

14th ANNUAL NATIONWIDE SURVEY
OF SOLID WASTE MANAGEMENT IN THE UNITED STATES

THE STATE OF GARBAGE IN AMERICA

*A joint study with the
Earth Engineering Center of Columbia University*

IT IS GENERALLY agreed that there are two main sources of national data on how solid waste is managed in the United States. The first is *BioCycle*'s "State of Garbage in America" survey, started in 1989 and done annually since then, with the exception of 2002. The other is an annual survey that Franklin Associates conducts for the U.S. Environmental Protection Agency, known as "Municipal Solid Waste In The U.S.: Facts and Figures." State of Garbage In America has always collected tonnage data on municipal solid waste (MSW) generation, and asked states to estimate — by percent — the amounts recycled and composted, combusted, and landfilled. Conversely, Franklin Associates has always used economic and population data to estimate MSW generation on a per capita basis, and then extrapolated data to estimate tonnages recycled and composted, combusted and landfilled.

An article by Professor Nickolas Themelis of Columbia University's Earth Engineering Center in the January 2003 issue of *BioCycle*, "Analyzing Data In State of Garbage In America, EPA Reports," shed light on the differences in the data from these two approaches to tracking solid waste management in the U.S. Themelis used findings from *BioCycle*'s 2001 "State of Garbage In America" report (based on 2000 data and published in the December 2001 issue) and EPA's "Municipal Solid Waste in the United States: 2000 Facts and Figures" (also based on 2000 data) to do his comparison. The analysis highlighted where the significant differences lie. For example, *BioCycle* reported 409 million tons of MSW generated in 2000, while Franklin data reported 232 million tons. Similarly, *BioCycle* reported 131 million tons of MSW recycled while Franklin reported close to 70 million tons.

After some thought and discussion, it was decided that the best way to identify the reasons for the data differences — and to test data gathering alternatives — was to have *BioCycle* and the Earth Engineering Center collaborate on the 2003 State of Garbage In

Collaboration leads to new methodology for the 2003 survey. And the numbers are ... 26.7% of MSW recycled, 7.7% combusted in waste-to-energy plants and 65.6% landfilled.

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America report. The information in this article is the culmination of that collaboration, which was conducted by the authors of this report. The contributions of the state solid waste and recycling officials who provided the data for this survey (see sidebar) are most appreciated.

ORIGINAL METHODS

The fundamental approach to the 2003 State of Garbage In America survey was to request all data in actual tonnages. In previous surveys, *BioCycle* asked states to provide the annual tons of MSW generated and a percent breakdown of tons recycled, composted, combusted, and landfilled. The 2001 State of Garbage In America survey questionnaire did ask states to provide the actual tonnages used to generate the percentages, but few states supplied that data. The tonnages of MSW recycled, combusted and landfilled were calculated using the percentage breakdowns and MSW generation tons for each state. Those tonnages (based on weighted averages) were used to calculate the national rates for recycling, combustion and landfilling (see years 1988-2000 in Table 1 on page 33).

The old approach worked for several reasons: a) It was used every year, so the year-to-year data could be compared to show trends; b) The incineration and landfill data provided by the states (and used to tally generation and percents incinerated and landfilled) typically included fairly accurate tonnages because of permit requirements for landfills and combustion plants. Therefore, the balance they calculated and attributed to recycling was fairly consistent from year to year (about one-third to half the states also provided specific recycling tonnages, similar to those shown in this year's Table 10); and c) The tonnage-based approach — combined with information from the states on what categories of waste and recycled materials were included — allowed for some state-to-state comparisons.

The primary disadvantage of the "old" approach is that even though we requested data on *municipal solid waste* — i.e., only the residential and commercial/institutional streams — most states only had aggregate tons for *solid waste*, which may include construction and demolition debris, industrial waste, biosolids, etc. The same was true of

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the recycling percentages, e.g. some states include C&D debris recycled, which technically is not municipal solid waste. This reality made it difficult to get a statistically accurate reading as to how much municipal solid waste was being recycled, combusted or landfilled.

