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**DATE:** May 9, 2024  
**TO:** Programs & Administration Committee/Recycling Board  
**FROM:** Emily Alvarez, Program Manager  
**SUBJECT:** 2023 Waste Characterization Study Update

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## **SUMMARY**

As part of the FY 22-23 Agency budget, the Waste Management Authority (WMA) approved funding for a Waste Characterization Study (WCS) and awarded a contract to SCS Engineers in December 2022 for completion of the study. A WCS identifies predominant materials in the waste stream and changes in composition over time and will be used by StopWaste and member agencies to refine programs and track progress toward the long-term goal of landfill obsolescence and upstream waste prevention. From June 2023 to February 2024, the consultant team sorted over 650 samples across the landfill, recycling, and organics streams — the first StopWaste WCS to collect data from all three streams. This memo presents several important trends from the data received so far. A final report with all data synthesized is expected to be completed by the end of the fiscal year and will also be shared with the Recycling Board and WMA.

## **BACKGROUND**

A WCS is a valuable snapshot in time of the materials that are consumed in Alameda County and ultimately comprise our material streams. It can contribute to informing Agency priorities by highlighting the largest components of the landfill, recycling, and organics streams in order to understand what materials are commonly disposed of, how accurately those materials are sorted, and to what extent the organics and recycling streams are contaminated. In addition to these general study purposes, the WCS will satisfy the organics processing capacity planning requirements of SB 1383.

The WCS consultant conducted waste stream sampling at transfer station and landfill facilities within the county. For the landfill stream, the samples were divided into single-family and multifamily residential and commercial. For the organics and recycling streams, they were separated by residential and commercial.

In consultation with staff, a list of approximately 70 material types were quantified that align with both standard WCS practices and the Agency's priorities and programs. Our main study included samples of the materials on this list by weight to understand the makeup of each stream. To further understand additional metrics that affect our work, the study also included a sub-sort of certain material categories to further identify the materials and get counts in addition to weight. The data was also processed to examine consumption patterns and sorting behavior.

## DISCUSSION

Field sampling for the Main Study and Sub-Project 1 concluded in February 2024. While the samples are recorded based upon a list of about 70 material categories developed by SCS and StopWaste staff, the charts below are simplified into larger material categories for legibility. The final report will provide detailed information on all material categories.

As shown in Figure 1 below, Compostable Organics are the largest category by weight in the landfill stream. The largest subcategory within Compostable Organics in the landfill stream is Food, accounting for 20 percent of the landfill stream for single-family residential and 27 percent for multifamily. The Other category is second across all sectors, which consists primarily of Mixed Residuals (those materials that did not fit into the 70+ material categories or were unidentifiable). However, in the single-family stream, 8 percent of the landfill stream was Diapers and Sanitary Products (which are found under the Other category). In contrast, the commercial landfill stream has less material in the Other category and a higher percentage of Plastic, Paper, Inerts (landscaping material, rocks, etc.), Glass, and HHW compared to the residential streams. The largest HHW subcategory in the commercial stream was Medical Waste/Sharps (2%) which were found in less than 0.5 percent of the residential streams. Across all three sectors, Film Plastic was the largest material in the Plastic category.

