled as "homeopathic" and animal medicines will be marketed for animals).
    - Does not include nonprescription drugs that are also regulated as cosmetics, such as dandruff shampoos, fluoride and anticavity toothpastes, deodorants that are also antiperspirants, and moisturizers and make-up with sun protection claims.

187. **Other hazardous chemicals**. Includes only chemicals that show hazardous characteristics other than those specified above. Includes acids and bases that are not cleaners, corrosive water-based paint strippers, toxic substances, oxidizers, liquid bleach, antifreeze, brake fluid, equipment hydraulic fluid. Include ionizing smoke detectors (lightly radioactive).

- Does not include non-hazardous chemicals such as detergents, vegetable oils, or non-hazardous inorganic salts (such as Epsom salt), fertilizers that do not contain pesticides, water-based adhesives and sealants (such as latex caulk), water-based paints (other than architectural paints) such as tempera and watercolors, bacterial or enzyme-type drain cleaners.

188. **Unknown hazardous**. Unlabeled chemicals believed to be hazardous but not identifiable.

Beverage categories – used in counts

1. **Beer**. Any malt beverage that would be required to carry a 10-cent refund value if sold in Oregon. Includes malt coolers and hard lemonade for those brands that require a deposit.
2. **Soft drink**. Carbonated non-alcoholic and non-malt-based beverage such as sodas that would be required to carry a 10-cent refund value if sold in Oregon. Carbonated sports drinks, waters, and juices are included in this category, but uncarbonated versions of these beverages are not.
3. **Still water and flavored water**. Non-carbonated water that carries a deposit in Oregon as of 2009. Carbonated water is included in soft drinks.
4. **Juice/tea/sports/coffee**. Includes all other beverages covered under the Oregon Bottle Bill as of 2021, excluding beer, soft drinks, and waters. Includes non-carbonated juices, teas, coffees, sports drinks, kombuchas, and any other beverage that carries a deposit and is not in one of the above 3 categories. These beverages became deposit by 2018 and 2019. Does not include wine, liquor, milk or milk substitutes.
5. **Liquor**. Distilled alcoholic spirits (no deposit required).
6. **Wine**. Includes wine and champagne. Alcoholic. (Non-alcoholic wine would go under "juice"). Does not include distilled liquor or malt beverages such as malt coolers.
7. **Milk**. Beverage containing dairy where milk is the main ingredient. Includes eggnog. Does not include cream or half-and-half as these are not ready-to-drink beverages. Does not include soy milk or rice milk as these are not dairy products.
8. **Milk substitutes**. Includes beverages such as soy, rice, oat, hemp, or similar milks.
9. **Other**. Includes infant formula, diet beverage meal drinks such as slim-fast. Only no-deposit containers.

Counts are to be done for each beverage category, separately for glass, plastic, aluminum, steel.

Resin categories for rigid plastic containers for contamination analysis

After sorting, rigid plastics are to be sorted and weighed by resin in the following four material categories:

1. Rigid plastic container bottles and blow-mold jars
2. Rigid plastic container tubs, injection mold, thermoform, or other molding
3. Bulky rigid plastic
4. Other rigid plastic

The plastic in each of the categories would then be classified into at least the following categories:

- 1 Polyethylene Terephthalate. PET
- 2 High-Density Polyethylene. HDPE

- 3 Polyvinyl Chloride. PVC
- 4 Low-Density Polyethylene. LDPE
- 5 Polypropylene. PP
- 6 Polystyrene. PS (not foam)
- 6 Polystyrene. PS (PS foam)
- Polylactic Acid. PLA (part of #7)
- Nylon
- Acrylonitrile Butadiene Styrene. ABS
- Teflon/fluorinated polyolefins
- Unknown

For rigid plastic containers, each resin should be split into 2 categories: blow-mold (bottles) and other molding (injection, thermoform). For other rigid plastics, the resin categories for bulky rigids should be weighed separately from those of other rigid plastics.