TONNAGE ONLY METHODOLOGY

To address that situation, we decided to move to a more objective, numbers-based analysis of solid waste management in the U.S. In the 2003 State of Garbage in America survey, therefore, all data was requested in actual tonnages. For instance, instead of asking states what percent of the total MSW generated was landfilled, the survey questionnaire asked for the tons landfilled in each category listed (e.g. residential, commercial, industrial, C&D, organics, tires, etc.). If a breakdown was not available, we asked for total tons landfilled. The same was done with recycling data: Instead of asking approximately what rate of recycling was being performed in a state, we requested specific tonnages recycled, broken down by categories, e.g., glass, metal, paper, etc.

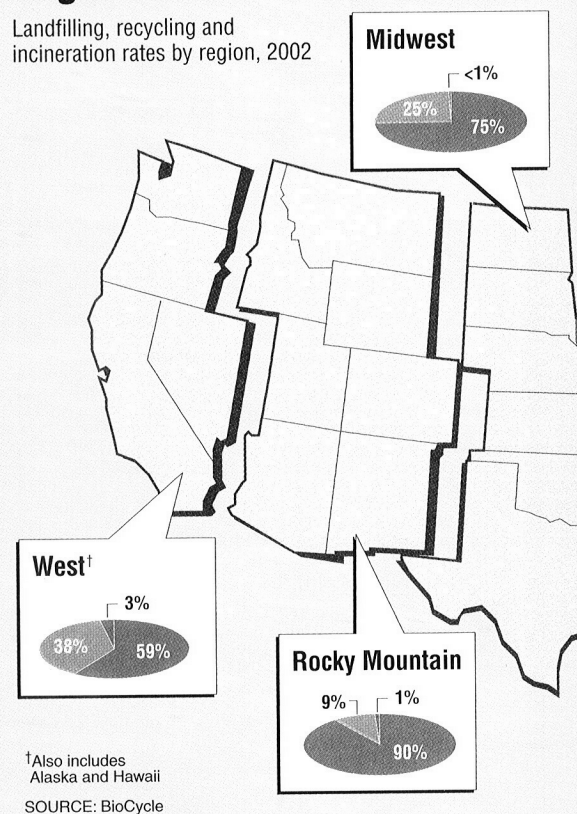
In order to maximize the opportunity for direct comparisons (state by state and nationally), the next step was to calculate only the MSW portions of total solid waste generated, recycled, combusted and landfilled. That was accomplished by only including MSW stream tonnages. With landfilling, for example, that included the residential and commercial waste streams, organics, tires and "other." Not included were C&D, industrial, agricultural and imported waste. Recyclables included tons reported for glass, steel, aluminum, other metals, paper, plastic, tires, organics, wood and "other." C&D materials were not included. The tons combusted in waste-to-energy (WTE) facilities made up the third component of the estimated MSW generated (tons/year).

A primary goal of the methodology was to start leveling the playing field so that when the rates for each state are compared, the same categories of materials in the MSW stream are included. In this way, we have approximated a "true" MSW recycling rate, with similar parameters in place for all states. With a few exceptions (see footnotes for Table 3), all percentages/rates reported in the 2003 State of Garbage survey are calculated from tonnage numbers that the states (or other sources, including state websites) provided. Obviously, the better the information reported by each individual state, the "truer" the results. But we can say with a fair bit of confidence that what follows in these pages is a generally accurate picture of the State of Garbage in America in 2003.

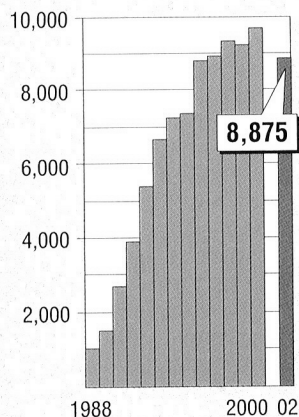
One final note on the methodology. The first question on the 2003 survey asked states to provide the total tons of nonhazardous solid waste generated in 2002 (or for the most recent year that data were available). This national total (483 million tons) is more statistically similar to the generation tonnages reported in earlier *BioCycle*

