Understanding Throughput Survey Responses 2020 and 2023

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As a nonprofit serving the composting trade organization, USCC uses the Throughput and Environmental Survey to identify national trends and needs. Conducted every three years beginning in 2020, the survey gathers data through SurveyMonkey and direct communication. The 2023 response exceeded that of 2020, strengthening insight into composting practices nationwide. This paper summarizes results from both surveys and outlines priorities for future data collection and outreach.

Executive Summary

To support the composting industry, the US Composting Council (USCC) conducts the Throughput and Environmental Survey to track national composting trends. Two survey rounds in 2020 and 2023 captured information about facility operations, materials processed, and outputs. This report compares responses, highlighting distribution, material flow, and industry stability.

Key Findings

- About one-fifth (21%) of 2020 respondents also participated in 2023, enabling limited year-over-year comparison.
- Expanded 2023 data provided greater detail on feedstock and output materials, revealing clear regional and material-use patterns.
- State-level reporting allowed geographic analysis of composting activity, showing both strong regional hubs and underrepresented areas across the U.S.

Methodology

Data Sources:

- **SurveyMonkey:** Primary collection tool.
- **Email submissions:** Provided flexibility for respondents.

Analytical Methods:

- **Collaborative Approach:** Data scientists and composting specialists ensured technical accuracy and policy relevance.
- **Data Preparation:** 2020 and 2023 datasets were standardized across shared variables. Records with incomplete tonnage data were excluded from quantitative summaries but retained for categorical analysis.
- **Analytical Tools:** Google Sheets and Microsoft Excel for data validation and summaries; Python for transformations and calculations.
- **Geographic Grouping:** Data organized by state, US EPA region, USCC chapter presence, and organics ban status. Metrics included response relative to concentration of survey responses, total intake/output, and feedstock categories.
- **Concentration and Average Calculations:** Determined total and average intake, output and feedstock/output by region.
- **Trend Analysis (2020-2023):** Compared consistent respondents on facility number, throughput flow, and permitted capacity.
- **Quality Assurance:** All calculations were reviewed jointly by analysts and subject experts to confirm consistency.
- **Statistical Confidence:** Given sample size and voluntary participation, results are reported descriptively without statistical inference.

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Results

Result 1. Geographic Distribution of Responses 2023

In 2023, responses were received from 33 states representing all 10 US EPA regions. The regions with the most responses were regions 4, 5, and 9, corresponding to the Southeast, Great Lakes, and Pacific regions. Fifteen of sixteen states with USCC chapters responded (all states except Indiana), while sixteen responses came from states without chapters. About 80% of states with organics diversion or landfill bans participated, suggesting a connection between policy incentives and higher reporting.

States with USCC Chapters: Arizona, California, Colorado, Florida, Georgia, Illinois, Indiana, Iowa, Maryland-DC, Michigan, Minnesota, North Carolina, Ohio, Tennessee, Texas and Virginia.

Figure 1 compares each state's population (U.S. Census data) with its relative concentration of survey responses. The comparison indicates that higher response rates are not solely associated with population size, but also reflected the presence of USCC chapters and state-level policy activity.