**Figure 1. Composition of Landfill Stream**

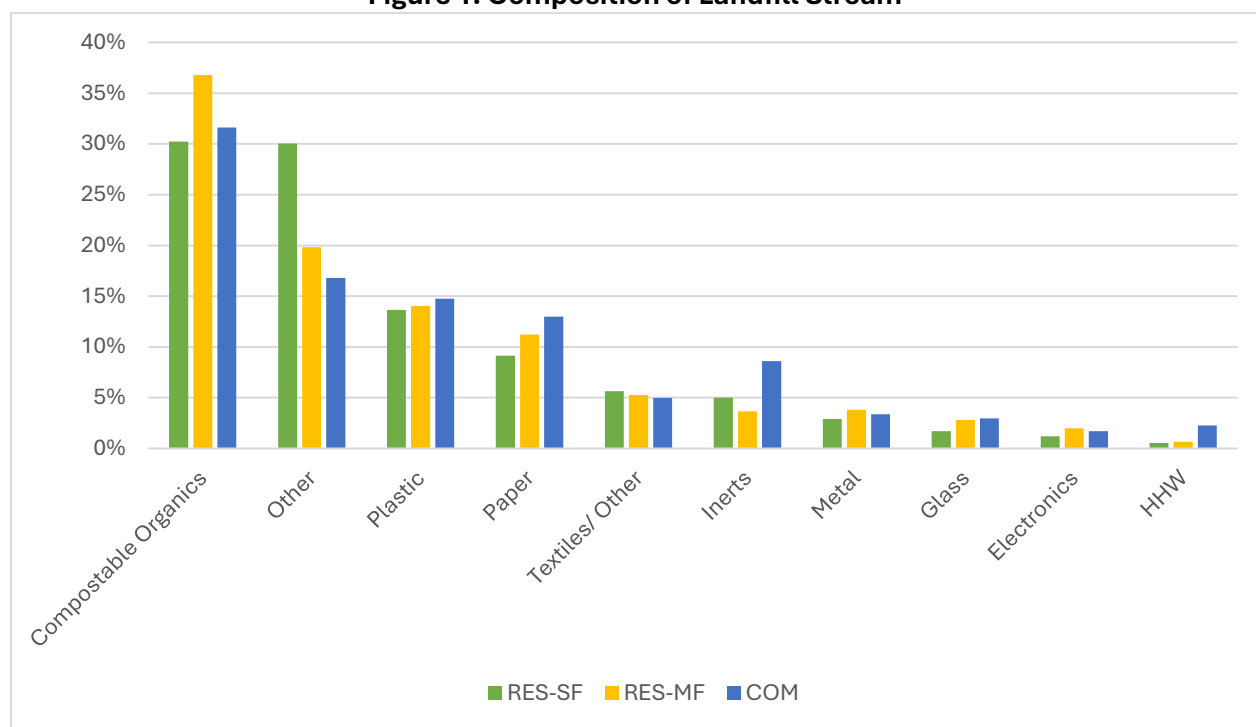
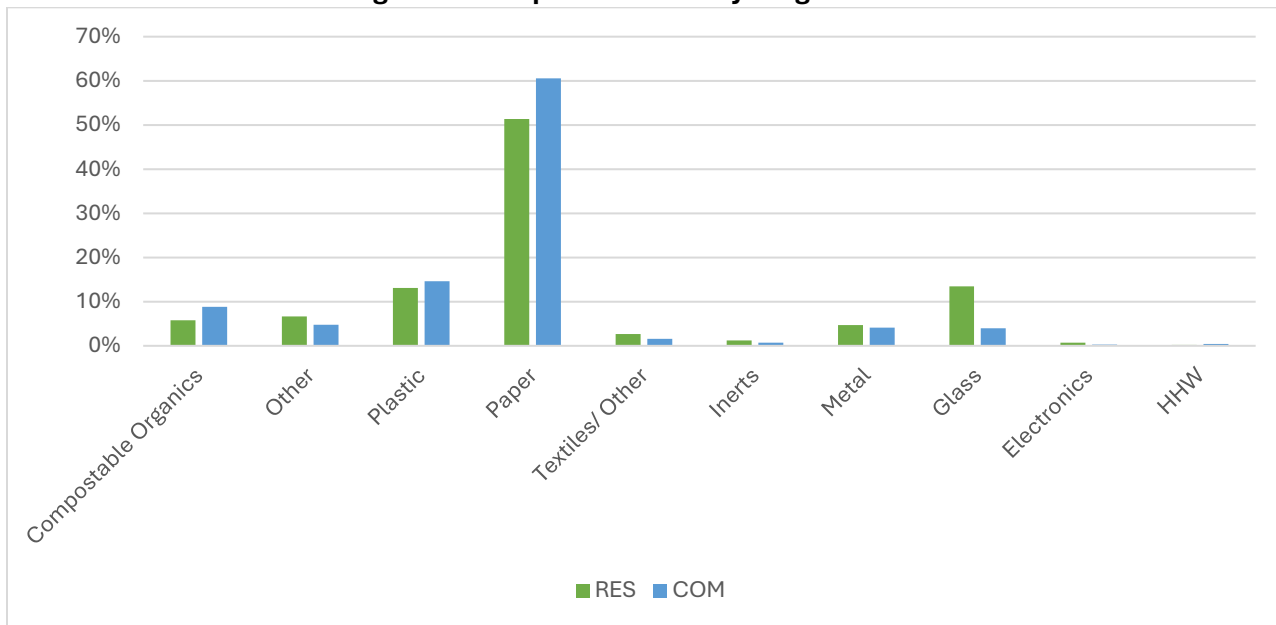


Figure 2 below shows the breakdown of material types by weight in the recycling stream. This stream has a much lower percentage of Compostable Organics than the landfill stream. The largest recycling stream material across both the residential and commercial sectors is Paper, followed by Plastic. Plastic Containers make up about 8 percent of both the residential and commercial streams. In the residential stream, it is primarily PETE Containers (4%) (such as plastic water bottles), whereas the commercial stream has more HDPE Containers (5%) (such as plastic milk jugs and laundry detergent bottles).