Regional Breakdown

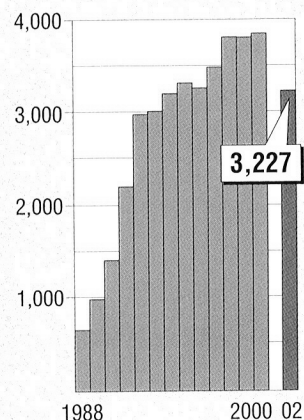
Landfilling, recycling and incineration rates by region, 2002



Curbside Programs



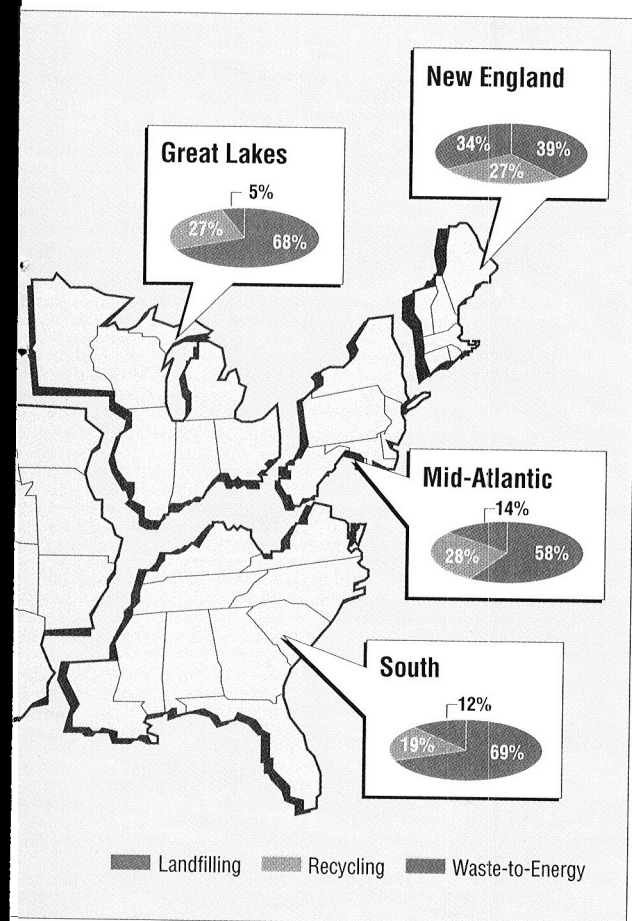
Yard Trimmings Facilities



State of Garbage In America surveys, starting with 1989 (see Table 1). As in past years, the 2003 questionnaire asked states to indicate all categories of waste included in that total solid waste generation number. Boxes to check off included residential, commercial, C&D, industrial, agricultural, imported waste, tires and other (states were asked to specify what was included in "other"). In a few cases, states only checked off categories that are in the definition of municipal solid waste used in the 2003 State of Garbage In America methodology. In those cases, the number reported for solid waste generation is the same as the one used for "estimated" MSW generation. There are a handful of states in Table 3 where the estimated MSW generated is greater than the reported solid waste generated tons. This is usually because these states did not include recycling tonnages in the nonhazardous solid waste tons generated. Table 2 has a state-by-state breakdown (where provided) of the waste stream categories included in the reported solid waste generation tons.

THE NATIONAL PICTURE

Where is the United States when it comes to solid waste management? Data in the 2003 State of Garbage report clearly indicate that we are a nation that continues to generate increasing volumes of solid waste — most of which are landfilled. In 2002, 483 million tons of solid waste were generated, based on data from 47 states. (Alabama, Alaska and Montana are not included in this total as no



information was provided from those states.) In 2000, 409 million tons of solid waste were generated. Over this two-year period, the U.S. population increased from 281 million to 288 million. On a per capita basis, this represents an increase from 1.46 tons in 2000 to 1.68 tons in 2002.

The more relevant number in the 2003 State of Garbage In America report is the estimated tons of municipal solid waste generated in the U.S. According to our calculations, the U.S. generated 369 million tons of MSW in 2002. That results in an average per capita generation of 1.31 tons/person in 2002 (see Table 3). Per capita rates calculated for individual states range from a low of 0.68 in South Dakota to a high of 1.73 tons in Kansas. Generally, it seems that more commercialized/industrialized states have higher per capita rates of MSW generation than those that are more agricultural. A more detailed data analysis to be published in the March issue of *BioCycle* will try to correlate per capita generation to the ratio of urban to rural population and tourism.