Identifying hazardous material

The labels of products which may contain dangerous material use key words like:

- Flammable
- combustible
- corrosive
- irritant
- inhalation hazard
- contact hazard
- poison
- explosive
- reactive
- toxic
- radioactive

They may show cautionary symbols, such as the “skull and crossbones”, “Mister Yuk”, or other universal symbols of warning.

Products packaged for home use in the U.S. are generally not required to warn of potential chemical hazards. When packaged for commercial distribution (used by business and industry), the same product must disclose the chemical hazards contained within, if any.

If a chemical can readily burn and can become a fire hazard, it should say so on the label. Transportation regulations are the main reason for this. A flammable liquid has a flash point of 141°F (60.5°C) or lower, and will ignite more readily than a combustible liquid, which has a flash point between 141°F and 200°F (93°C).

Non-hazardous products often use water, rather than oil, alcohol, or a chemical solvent as their base. This normally renders them non-flammable. Water-based products may be labeled to “protect from freezing” or “clean up with soap and water”.

However, water is also the vehicle for a vast number of products containing dangerous chemicals. Instructions to wear gloves or a mask may indicate the presence of hazardous chemicals, as may precautions to protect surrounding surfaces or vegetation.

Inbound recycling material categories

Generally, for recyclable materials, we used the same material categories and definitions as in the disposal site waste composition categories above. However, for most non-recyclable items, we lumped them into larger categories such as "food", "wood", "yard debris", and other non-recyclables". Some non-recyclable materials that are of considerable concern, such as diapers, were also sorted separately.

For bagged recyclables, we did the following:

- Shredded paper in a plastic bag, in a paper bag, and loose were weighed in separate categories.
- Bagged recyclables were weighed in the bag and then dumped out with the other recyclables for sorting and weighing.
- Bagged garbage was weighed in the bag but not dumped out with the other material for sorting. The entire contents of the bag will be counted as something that would be disposed. For the purpose of distinguishing between bagged garbage and bagged recyclables, "bagged garbage" is anything where over 50% of the material is either non-program material or is so contaminated by food or other wastes that it should be disposed.

Important new considerations on four exemptions in SB 582 from being "covered products" that were taken into account only in the inbound recycling study

Although we have consolidated many categories for the inbound recycling study, we have added 9 new categories to separate out some groups of specific materials which are specifically designated at not being a covered material under SB 582. All of these materials described below are collectively called "exempt" in the table of material categories below.

(M) Packaging and paper products sold or supplied in connection with:
  (i) Prescription drugs as defined in ORS 689.005;
  (ii) Nonprescription drugs as defined in ORS 689.005;
  (iii) Drugs marketed under a brand name as defined in ORS 689.515; or
  (iv) Drugs marketed under a generic name as defined in ORS 689.515

(N) Packaging and paper products sold or supplied in connection with drugs that are used for animal medicines, including but not limited to parasiticide drugs for animals.

(O) Packaging and paper products sold or supplied in connection with:
  (i) Infant formula as defined in 21 U.S.C. 321(z);
  (ii) Medical food as defined in 21 U.S.C. 360ee(b)(3); or
  (iii) Fortified oral nutritional supplements used for individuals who require supplemental or sole source nutrition to meet nutritional needs due to special dietary needs directly related to cancer, chronic kidney disease, diabetes, malnutrition, or failure to thrive, as those terms are defined as by the International Classification of Diseases, Tenth Revision, or other medical conditions as determined by the commission.

(Q) Packaging for products:

(i) That are required under 40 C.F.R. 156.140, or other federal regulation pertaining to toxic or hazardous materials, to state on the label or container that the packaging should not be recycled or should be disposed of in a manner other than recycling; or

(ii) Identified by the commission by rule as product that is required by law to state on the label or container that the packaging should not be recycled or should be disposed of in a manner other than recycling.