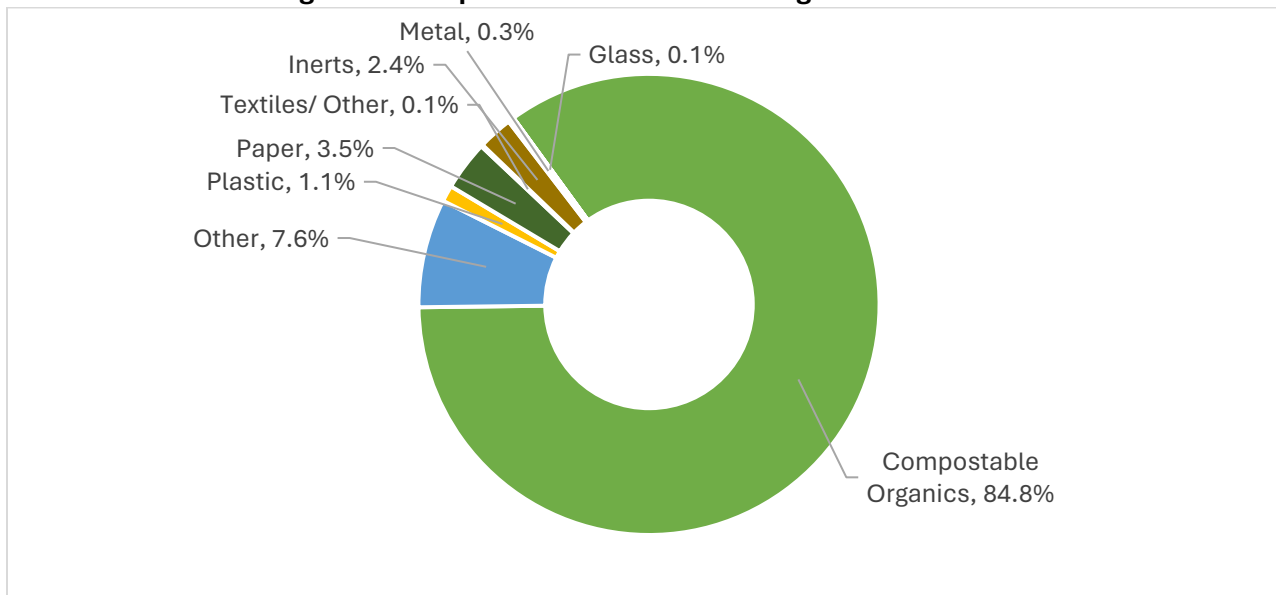
**Figure 2. Composition of Recycling Stream**



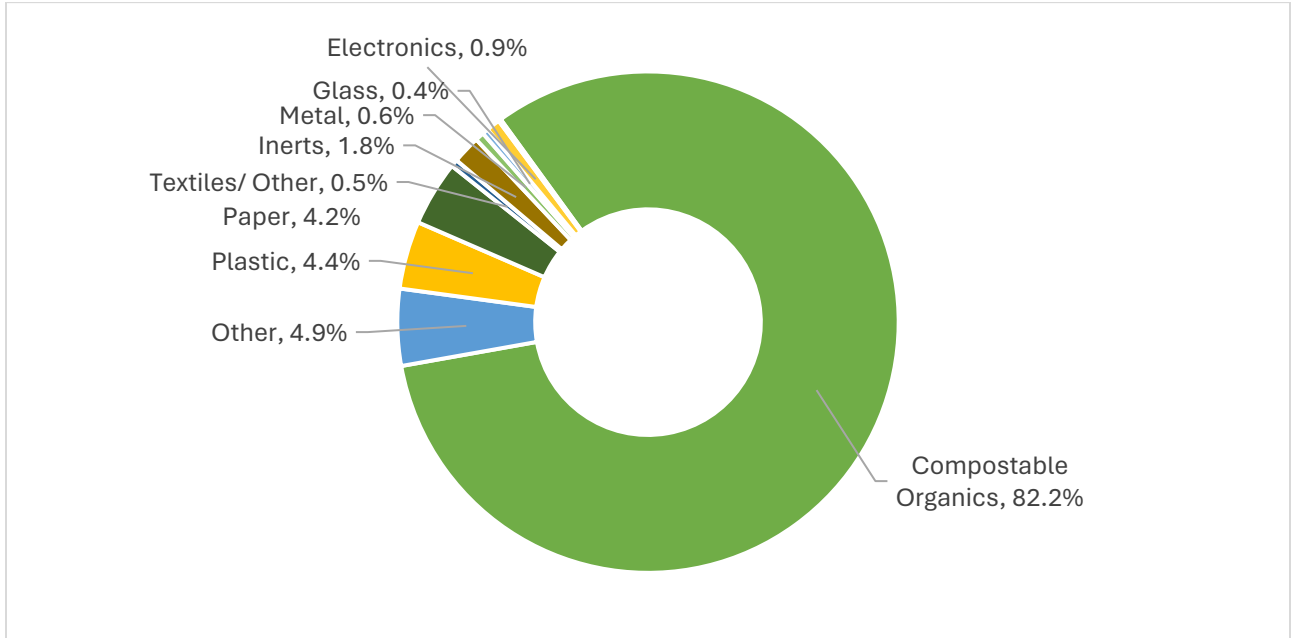
Figures 3 and 4 below present the composition of the organics stream by weight. These are shown in pie charts since Compostable Organics are significantly higher in this stream, which would make the other categories illegible in bar format. In the residential stream, approximately 68 percent of the Compostable Organics are Leaves, Grass, Chips, Prunings, and Trimmings which are only about 30 percent of the commercial stream. Food is about 14 percent of the residential stream, but 47 percent of the commercial stream.