Of the 369 million tons of MSW generated in 2002, 98.7 million tons were recycled or composted, 28.5 million tons were combusted in waste-to-energy (WTE) plants, and 242 million tons were landfilled (see Table 4). That yields the following national rates — MSW Recycling: 26.7 percent; MSW to WTE: 7.7 percent; MSW Landfilled: 65.6 percent. For comparison, in the 2001 State of Garbage in America report, the national rates were 32 percent recycled, 7 percent

combusted and 61 percent landfilled.

Overall, because this is the first time an estimated MSW generation number has been calculated based on actual tonnages recycled, combusted and landfilled, there is not any historical data to compare with. For example, the 2001 State of Garbage in America survey reported that 61 percent, or 249 million tons of the 409 million tons of solid waste generated in 2000, were landfilled. In 2002, 65.7 percent, or 242 million tons, of MSW were landfilled. One could attempt to compare landfill tonnages for 2000 and 2002 by using that same 65.7 percent landfilled rate in 2002 and the total solid waste generation number of 483 million tons. That yields an amount of 317 million tons of nonhazardous solid waste landfilled in 2002 (or about a 74.5 million tons differential). It seems safe to assume that this number reflects hefty tonnages of industrial and C&D waste streams.

Comparing states' recycling, combustion, and landfilling rates between the 2001 and 2003 State of Garbage in America surveys yields the following information:

Recycled: Using the recycling rates calculated for the 47 states that provided data, the 2003 State of Garbage in America survey found that 28 states had a decrease in their recycling rate from the 2001 survey, 12 states had an increase, and four stayed the same; three states did not report recycling rates in the 2001 survey.

Combusted: In terms of WTE/incineration rates (the 2001 survey did not specifically ask for waste-to-energy data, thus some states may have included data on incinerators as well as WTE plants), 16 states had a decrease in the combustion rate, 11 had an increase, four stayed the same and three states did not report WTE data in 2001. In addition, 13 of the 47 states do not have any WTE plants.

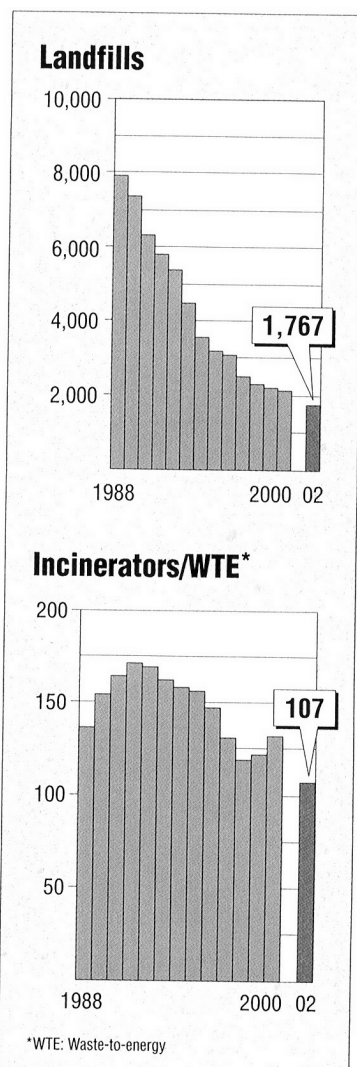


Table 1. State of Garbage in America survey data 1989–2002: Reported generation and estimated MSW generated, and rates of MSW recycling, incineration/waste-to-energy and landfilling¹