In the table of materials below, a blank in the "inbound recycling" column means that material is included in one of the combined categories such as "food" or "wood". Category columns including *"[counted]"* in italicized brackets means that counts of items were required (mostly for beverage containers). The "covered in SB 582?" column indicates whether that material is a covered material under SB 582. For the combined inbound recycling categories such as "food" or "wood", the numbers in parentheses refers to which of the disposal site material categories are combined into the inbound recycling combined category. The 9 new categories of "Exempt" material below, as indicated in the "material type" column, have no directly corresponding category from the disposal site material list categories. In the "material type" column, packaging is noted as "pkg", food service ware is noted as "fsw", and printing and writing paper is noted as "pwp".

Table 1. Inbound recycling material categories, as compared to disposal site material categories

#	Material type	Covered in SB 582?	Disposal site categories	Inbound recycling categories
1	pkg	Yes	Gable top beverage cartons *[Counted]*	Gable top beverage cartons (1) *[Counted]*
2	pkg	Yes	Aseptic drink boxes *[Counted]*	Aseptic drink boxes (2) *[Counted]*
3	pkg	Yes	Wine boxes *[Counted]*	Wine bag-in-boxes (3) *[Counted]*
4	pkg, fsw	Yes	Corrugated cardboard and unbleached kraft paper (OCC) (pizza boxes and some bags are fsw)	Corrugated cardboard and unbleached kraft paper (OCC) (4) (exclude "Exempt")
5	pkg	Yes	Waxed corrugated cardboard	(in with 19)
6	pwp	Yes	High-grade office/printing/writing paper (uncoated high grades)	High-grade paper (6) (exclude "Exempt")
7	pwp	Yes	Newspaper (ONP)	Newspaper (7)
8	pwp	Yes	Magazines	Magazines (8)
9	pwp	Yes	Low-grade printing/writing paper (includes junk mail)	Low-grade printing/writing paper (junk mail) (9) (exclude "Exempt")
10	pwp	Yes	Shredded paper	
11	pwp	Yes		Shredded paper in a paper bag (part of 10)

12	pwp	Yes		Shredded paper in a plastic bag (part of 10)
13	pwp	Yes		Loose shredded paper (part of 10)
14	pkg, fsw	Yes	Low-grade packaging paper and recyclable food serviceware paper	Low-grade packaging + recyclable FSW paper (14) (exclude "Exempt")
15	product	No	low-grade recyclable paper products	low-grade recyclable paper products (15)
16	pkg, fsw	Yes	Polycoated paper, freezer boxes, cups, plates, take-out paper containers	Polycoated paper, freezer boxes, cups, plates, take-out paper containers (16)
17	pwp	No	Hard-covered books	Hard-covered books (17)
18	product	No	Compostable non-recyclable paper products	(in with 20)
19	pwp, pkg, fsw	Yes	Compostable, non-recyclable paper packaging, printing/writing, and food serviceware	Non-recyclable paper packaging, food serviceware, and printing/writing paper (5,19,21)

#	Material type	Covered in SB 582?	Disposal site categories	Inbound recycling categories
20	product	No	Non-compostable, non-recyclable paper products	Non-recyclable paper products (18,20)
21	pwp, pkg, fsw	Yes	Non-compostable, non-recyclable paper packaging, food serviceware, and printing/writing paper	(in with 19)
22	pkg, pwp "Exempt"	No	(in with 14)	Recyclable "Exempt" paper packaging and printing and writing paper (acceptable for recycling in an Oregon curbside program)
23	pkg, pwp, "Exempt"	No	(in with either 19 or 21)	Non-recyclable "Exempt" paper packaging and printing and writing paper (not acceptable for recycling in an Oregon curbside program)
24			(reserved)	(reserved)
25	pkg	No	Deposit beer and soft drink plastic beverage bottles *[Counted]*	Deposit beer and soft drink plastic beverage bottles (25) *[Counted]*
26	pkg	No	Deposit plastic water bottles *[Counted]*	Deposit plastic water bottles (26) *[Counted]*
27	pkg	No	All other deposit plastic beverage bottles *[Counted]*	All other deposit plastic beverage bottles (27) *[Counted]*
28	pkg	Yes	No-deposit plastic bev. bottles (RPCs) 8 oz to 5 gallons *[Counted]*	No-deposit plastic bev. bottles (RPCs) 8 oz to 5 gallons (28) *[Counted]*