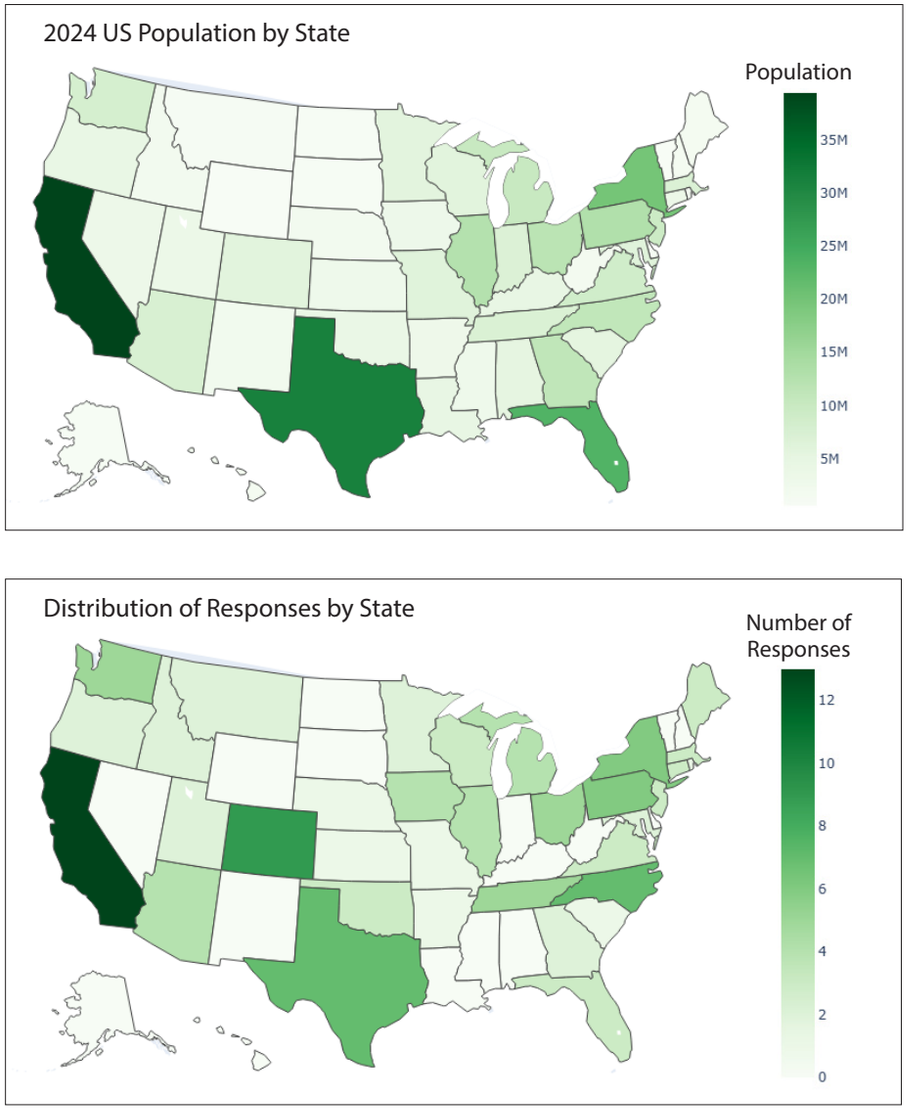


Figure 1. Distribution of US Census population data vs. Distribution of Responses by State 2023

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Table 1. Number of Responses per US EPA Region 2023

