Quantifying Existing Food Waste Composting Infrastructure In The U.S.

Task 3 Report submitted by:
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INTRODUCTION

BioCycle has led the Composting Collaborative's initiative to better quantify full-scale food waste composting infrastructure in the U.S. The original scope of Task 3 was a broader U.S. composting infrastructure assessment, with the intent of expanding the number of all types of composting facility listings in *BioCycle* FindAComposter.com. The decision to narrow the scope to full-scale facilities that compost food waste was made following discussions with U.S. EPA Region 4 about Task 3 at the US Composting Council's Conference in Atlanta (1/22/18 and 1/24/18), and during an in-person meeting at EPA Headquarters in mid-February.

BioCycle contracted with the Institute for Local Self-Reliance (ILSR) to collect data on full-scale food waste composting facilities in the U.S. under the Task 3 scope of work. Work began on Feb. 14, 2018 with a transfer of all relevant documents. *BioCycle* assisted with the outreach and verification process throughout the contract period with ILSR.

BioCycle's methodology to identify full-scale food waste composting facilities in the U.S. is described in the Methodology section of this report. Briefly, 300 full-scale food waste composting facilities were identified in winter/spring of 2018. These facilities received a questionnaire (in a Survey Monkey link) to complete. One question on the survey is if the facility gives *BioCycle* permission to list the facility in *BioCycle* FindAComposter.com, an online portal that is free to use and list, and available to the public. The majority of food waste composting facilities that completed the full-length survey gave *BioCycle* permission to list their facility or update their existing listing. That final step of Task 3 will be completed by the end of 2018.

DEFINITIONS AND METHODOLOGY

Definitions

BioCycle defines a full-scale facility as a municipal or commercial facility equipped to receive and process organic waste streams arriving by truckload volumes from generators and haulers on a year-round basis. This is in contrast to "captive" and "community" composting sites, which *BioCycle* defines as follows:

- *Captive*: Only compost organics from own facility; utilize compost onsite. No outside materials accepted.
- *Community*: Small-scale operation that enables community members to manage organic material on a neighborhood scale, e.g. at a community garden or urban farm. Accepts feedstocks, e.g., food scraps, from off-site. Seeks to keep organics in a closed loop (e.g., neighborhood), from source of feedstocks to use of compost.

These are the three categories of composting facilities *BioCycle* uses in its FindAComposter.com portal. The listing entry form questions are different for each category.

Methodology

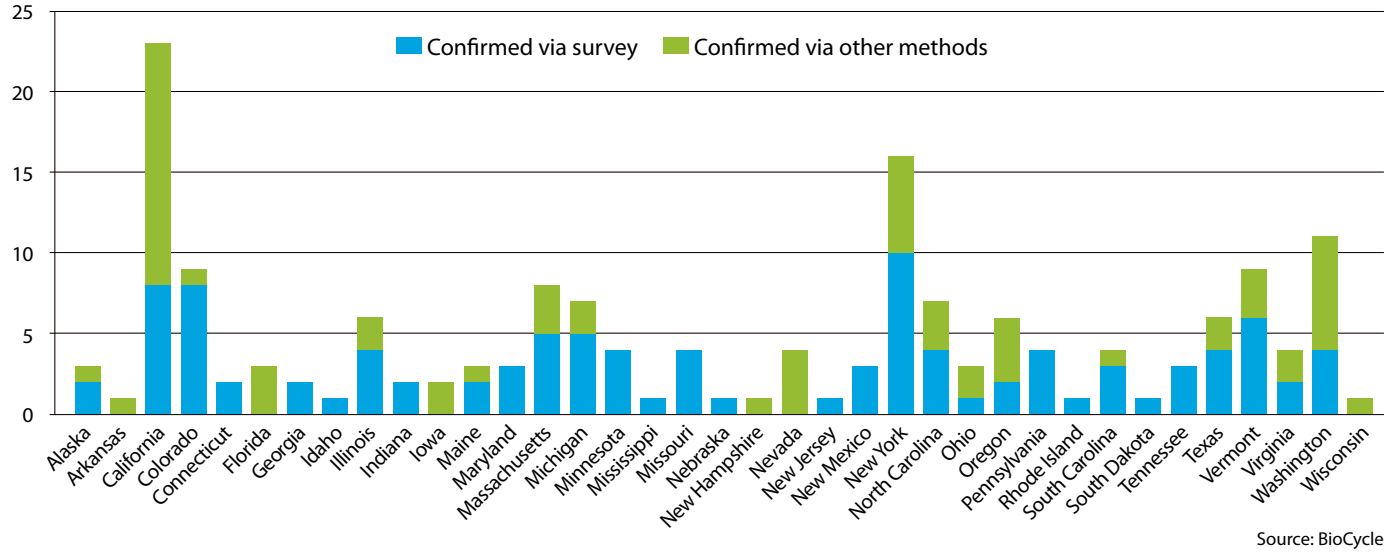
ILSR compiled a Master List of full-scale composting facilities in the U.S. using data from the following sources: the *BioCycle* FindAComposter.com portal; facilities identified during the *2017 BioCycle Food Waste Collection Access* study; *BioCycle* editorial archives; and USCC's directory of STA certified compost manufacturers that accept food waste.