29	pkg	Yes	No-deposit very small plastic beverage bottles less than 8 oz *[Counted]*	No-deposit very small plastic beverage bottles less than 8 oz (29) *[Counted]*
30	pkg	Yes	No-deposit very large plastic beverage bottles greater than 5 gallons *[Counted]*	No-deposit very large plastic beverage bottles greater than 5 gallons (30) *[Counted]*
31	pkg	Yes	Other plastic bottles and jars (RPCs) non-beverage 8 oz to 5 gallons	Other plastic bottles and jars (RPCs) non-beverage 8 oz to 5 gallons (31)
32	pkg	Yes	<2 to 5 Gallon buckets, flowerpots	<2 to 5 Gallon buckets, flowerpots (32)
33	pkg	Yes	Other plastic tubs, pails acceptable in curbside 8 oz to 2 gallons	Other plastic tubs, pails acceptable in curbside 8 oz to 2 gallons (33)
34	pkg	Yes	Other rigid plastic containers tubs, trays, etc. - RPCs not acceptable curbside + cups	Other rigid plastic containers tubs, trays, etc. - RPCs not acceptable curbside + cups (34)
35	pkg	Yes	Small tubs 6+oz but <8 oz	Small tubs 6+oz but <8 oz (35)
36	pkg	Yes	Bulky other rigid plastic packaging	Bulky other rigid plastic packaging (36)
37	pkg	Yes	Block foam plastic packaging	Block foam plastic packaging (37)
38	pkg	Yes	Other rigid plastic packaging	Other rigid plastic packaging (38)
39	product	No	Bulky rigid plastic products	Bulky rigid plastic products (39)
40	product	No	Other rigid plastic products that is not food serviceware	Other rigid plastic products that is not food serviceware (40)
41	fsw	Yes	Rigid plastic food serviceware (cutlery, etc. excluding cups, RPCs)	Rigid plastic food serviceware (cutlery, etc. excluding cups, RPCs) (41)

#	Material type	Covered in SB 582?	Disposal site categories	Inbound recycling categories
42	pkg, fsw	Yes	Rigid mixed plastic / materials packaging/ food serviceware	Rigid mixed plastic / materials packaging/ food serviceware (42)
43	product	No	Mixed plastic / materials products	Mixed plastic / materials products (43)
44	pkg, "Exempt"	No	(in with appropriate rigid plastic container category)	"Exempt" rigid plastic containers that are curbside-acceptable (8 oz to 5 gallons)
45	pkg, "Exempt"	No	(in with appropriate rigid plastic container category)	"Exempt" rigid plastic containers that are **not** curbside-acceptable (8 oz to 5 gallons)
46	pkg, "Exempt"	No	(in with appropriate rigid plastic container category)	"Exempt" other rigid plastic that is curbside-acceptable (small bottles and tubs less than 8 oz, but at least 6 oz)
47	pkg, "Exempt"	No	(in with appropriate rigid plastic category)	"Exempt" other rigid plastic not curbside-acceptable

48	pkg	Yes	Plastic beverage pouches *[Counted]*	Plastic beverage pouches (48) *[Counted]*
49	pkg	Yes	Plastic grocery/merchandise bags	Plastic grocery/merchandise bags (49) *[Counted]*
50	pkg	Yes	Plastic other film packaging or fsw - recyclable	Plastic other film packaging or fsw - recyclable (50) (count only for 30 samples)
51	product	No	Plastic film products - recyclable	Plastic film products - recyclable (51) *[Counted only for 30 samples]*
52	product	No	Plastic garbage bags	Plastic garbage bags (52) *[Counted only for 30 samples]*
53	pkg, fsw	Yes	Plastic film packaging or fsw - other nonrecyclable	Plastic film packaging or fsw - other nonrecyclable (53) *[Counted only for 30 samples]*
54	product	No	Plastic film product - other non-recyclable	Plastic film product - other non-recyclable (54) *[Counted only for 30 samples]*
55	pkg, "Exempt"	No	(in with appropriate film plastic packaging)	"Exempt" film packaging *[Counted only for 30 samples]*
56-60			(reserved)	(reserved)
61	Natural	No	Grass clippings	All yard debris (61 to 65)
62	Natural	No	Leaves / weeds	(in with 61)
63	Natural	No	Small Prunings under 2"	(in with 61)
64	Natural	No	Large Prunings over 2"	(in with 61)
65	Natural	No	Stumps	(in with 61)
66	Natural	No	Reusable dimensional lumber: unpainted	All wood (66 to 77)
67	product	No	Clean sawn lumber	(in with 66)
68	product	No	Clean engineered wood	(in with 66)
69	product	No	Reusable dimensional lumber: painted	(in with 66)
70	product	No	Other painted lumber	(in with 66)
71	product	No	Chemically treated lumber	(in with 66)
72	product	No	Wood Pallets	(in with 66)