EPA Region	1	2	3	4	5	6	7	8	9	10	NA
Number of Responses	9	7	8	14	16	8	7	13	16	9	3

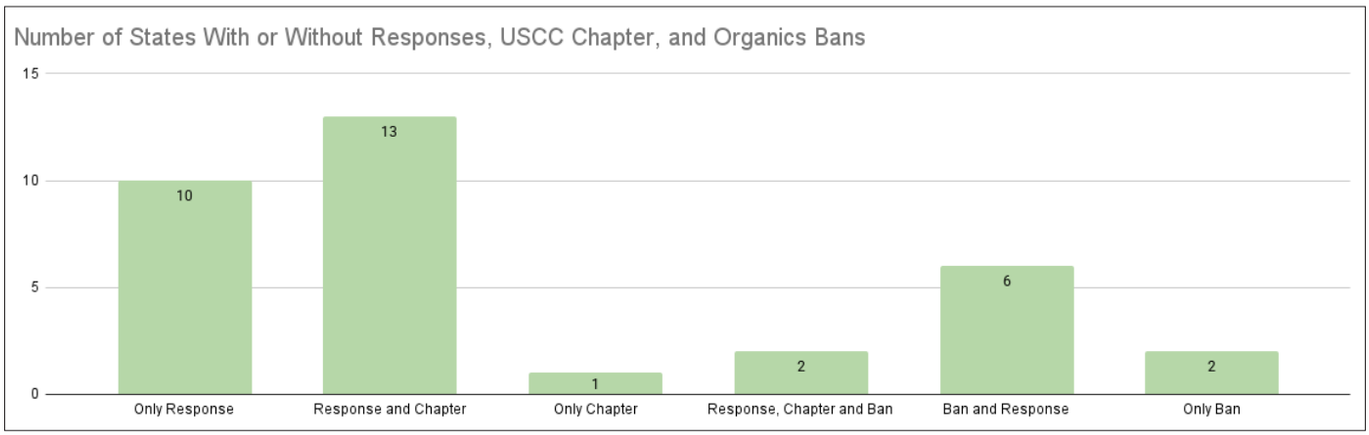


Figure 2. States with Responses, USCC Chapter, and Organics Bans 2023

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Result 2. 2020 and 2023 Distribution of Questions which were measured in Amount of Compost: Total Intake, Total Output, and Total Permitted Capacity

Reported volumes varied widely across categories. We asked that participants tell us total intake, output, and permitted capacity per year as a whole number in the unit of measure used by their particular facility. Total reported intake in 2023 reached 6.5 million tons, with output totaling 2 million tons. In 2020 an intake of 7.6 million tons and an output of 2.2 million tons were reported. In the table below it is shown that for an unknown reason the reported whole values of intake were smaller than output in 2023. The changes seen between intake and output in 2020 are more like what is expected to happen over the course of compost processing.

Table 2. Total Intake and Output for 2020 and 2023

Tonnage change between	Number of Responses 2020	Number of Responses 2023
Intake tons larger than output tons	95	8
Output tons larger than Intake tons	10	99
NA	1	4

Permitted capacity is the amount of compost a compost operation retains a permit to produce in their operation. This is often larger than the actual intake and output compost amounts to account for potential fluctuations in compost processing totals. Missing values or values equaling zero could mean that a particular participant does not require a permit in order to undergo their compost operations. The distributions of permitted capacity tonnage are very different between operations, so we have defined them into different categories for analysis: 0 tons, less than 1000 tons, less than 10,000 tons, over 100,000 tons, NA (Missing Values), and Total. We see a lot more responses in 2023 that could indicate that none of the capacity of the operation in question is permitted. However, in 2020 nearly all responses contained a permitted amount.

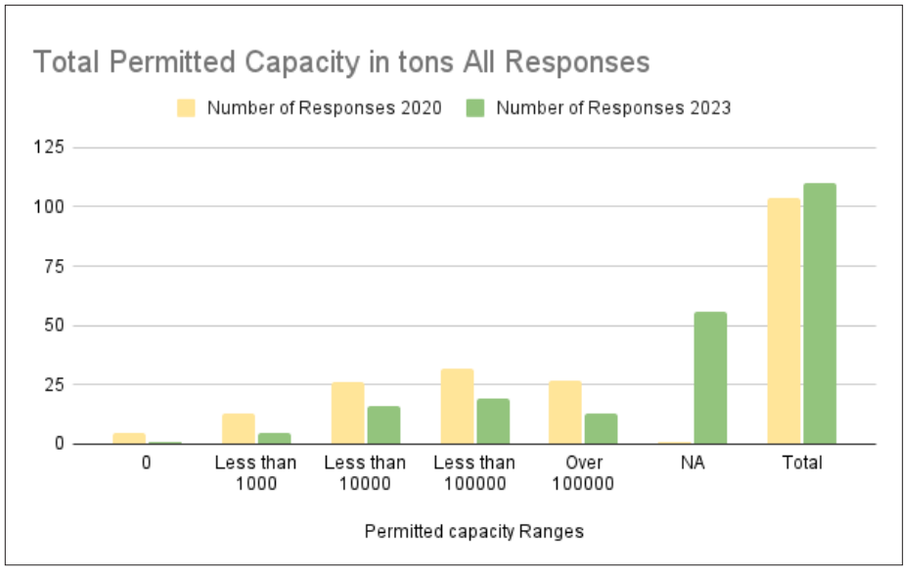


Figure 3. Total Permitted Capacity in tons for All Responses

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Result 3. Trend Analysis (2020-2023 Subset)

Twenty-one percent of 2020 respondents also participated in 2023, providing limited but informative longitudinal data. Given the small overlapping sample, findings should be interpreted as indicative rather than represented of nationwide temporal trends.