Once the Master List was compiled, ILSR sent individual states spreadsheets of food waste composting facilities that *BioCycle*/ILSR identified in their states. State organics recycling officials were asked to edit the spreadsheet — add sites not on the list, delete sites that no longer accept food waste, and fill-in-the blanks of missing details. Twenty-three of the 36 states that received the spreadsheets for their states responded with updates. Updated information from states was utilized to update the Master List of full-scale food waste composting facilities in the U.S. The total number of food waste composting facilities captured in the final Master List was 300.

A questionnaire with 48 questions

Figure 1. Number of facilities/state

103 total survey responses, 82 confirmed via alternative methods



Source: BioCycle

was created utilizing the Survey Monkey tool. The link to the questionnaire was in an email that explained the *BioCycle* Task 3 project — updating *BioCycle's* database of food waste composting facilities in the U.S. It was noted that responses would only be reported to U.S. EPA in the aggregate, i.e., part of a total number for all tallied responses to the questionnaire.

The survey questionnaire was emailed to composting facilities on the final *BioCycle* Master List during the week of April 16, 2018; a small percentage of the emails came back as nondeliverable. *BioCycle* and ILSR verified that either the email used was incorrect, or the facility no longer was operating.

Second reminders and final reminders to complete the survey were sent to non-respondents (final reminder sent May 16-17). The updated Master Spreadsheet of full-scale food waste composting facilities in the U.S. was provided to *BioCycle* by its contractor, ILSR, in early June. About 90 facilities completed the survey at that point.

The final step was to reach out to all non-responding facilities with a "mini-survey" comprised of six questions, including types of food waste composted, composting method and estimated tons of food waste composted.

FINDINGS

The data in this Task 3 report is based on 103 responses. Eleven facilities started filling out the questionnaire, but never finished, even after reminders from ILSR. From the original Master List, ILSR/*BioCycle* confirmed that of the remainder on the list, 82 full-scale composting facilities are accepting food waste (categorized as "non-responders accepting food waste"). This includes the 11 facilities that started but did not complete the questionnaire. Additionally, about a dozen facilities on the Master List were determined to be no longer operational or no longer accepting food waste. Table 1 summarizes these totals.

Figures 1 through 8 summarize the responses to the following questions (note that responding full-scale food waste composting facilities were told that their responses would only be reported in the aggregate). Each figure indicates the total number of full-scale food waste composting facilities that responded to the question:

• Figure 1: *Number of full-scale facilities in the U.S. taking food waste — state-by-state summary.* Includes responses to *BioCycle* questionnaire and facilities confirmed via other methods.