#	Material type	Covered in SB 582?	Disposal site categories	Inbound recycling categories

73	pkg, fsw	Yes	Wood crates, other wood packaging, wood food serviceware	(in with 66)
74	product	No	Cedar shakes and shingles	(in with 66)
75	product	No	Wood Furniture	(in with 66)
76	product	No	Other Wood Products	(in with 66)
77	product	No	Mixed Wood / Materials	(in with 66)
78-80			(reserved)	(reserved)
81	product	No	Non-packaged bakery goods	All food (81 to 91)
82	product	No	Packaged bakery goods	(in with 81)
83	product	No	Non-packaged other vegetative edible food	(in with 81)
84	product	No	Non-packaged other vegetative nonedible food	(in with 81)
85	product	No	Packaged other vegetative food	(in with 81)
86	product	No	Non-packaged edible meat, eggs, dairy	(in with 81)
87	product	No	Non-packaged nonedible animal food-related	(in with 81)
88	product	No	Packaged meat, eggs	(in with 81)
89	product	No	Packaged dairy	(in with 81)
90	product	No	Mixed unpackaged foods	(in with 81)
91	product	No	Mixed packaged foods	(in with 81)
92	product	No	Disposable Diapers	Disposable Diapers (92)
93	product	No	Clothing textiles	Textiles (93, 94)
94	product	No	Other textiles excluding clothing	(in with 93)
95	product	No	Mixed textile / material	(in with 141 Other nonrecyclables)
96	product	No	Carpet	(in with 141 Other nonrecyclables)
97	product	No	Rugs	(in with 141 Other nonrecyclables)
98	product	No	Polyurethane foam carpet pad	(in with 141 Other nonrecyclables)
99	product	No	Other carpet/rug pad	(in with 141 Other nonrecyclables)
100			(reserved)	(reserved)
101	product	No	Automotive Tires	(in with 141 Other nonrecyclables)
102	product	No	Other tires	(in with 141 Other nonrecyclables)
103	product	No	Other rubber products	(in with 141 Other nonrecyclables)

104	product	No	Asphalt roofing: recyclable	(in with 141 Other nonrecyclables)
105	product	No	Asphalt roofing nonrecyclable	(in with 141 Other nonrecyclables)
106	product	No	Mattresses and box springs	(in with 141 Other nonrecyclables)
107	product	No	Furniture (mixed material)	(in with 141 Other nonrecyclables)
108	product	No	Paper composite ceiling tiles	(in with 141 Other nonrecyclables)
109	product	No	Compostable other organics	(in with 141 Other nonrecyclables)
110	product	No	Non-compostable other organics	(in with 141 Other nonrecyclables)