Among this cohort:

- The number of facilities per respondent increased a small amount. In the total dataset the number of facilities both per response and total declined a small amount.
- Permitted Capacity in this cohort shows the same patterns of permitted compost in 2020 and 2023 participants not reporting permitting capacity that are seen in the total survey responses.
- In contrast to the intake-to-output tonnage amounts in the entire survey, the overlapping subset only had one response that had more intake tonnage than output amount.
- Roughly half of this cohort operated in USCC chapter states, and half did not. This may be used as a baseline for future tracking.

Table 3. Changes in Reported Facility Amounts Across 2020 and 2023 in Overlapping Subset

	2020	2023	Change Between years
Number of Facilities in Overlap	29	33	+12%
Average Number of Facilities per Response in Overlap	1.26	1.43	+12%
Number of Total Facilities in Total Survey	178	158	-11%
Average Number Facilities per Response in Total Survey	1.71	1.44	-16%

Table 4. Changes in Reported Intake and Output tonnages Across 2020 and 2023 in Overlapping Subset

Tonnage change between	Number of Responses Overlap 2020	Number of Responses Overlap 2023
Intake tons larger than output tons	21	22
Output tons larger than Intake tons	1	0
NA	0	0

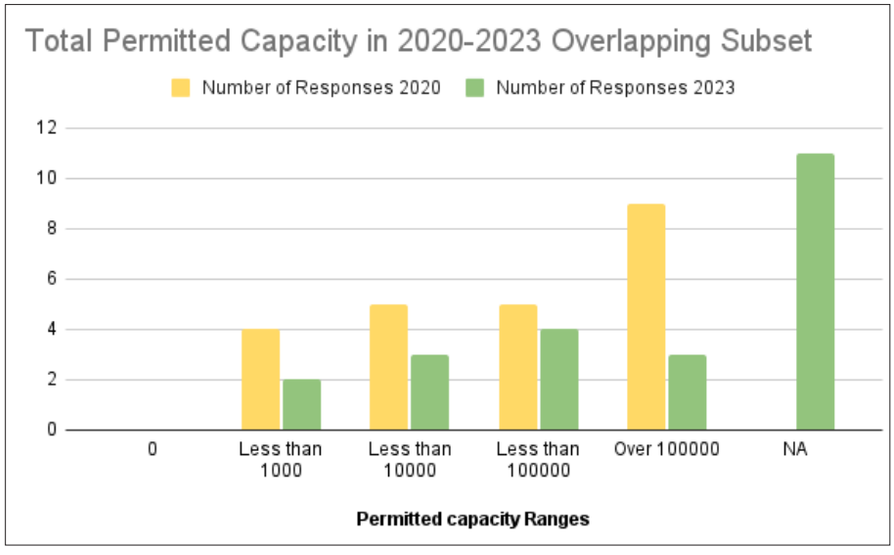


Figure 4. Total Permitted Capacity in tons for subset of responses overlapping from 2020 and 2023

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These results suggest a stable operator base with modest structural changes that warrant continued observation. The sample of consistent responses increasing their facility number will hopefully be reflective of growth when combined with future survey data. The full dataset has variability between operation sizes which could be the reason that the total dataset showed a slight decrease in facility number. Despite the full data set containing many responses where the output tonnage was smaller than the intake amounts, the subset shows only one response that has this trend. However, trends in permitted capacity seen in the larger dataset are mirrored by this smaller cohort. In the overlapped category we saw about half of the responses were from states with a USCC chapter, but for this group the responses were equally from other states.