When looking at contamination in the organics stream, the data shows that the largest category, aside from Mixed Residuals, in the residential sector is Treated Wood. Residents may be unaware of what wood is considered compostable. The commercial stream has more contamination overall, including four times as much Plastic. It should be noted that all of these categories are being reported by weight, as is standard practice for a WCS. Food and wood are heavier items in general than plastic and paper. If material were counted or measured by volume, these proportions would likely be different.

**Figure 3. Composition of Residential Organics Stream**



**Figure 4. Composition of Commercial Organics Stream**



In addition to the composition of each stream, the study also looked at sorting behavior for various materials across all three streams. To do this, the total annual tons of each stream were multiplied by the percentage of the composition presented above. For example, Figures 5 and 6 below are examples of that data for the residential sorting of Compostable Organics. Figure 5 shows in which stream various Compostable Organics were found, which can be used to interpret sorting behavior or answer the question, “how often are organics winding up in the correct bin?” The data below shows that generally, green waste (Chips, Prunings, Trimmings, Branches, and Stumps and Leave and Grass) are being sorted correctly. However, Food is most often winding up in the landfill stream (68% of the time).

**Figure 5. Residential Sorting of Compostable Organics by Percent**

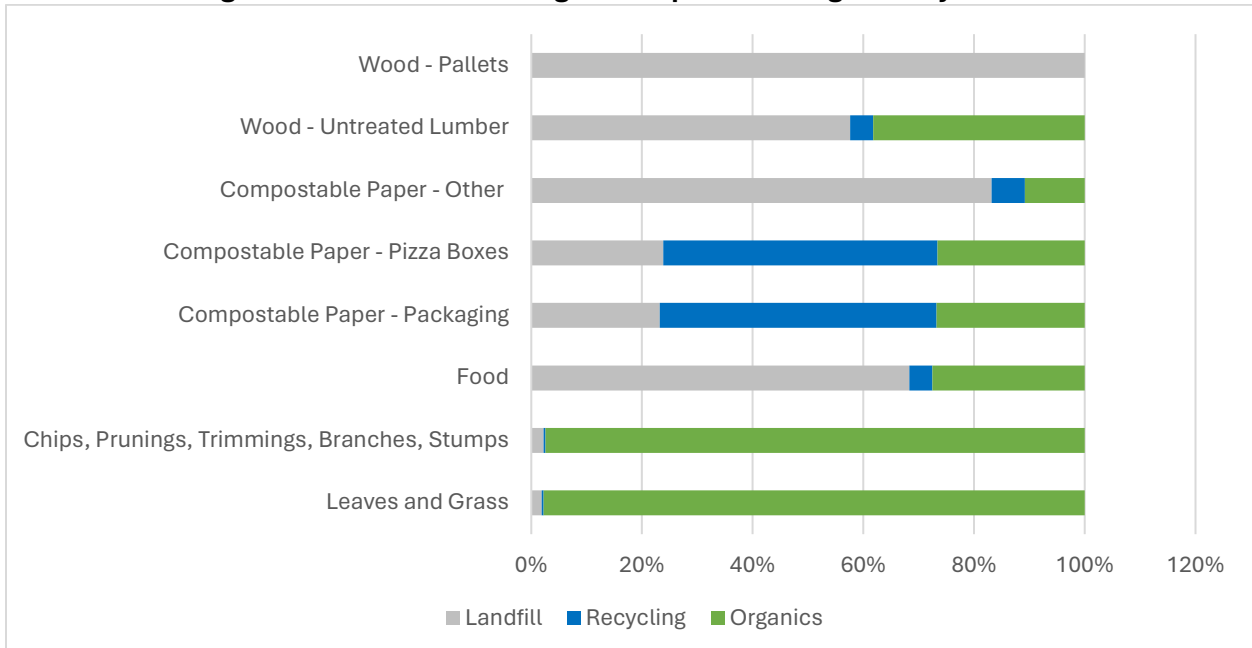