#	Material type	Covered in SB 582?	Disposal site categories	Inbound recycling categories
111	pkg	No	Deposit beer, soft drink, water glass containers *[Counted]*	Deposit Beverage Glass (111,112) *[Counted]*
112	pkg	No	Other deposit glass beverage containers *[Counted]*	(in with 111)
113	pkg	Yes	Non-deposit beverage glass bottles *[Counted]*	Other beverage glass bottles (113) (exclude "Exempt") *[Counted]*
114	pkg	Yes	Other container glass	other container glass (114) (exclude "Exempt") *[Counted]*
115	pkg, "Exempt"	Yes	(in with 114)	"Exempt" glass containers
116	product	No	Flat Window Glass	All other glass (116,117)
117	product	No	Other Nonrecyclable Glass	(in with 116)
118-119			(reserved)	(reserved)
120	pkg	No	Deposit Alum Beer, soft drink, water cans *[Counted]*	Deposit Alum Beer, soft drink, water cans (120) *[Counted]*
121	pkg	No	Other deposit aluminum beverage cans *[Counted]*	Other deposit aluminum beverage cans (121) *[Counted]*
122	pkg	Yes	Other Alum. Beverage Cans *[Counted]*	Other Alum. Beverage Cans (122) *[Counted]*
123	pkg, fsw	Yes	Alum. Foil / Food Trays	Alum. Foil / Food Trays (123) (exclude "Exempt")
124	product	No	Other aluminum: curbside-acceptable	Other Aluminum curbside acceptable (124)
125	product	No	Large aluminum not acceptable curbside	Large Aluminum non-curbside (125)

126	pkg	No	Steel/bimetal deposit beer, soft drink, water cans (rare) *[Counted]*	Steel/Bimetal Deposit beer, soft drink, water cans (rare)) (126) *[Counted]*
127	pkg	No	Other steel/bimetal deposit beverage cans *[Counted]*	Other steel/bimetal deposit beverage cans (127) *[Counted]*
128	pkg	Yes	Steel/bimetal other beverage cans *[Counted]*	Steel/Bimetal Other Beverage Cans (128) *[Counted]*
129	pkg	Yes	Other tinned cans	Other Tinned Cans (129) (exclude "Exempt")
130	product	No	Nonferrous metal curbside-OK	Nonferrous Metal curbside-OK (130)
131	product	No	Non-ferrous non-curbside	Non-ferrous non-curbside (131)
132	product	No	Other ferrous metal curbside-OK	Other Ferrous Metal curbside-OK (132)
133	product	No	Other ferrous metal non-curbside	Other Ferrous Metal non-curbside (133)
134	product	No	White Goods	White Goods (134)
135	product	No	Used oil filters *[Counted]*	Used oil filters (135) *[Counted]*
136	pkg	Yes	Empty aerosol cans	Empty Aerosol Cans (136) (exclude "Exempt")
137	product	No	Mixed ferrous - non-ferrous curbside	Mixed ferrous - non-ferrous curbside (137)
138	product	No	Mixed ferrous - non-ferrous non-curbside	Mixed ferrous - non-ferrous non-curbside (138)
139	product	No	Mixed metal / material	Mixed Metal / Material (139)

#	Material type	Covered in SB 582?	Disposal site categories	Inbound recycling categories
140	pkg, "Exempt"	No	(in with appropriate metal packaging categories)	"Exempt" metal packaging
141	product	No	Computer monitors	Other nonrecyclables (95-110,141-167) *[Counted large and small cell phones]*
142	product	No	Computer CPU units *[Counted large and small cell phones]*	(in with 141 Other nonrecyclables)
143			(reserved)	(reserved)
144	product	No	Printers	(in with 141 Other nonrecyclables)
145	product	No	Computer mice keyboards	(in with 141 Other nonrecyclables)
146	product	No	TVs	(in with 141 Other nonrecyclables)
147	product	No	Microwaves	(in with 141 Other nonrecyclables)