• Figure 2: *State permit type*. The questionnaire listed the following categories as options to check: Solid waste facility permit; Source separated organics composting permit allowing food waste; Permit by rule or registration; Biosolids composting permit; On-farm composting exemption from permit; and Other. Types of permits described in the "other" category included biosolids composting, on-farm exemption, and then responses such as "Type IV."

• Figure 3: *Allowed feedstocks* — all organic waste streams including yard trimmings, food waste, food-soiled paper and compostable products that are allowed to be received under the facility's regulatory category. Allowed feedstocks at those facilities checking "other" include wood debris, livestock manure, seafood by-products, short paper fibers.

• Figure 4: *Accepted feedstocks* — all organic waste streams that the full-scale food waste composting facility

Table 1. Full-Scale food waste composting facilities in U.S. (Sept. 2018)

Final Tallies[1]	# Of Facilities
Starting Master List	300
Questionnaire responses	103
Non-responders confirmed as accepting food waste	82
Could not make a determination	19
Total confirmed U.S. full-scale composting facilities	185

[1]About a dozen facilities no longer operating and/or not taking food waste. Source: *BioCycle*

Figure 2. State permit type

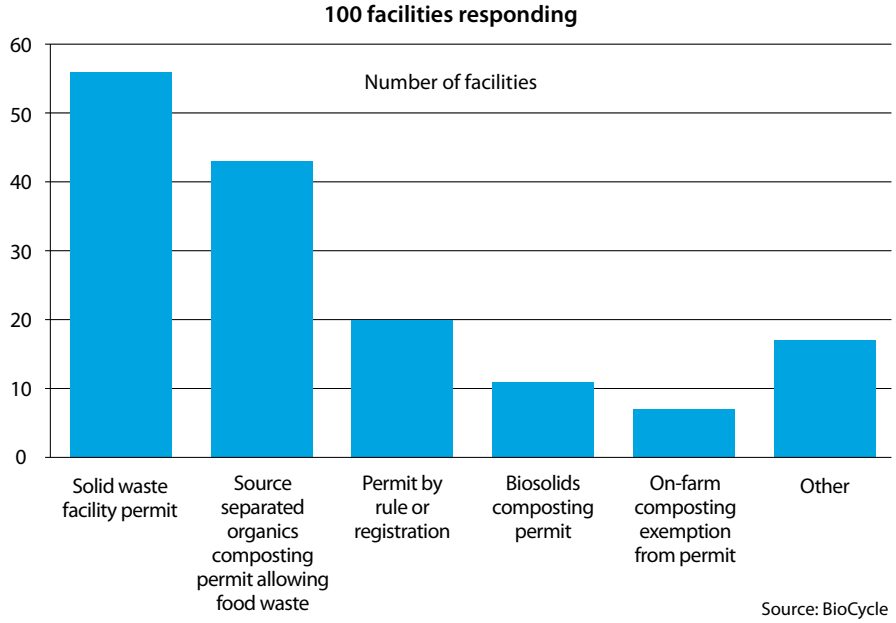
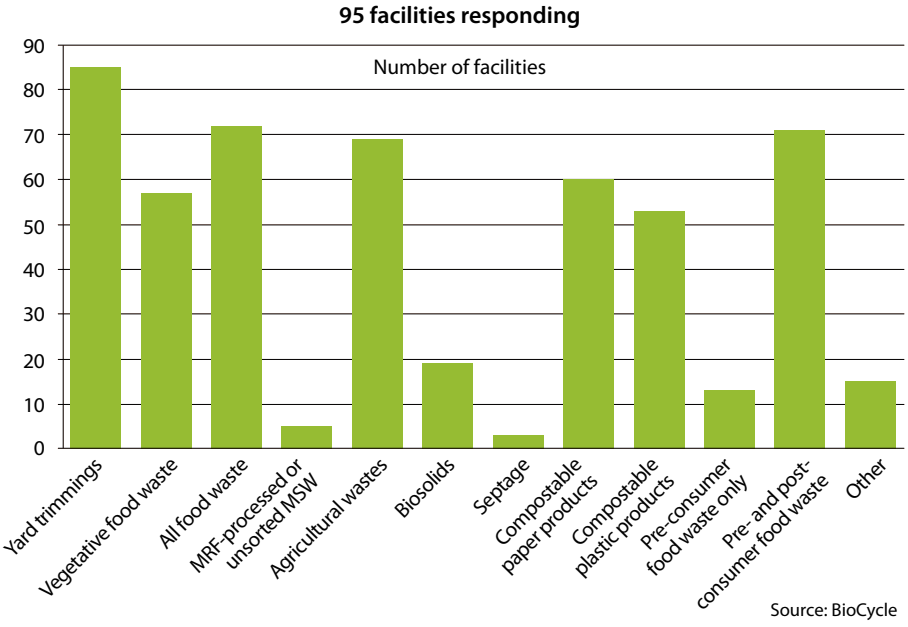