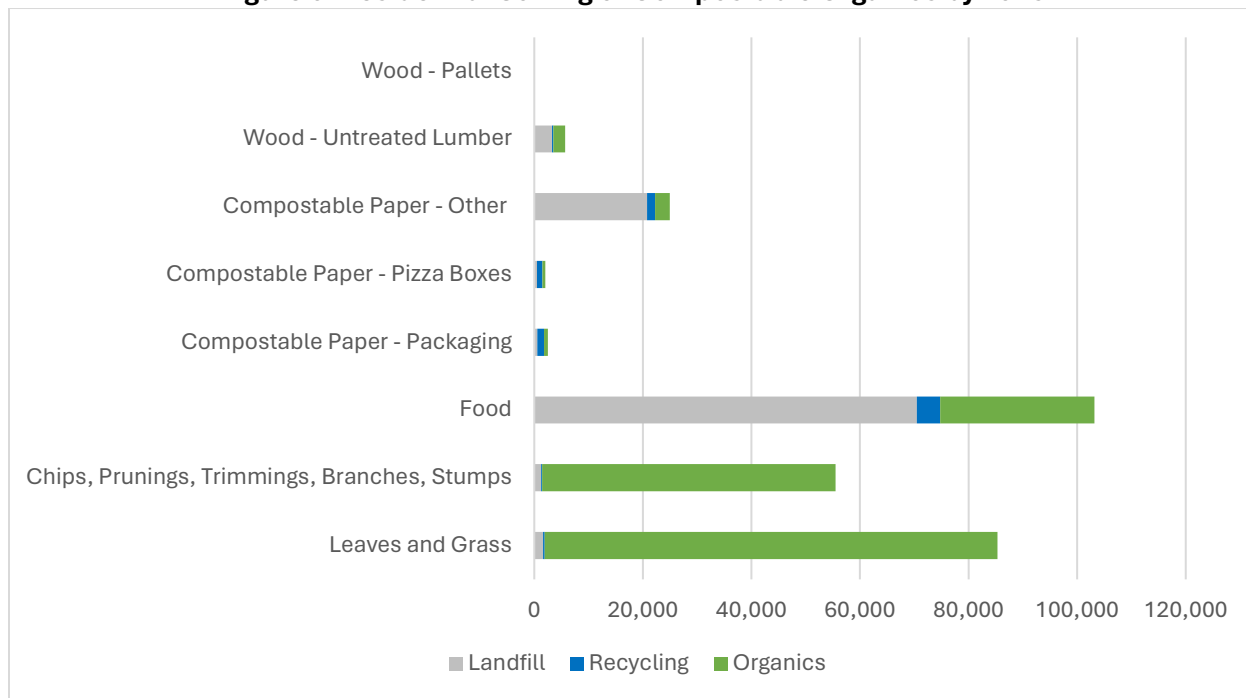


Figure 6 below presents the same data in a different way – this time showing the total estimated annual tons of material and what tonnage is ending up in which stream. This also helps to understand sorting behavior but adds the ability to identify which materials may be worth prioritizing for the Agency. For example, Food Soiled Packaging is often being recycled when it should be composted. When looking at just Figure 5 above, one may conclude that a campaign about composting versus recycling this material could be useful. When considering the data in Figure 6, however, we can understand that while there is room for improvement in this sorting behavior, Food Soiled Packaging is only about 2,500 tons annually. In contrast, Food makes up over 100,000 tons of material annually. Therefore, while a campaign focused on Food Soiled Packaging can improve proper sorting, it may not be the most impactful category to focus on in terms of environmental impact.

**Figure 6. Residential Sorting of Compostable Organics by Tons**



A significant amount of data has been collected for the 2023 WCS which will allow the Agency to understand all three material streams and sorting behavior in a way that was not possible with previous landfill only studies. Additional data and interpretation of trends will be presented in the final report. Further, Sub-Project 2, which will sample organics residuals from composting facilities to better understand how contamination appears throughout the composting process is planned to start this summer.

**RECOMMENDATION**

This item is for information only.