148	product	No	LED lights	(in with 141 Other nonrecyclables)
149-150			(reserved)	(reserved)
151	product	No	Other consumer electronics / brown goods *[Counted small cell phones]*	(in with 141 Other nonrecyclables)
152	product	No	Small Appliances-non electronic	(in with 141 Other nonrecyclables)
153	product	No	E-Cigarettes and vapes	(in with 141 Other nonrecyclables)
154-160			(reserved)	(reserved)
161	product	No	Rock, concrete, or brick	(in with 141 Other nonrecyclables)
162	natural	No	Soil / Sand / Dirt	(in with 141 Other nonrecyclables)
163	product	No	Pet litter / animal feces	(in with 141 Other nonrecyclables)
164	product	No	Gypsum wallboard new	(in with 141 Other nonrecyclables)
165	product	No	Gypsum wallboard old	(in with 141 Other nonrecyclables)
166	product	No	Fiberglass insulation	(in with 141 Other nonrecyclables)
167	product	No	Other inorganics	(in with 141 Other nonrecyclables)
168-169			(reserved)	(reserved)
170	product	No	"medical wastes" excluding sharps	"medical wastes" excluding sharps (170)
171	product	No	Sharps (can estimate) *[Counted]*	Sharps (171) (can estimate) *[Counted]*
172	product	No	Lead-Acid Batteries	Batteries (172,173)
173	product	No	Dry-cell Batteries	(in with 173 Batteries)
174	product	No	Latex Paint	Other hazardous materials (174 to 188)
175	product	No	Oil Paints	(in with 174 Other hazardous materials)
176	product	No	Motor Oil	(in with 174 Other hazardous materials)
177	product	No	Other flammables	(in with 174 Other hazardous materials)
178	product	No	Pesticides / herbicides	(in with 174 Other hazardous materials)
179	product	No	Corrosive cleaners	(in with 174 Other hazardous materials)
180	product	No	Asbestos	(in with 174 Other hazardous materials)
181	product	No	Fluorescent tubes	(in with 174 Other hazardous materials)
182	product	No	Compact fluorescent lights	(in with 174 Other hazardous materials)
183	product	No	Other mercury-containing items	(in with 174 Other hazardous materials)

#	Material type	Covered in SB 582?	Disposal site categories	Inbound recycling categories
184	product	No	Ammunition and fireworks	(in with 174 Other hazardous materials)
185	product	No	Compressed gas cylinders	(in with 174 Other hazardous materials)
186	product	No	Drugs covered under the Drug Takeback Program	(in with 174 Other hazardous materials)
187	product	No	Other Hazardous Chemicals	(in with 174 Other hazardous materials)
188	product	No	Unknown Hazardous Chemicals	(in with 174 Other hazardous materials)
189-194			(reserved)	(reserved)
195				Bagged garbage (new category)
196				Bagged recyclables (weigh and then re-sort)
197			(reserved)	(reserved)
198			Supermix - estimate composition	Supermix - estimate composition
199			Mixed fines - estimate composition	Mixed fines - estimate composition

Outbound recycling material categories

As was true for inbound recyclable, many of the outbound recycling categories are defined identically to the field sort categories for disposal site sampling at the beginning of this document. Other outbound recyclable categories combine multiple field sort categories for disposal site sampling. In the outbound recycling material category list below, numbers after each material category name refer to the individual disposal site category or categories.

Table 2. Outbound recycling material categories

Outbound recycling categories	Outbound recycling categories - continued
Gable top beverage cartons (1)	Nonrecyclable plastic film products (52, 54)
Aseptic drink boxes (2)	All yard debris (61 to 65)
Corrugated cardboard /Brown paper (3,4)	All wood (66 to 77)
High-grade office/printing /writing paper (6)	All food (81 to 91)
Newspaper, junk mail, other curbside acceptable paper that is a covered material (7-14)	Disposable Diapers (92)
low-grade recyclable paper products (15)	Textiles (93, 94)
Polycoated paper, freezer boxes, cups, plate, take-out paper containers (16)	Deposit beverage container glass (111, 112)
Hard-covered books (17)	Other glass bottles, jars curb-acceptable but not in commingled bin (113, 114)
Non-recyclable paper packaging, food serviceware, and printing/writing paper (5,19,21)	All other glass (116, 117)
Non-recyclable paper products (18,20)	deposit aluminum cans (120,121)
Plastic deposit bottles (25, 26, 27)	Other aluminum beverage cans (122)
Other plastic bottles and jars (28 – 31)	Aluminum foil, food trays (123)
Other curb-acceptable rigid plastic containers (32, 33) and small tubs (35)	Other aluminum (124, 125)
Other RPCs not acceptable at the curb (34)	Deposit steel/bimetal cans (126, 127)
Bulky other rigid plastic packaging (36)	Other steel/bimetal cans (128)
Block foam plastic packaging (37)	Other tinned cans, empty aerosol cans (129, 136)