Figure 3. Feedstocks allowed to accept under permit type



is actually accepting and composting (versus what the facility is allowed to take under its regulatory category). Accepted feedstocks at those facilities checking "other" include fish processing waste, wood materials and landscaping debris, livestock manure, off-spec or expired beverages.

• Figure 5: *Ownership type*. Answer boxes included commercial (privately owned and operated), municipal/public agency, institution and nonprofit. Of the 94 facilities responding to this question, the majority of facilities (63%) are under commercial ownership.

• Figure 6: *Composting methods*. The questionnaire listed the following categories as options to check: Windrow, container or in-vessel, aerated static pile (ASP), covered ASP, aerated windrow, static pile, vermicomposting, and "other." Of the 101 facilities responding to this question, 64 utilize the windrow composting method. ASP (29) and static pile (21) were the next most common methods.

• Figure 7: *Total amount of feedstocks composted annually*. This question reflects all of the feedstocks the full-scale food waste composting facility receives, i.e., *not* exclusively food waste. The response options were given in ranges, as follows: less than 5,000 tons/year (tpy); 5,000 to 9,999 tpy; 10,000 to 24,999 tpy; 25,000 to 49,999 tpy; 50,000 to 99,999 tpy; and greater than 100,000 tpy. The conversion factor provided by *BioCycle* is 2 cubic yards/ton. As is evident in Figure 7 (94 facilities responding), the break out in facilities composting less than 100,000 tpy is not dramatically different between the tonnage ranges.

• Figure 8: *Total amount of food waste composted annually*. This question reflects only the quantity (tons) of food waste composted annually at the full-scale facilities (102 facilities responding). The response options were given in ranges, as follows: <5,000 tpy; 5,000 to 9,999 tpy; 10,000 to 24,999 tpy; 25,000 to 49,999 tpy; 50,000 to 99,999 tpy; and >100,000 tpy. The conversion factor provided by *BioCycle* is 2 cubic yards/ton. In contrast to the results shown in Figure 7, the vast majority of full-scale composting facilities in the U.S. responding to this question compost <5,000 tpy of food waste (60). Twenty-two compost between 5,000 and 9,999 tpy. No facilities reported composting >100,000 tpy of food waste (5 fall into the 50,000 to 99,999 tpy range).

DISCUSSION

BioCycle has been conducting nationwide surveys of food waste composting facilities in the U.S. since the mid 1990s. Ten years ago (2008), *BioCycle* did a national survey titled, "Food Composting Infrastructure," a 5-part series. [https://www.biocycle.net/2008/12/22/food-composting-infrastructure-5]. *BioCycle*'s 2008 data identified 267 food waste composting projects in the U.S. The 2008 statistics break out as follows: Colleges/universities — 93; Farms — 43; Commercial composters — 92; and Municipal — 39. Sorting the data by region, the West had the most projects (72), followed by New England (51) and Northeast/Mid-Atlantic (47). The Upper Midwest and the Central/Mountain regions each had 36. The Southeast had the fewest projects (25).