Table 5. Number of Responses Operating in States with USCC Chapters

Has a USCC Chapter	11
No USCC Chapter	11
Operates in both	1

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Result 4. Feedstock and Output Categories with 2023 Binary Responses found in 2023

The 2023 survey expanded data collection with binary questions on accepted materials, output types, permitted categories, and certifications.

- **Feedstock Categories:** Table 5 summarises the distribution of the most common foodstock categories accepted and output product types. Yard Waste and Commercial Horticulture were the most frequently reported feedstocks.
- **Food Waste Acceptance:** Nearly all respondents accepted food waste, and Back-of-House and Front-of-House materials were the highest specific categories accepted.
- **Feedstocks Brought:** Of the variety of feedstock brought to composting facilities the lowest category is wastewater treatment feedstock. A tie between Other and Household feedstock categories were reported.
- **Certifications**: Most did not require certifications from waste generators. Those that did cited BPI and CMA certifications most frequently, with a few referencing TÜV SÜD, EN 13432, and USCC certifications. Preliminary comparisons suggest no clear correlation between certification requirements and the diversity of accepted feedstocks.

Table 6. Intake and Output counts and averages for each feedstock category

Intake Category	Count of Responses	Average Percent of Operation	Count Not in this Category	Output Category	Count Responses	Average Percent of Operation	Count Not in this Category
Yard Waste (Green Waste)	94	50%	16	Agriculture	75	26%	35
Food Scraps	79	26%	31	Commercial Horticulture	82	50%	28
Biosolids	50	15%	60	Direct to Public	82	39%	28
Agriculture Manure	57	11%	53	Environmental Remediation	38	8%	72
Forestry Byproducts	53	21%	57	Turfgrass Management	44	8%	66
Crop Residues	44	5%	66	Erosion, Stormwater, or DOT	49	9%	61
Compostable Food Service Ware and Packing	51	4%	59	Other	34	14%	76
Commingled Yard and Food Waste	50	15%	60				
Other	47	11%	63				

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Insights and Discussion

Findings indicate a maturing composting landscape with increasing feedstock diversity and strong acceptance of food waste. However, lower permitted capacities and variable intake-to-output ratios reveal uneven scaling and potential inconsistencies in reporting. Geographic analysis shows composting activity across both chapter and non-chapter states, suggesting that industry development is not confined to organized networks. Broader outreach, standardized reporting, and regional collaboration can strengthen data reliability and comparability in future surveys.

Conclusion

The 2023 dataset provides the most detailed national view of composting operations to date. While the operator base remains stable, observed changes in capacity and throughput underscore the need for continued monitoring.

Future Surveys priorities include:

- Understanding factors affecting intake-to-output ratios
- Assessing policy impacts on capacity and reporting
- Examining certification adoption in relation to feedstock acceptance.

Together these efforts can inform industry growth, policy design, and resource allocation to advance composting as a key component of circular materials management.