Other rigid plastic packaging and food serviceware (38, 41)	Non-ferrous metal (130,131)
Bulky rigid plastic products (39)	Other ferrous metal, white goods, used oil filters (132 to 135)
Other rigid plastic products that is not food serviceware (40)	mixed ferrous/nonferrous and mixed metal/material (137, 138, 139)
Rigid Mixed plastic/materials packaging/ food serviceware (42)	Other nonrecyclables (95 to 110 and 141 to 167)
Mixed plastic / materials products (43)	"MEDICAL WASTES" including sharps (170, 171)
Recyclable plastic film packaging/bags (49, 50)	Batteries (172, 173)
Recyclable film products (51)	Other hazardous materials (174 to 188)
Non-recyclable film packaging, food serviceware (48, 53)	

Appendix C: Tables

In addition to the tables and figures in this report, the following tables are available on the Department of Environmental Quality waste composition study webpage in the Inbound Commingled Recycling Study Results data file.

Sheet	Descriptions
Explanation	Information to help understand the contents of each sheet
CompareJurisdictionsFull	Comparison of composition of commingled recycling for all jurisdictions studied in Oregon
SummCompareJurisdictions	Summary comparison for all jurisdiction in Oregon
01Statewide	Average composition of commingled recycling statewide – residential and commercial
02Metro	Composition of commingled recycling in the Metro tri-county area – residential and commercial
03MarionCounty	Composition of commingled recycling in Marion County – residential and commercial
04LaneCounty	Composition of commingled recycling in Lane County – residential and commercial
05Rest of Oregon	Average Composition of commingled recycling in all areas of Oregon except the Metro area and Marion and Lane Counties – residential and commercial
06DeschutesCounty	Composition of commingled recycling in Deschutes County – residential and commercial
07WillametteValley	Composition of commingled recycling in counties in the Willamette Valley, plus Hood River, excluding Marion, Lane, and the Metro counties - residential and commercial
08Coastal	Composition of commingled recycling in coastal counties from Clatsop to Coos County excluding the coastal parts of Lane and Douglas Counties - residential and commercial
09SWOregon	Composition of commingled recycling in Jackson, Josephine, and Douglas Counties – residential and commercial
10EOregon	Composition of commingled recycling in counties east of the Cascades where commingled recycling collection is provided, excluding Deschutes and Hood River Counties – residential and commercial

11Downstate	Average composition of commingled recycling in all parts of Oregon except the Metro tri-county area – residential and commercial
12MetroResidential	Composition of commingled recycling from single-family residential route trucks from the Metro tri-county area
13MetroOther	Composition of commingled recycling from all Metro tri-county samples excluding single-family residential route trucks
14MetroMixedRoutes	Composition of commingled recycling from mixed (part residential, part commercial) route trucks from the Metro area
15MetroCommercial	Composition of commingled recycling from commercial route trucks from the Metro tri-county area
16StatewideResidential	Composition of commingled recycling from residential route trucks statewide
17StatewideMixedRoutes	Composition of commingled recycling from mixed (part residential, part commercial) route trucks statewide
18StatewideCommercial	Composition of commingled recycling from commercial route trucks statewide
19StatewideRES-MIX-COM	Comparison of composition of commingled recycling from residential, commercial, and mixed route trucks
Sheets beginning with S01 to S19 are shortened summaries of the 19 previous sheets	
SampleCountByArea	Counts of samples of each type for each geographic area samples. Results of a chi squared test shows that the proportion of residential vs commercial vs mixed samples varies significantly from jurisdiction to jurisdiction
Facilities-SampleCount	A list of all the facilities where we captured samples, and the number of samples collected at each.