Fast forward to 2018. Task 3 identi-

Figure 4. Accepted feedstocks — all organic waste streams

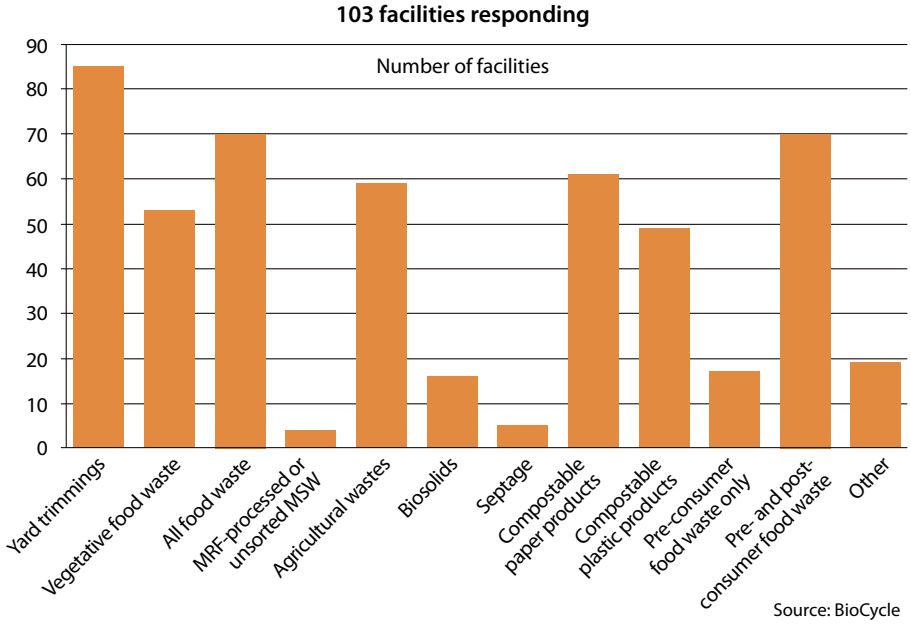
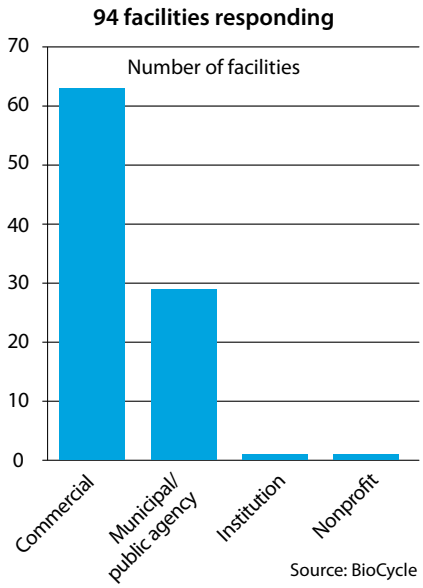


Figure 5. Food waste composting facility ownership type



fied a total of 185 full-scale food waste composting facilities in the U.S. Task 3 outreach did not include food waste composting at colleges and universities, correctional facilities, and other "captive composting" operations. Including only the tallies of the farm, commercial and municipal food waste composting operations from the 2008 *BioCycle* report, the total is 174. This is in comparison to *BioCycle's* Task 3 confirmed total of 185 full-scale food waste composting facilities in the U.S. in 2018.

One distinct difference is in the farm-based food waste composting category. Based on the responses to state permit type (Figure 2), only 7 of the 100 facilities responding to that question are in the "on-farm composting exemption from permit" category. A direct comparison of the farm-based facilities responding in 2008 vs. 2018 was not done for Task 3, but the difference is interesting to note.