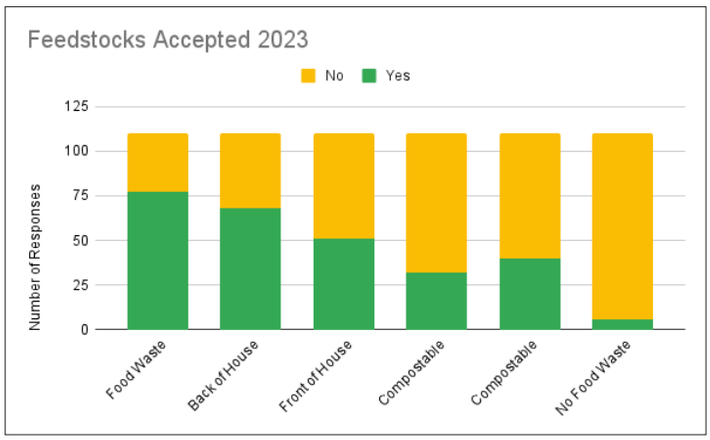


Figure 5. Feedstock intake materials accepted 2023

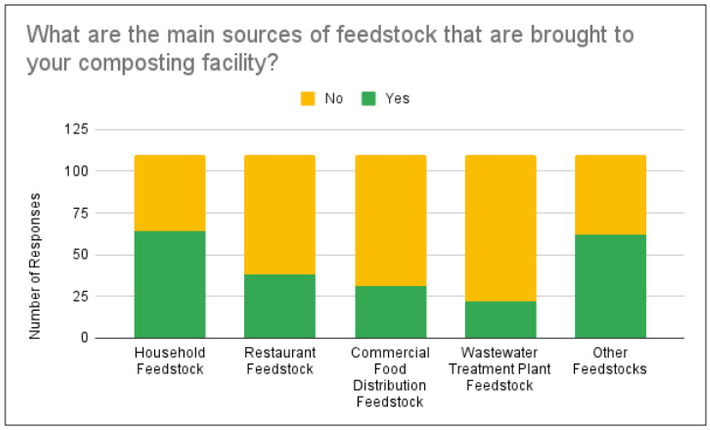


Figure 6. Main sources of feedstock brought to composting facilities

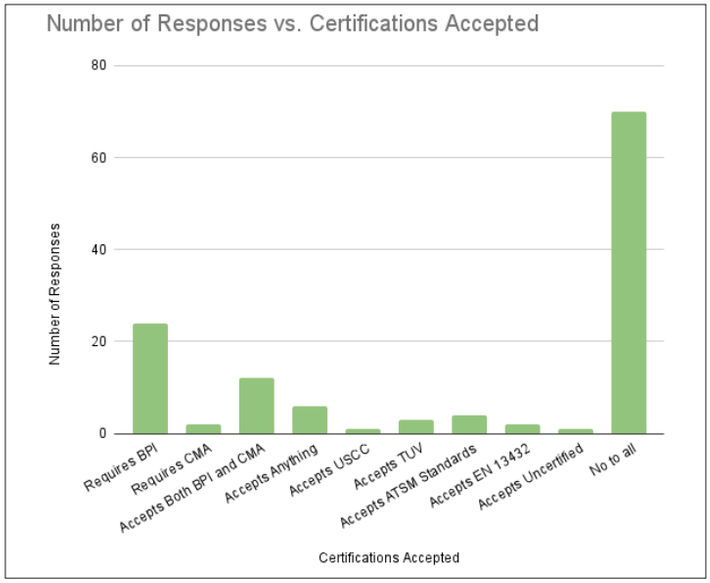


Figure 7. Frequency of Certifications Accepted

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Appendix

Data Summary:

The 2023 Throughput and Environmental Survey collected data from a diverse range of U.S. composting operations, building on the 2020 Throughput and Environmental Survey. Respondents provided information on feedstock types, intake and output tonnages, permitted capacity, certifications, and facility location.

Summary Statistics:

- Total Responses: 110 (2023), 104 (2020)
- Repeat Participants: 21%
- Average Intake: 59,833.32 tons
- Average Output: 18,392.67 tons
- Median Permitted Capacity: 17,000.00 tons
- States Represented: 33
- EPA Regions Covered: All 10

These figures represent self-reported data and may vary in completeness and precision depending on facility record-keeping and measurement practices.

Tools Used:

Analytical work was conducted using a combination of Google Sheets, Microsoft Excel, and Python to ensure flexibility in data management, calculation, and visualization.

Supplemental Notes:

- **Geographic Aggregation:** State-level and EPA region-level analyses were conducted using respondent provided location data.
- **Unit Conversions:** All volumes standardized to tons (1:0.25 ratio)
- **Response Weighting:** Unweighted facility-level means; outliers excluded. Because facility sizes vary greatly, averages reflect operational diversity but may overrepresent larger facilities' tonnages.
- **Data Limitations:** Voluntary participation may limit completeness and regional balance.

References

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- TÜV SÜD Certification. Compostable and Biodegradable Product Certification Services. https://www.tuvsud.com
- Compost moisture loss. The composting process UC Agriculture and Natural Resources. https://ucanr.edu/sites/default/files/2022-04/365893.pdf
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