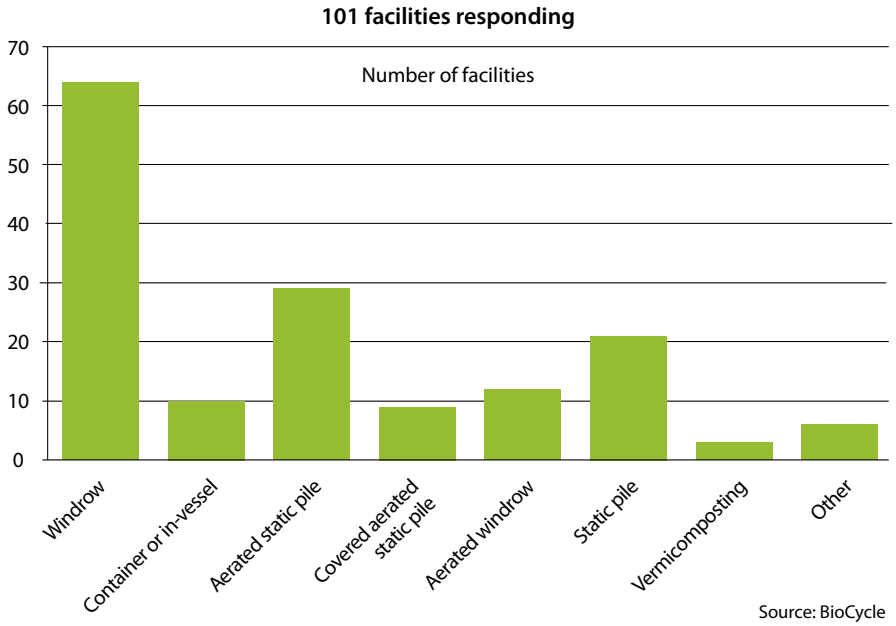
TRENDS

Based on the data presented in Figures 1-to-8, several trends stand out in terms of full-scale food waste composting infrastructure in the U.S. in 2018:

• The majority of responding facilities have either a solid waste facility permit or a source separated organics (SSO) composting permit allowing food waste (56 and 43, respectively, out of a total of 100 facilities responding to this question; Figure 2). These categories of facilities typically are under more stringent air and water quality requirements than those with permit-by-rule, registration, or exemption categories — and thus require a larger investment in infrastructure and labor. This is a positive trend, as typically facilities with solid waste or SSO permits allowed to accept food waste have more permanent infrastructure designed to manage food waste streams (e.g., versus yard trimmings only).

• Of the 95 facilities responding to feedstocks they are allowed to accept under their regulatory category (Figure 3), the majority are allowed to take all food waste streams (72), including pre- and post-consumer food waste (71). In addition, 60 facilities are allowed to accept Biodegradable Product Insti-

Figure 6. Composting methods utilized at full-scale food waste composting facilities



tute-(BPI) certified compostable paper products, and 53 can take BPI-certified compostable bioplastics products.

• In terms of feedstocks actually accepted (103 facilities reporting; Figure 4), the data tracks pretty similarly to feedstocks allowed. For example, 70 facilities take all food waste streams, including pre- and post-consumer food waste.

• As noted in Figure 8, 59% of the full-scale food waste composting facilities in the U.S. responding to the questionnaire compost less than 5,000 tons/year of food waste. Of the remaining facility responses, 22% are in the 5,000-9,999 tons/year range, 4% are in the 25,000-49,999 tons/year range, and 5% are in the 50,000-99,999 tpy range. Without tonnage range data from the non-responding facilities that *BioCycle* confirmed accept food waste, it is difficult to ascertain at this point a more complete estimate of tons of food waste composted in the U.S.

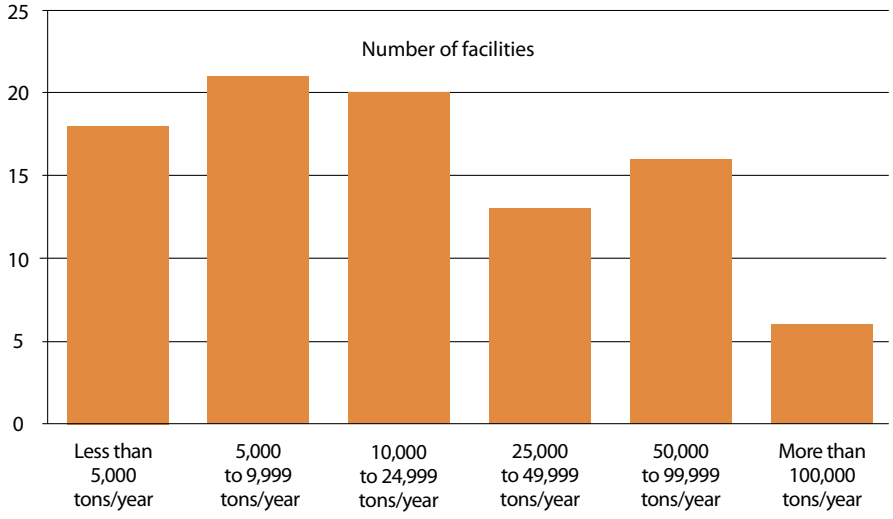
In conclusion, Task 3 illustrates the challenge of tracking food waste composting infrastructure in the U.S., especially with regard to specific details regarding tonnages of food waste received and composted. Identifying where the infrastructure is located is an excellent first step towards tracking more specific data.

However, as is discussed in *BioCycle's* Task 4 report, "State Food Waste Recycling Data Collection, Reporting Analysis," the difficulty in obtaining data can be attributed in part to states' difficulty in tracking food waste composting activity. In some states, officials can report the permitted annual capacity that a facility is allowed to accept, but do not have data on how much food waste was actually composted.

Another factor is that a significant number of the full-scale food waste composting facilities in the U.S. are privately owned and operated (Figure 5). Thus access to data related to actual tonnages composted and annual amount of compost produced can be somewhat limited. Recognizing that reality, *BioCycle* switched to asking for ranges of annual tons composted, versus a specific quantity. Responses have increased as a result. ■

Figure 7. Annual tonnage of all organic waste streams composted by quantity range

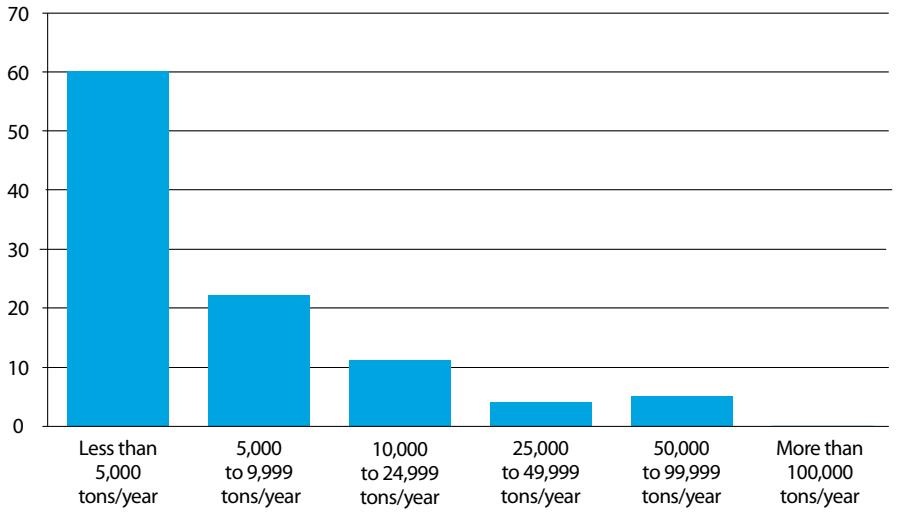
94 facilities responding, Conversion factor: 2 cubic yards/ton



Source: BioCycle

Figure 8. Annual tonnage of all food waste composted by quantity range

102 facilities responding, Conversion factor: 2 cubic yards/ton



Source: BioCycle