| Year Of Data | Reported Generation (tons/yr) ² | Estimated ³ MSW Generated (tons/yr) | MSW Recycled (%) | MSW Incineration/ ⁴ Waste-To-Energy (%) | MSW Landfilled (%) |
|--------------|--|--|------------------|--|--------------------|
| 1989 | 269,000,000 | — | 8 | 8 | 84 |
| 1990 | 293,613,000 | — | 11.5 | 11.5 | 77 |
| 1991 | 280,675,000 | — | 14 | 10 | 76 |
| 1992 | 291,742,000 | — | 17 | 11 | 72 |
| 1993 | 306,866,000 | — | 19 | 10 | 71 |
| 1994 | 322,879,000 | — | 23 | 10 | 67 |
| 1995 | 326,709,000 | — | 27 | 10 | 63 |
| 1996 | 327,460,000 | — | 28 | 10 | 62 |
| 1997 | 340,466,000 | — | 30 | 9 | 61 |
| 1998 | 374,631,000 | — | 31.5 | 7.5 | 61 |
| 1999 | 382,594,000 | — | 33 | 7 | 60 |
| 2000 | 409,029,000 | — | 32 | 7 | 61 |
| 2002 | 482,770,983 | 369,381,411 | 26.7 | 7.7 | 65.6 |

¹Alabama, Alaska, and Montana did not report for this survey. The combined population of these three states is 6,039,747 (or two percent of total US population); ²Data for 1989–2000 was provided to *BioCycle* as "MSW generation." Data for 2002 was provided as solid waste generation; ³MSW generated is computed from reported tonnages of: [Landfill + Exported Landfill + WTE + Exported WTE + MSW Recycled] - [C&D Landfill + Industrial Landfill + Imported Landfill + Imported WTE]; ⁴The 2003 "State Of Garbage In America" survey only collected data on waste-to-energy combustion. Previous surveys (1990–2000) asked more generally about "incineration."

According to our calculations, the U.S. generated 369 million tons of MSW in 2002. That results in an average per capita generation of 1.31 tons/person.

Landfilled: Based on the landfilling rates calculated for the 47 states providing data, 30 states had an increase in MSW landfilled, 14 had a decrease, and three did not have a rate reported in the 2001 report.

The breakdown on a regional basis (see map on pages 32-33 to identify states in each region) is as follows. The percentage rates from the 2001 State of Garbage report are in parentheses and are in the order of recycled, WTE/incineration, landfilled:

-New England: Recycled-27%; WTE-34%; Landfilled-39% (33%-36%-31%)

-Mid-Atlantic: Recycled-28%; WTE-14%; Landfilled-58% (39%-15%-46%)

-South: Recycled-19%; WTE-12%; Landfilled-69% (27%-8%-65%)

-Great Lakes: Recycled-27%; WTE-5%; Landfilled-68% (27%-5%-68%)

-Midwest: Recycled-25%; WTE-<1%; Landfilled-75% (32%-1%-67%)

-Rocky Mountain: Recycled-9%; WTE-1%; Landfilled-90% (11%-1%-88%)

-West: Recycled 38%; WTE-3%; Landfilled-59% (39%-3%-58%)

Finally, in terms of the big picture, significant tonnages of solid waste are crossing state borders, a trend that began a number of years ago as thousands of landfills closed across the country and super-sized landfills

Table 2. Tons of solid waste (nonhazardous) generated by state and waste stream categories included (2002 data unless noted)

| State | Reported Solid Waste Generated (tons/yr) | Waste Stream Categories | | | | | Imported | |
|----------------------------|--|-------------------------|------------|-----|------------|--------------|----------|-------|
| | | Residential | Commercial | C&D | Industrial | Agricultural | Waste | Tires |
| Arizona | 4,962,000 | x | x | | | | | x |
| Arkansas | 4,061,128 | x | x | | x | | | x |
| California | 72,000,000 | x | x | x | x | x | x | x |
| Colorado | 7,673,778 | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| Connecticut | 3,474,981 | x | x | | x | | | |
| Delaware | 2,747,205 | x | x | x | x | | | x |
| Florida ² | 25,726,175 | x | x | x | x | | | x |
| Georgia | 12,302,534 | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| Hawaii | 1,275,913 | x | x | x | x | | | |
| Idaho | 1,090,000 | x | x | x | | | | |
| Illinois | 15,428,491 | x | x | x | | | | |
| Indiana | 16,228,824 | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| Iowa | 3,828,808 | x | x | x | x | x | x | |
| Kansas | 7,846,080 | x | x | x | x | | x | x |
| Kentucky | 6,529,846 | x | x | | | | x | |
| Louisiana | 3,272,331 | x | x | | | | | |
| Maine ³ | 1,844,059 | x | x | x | | | | x |
| Maryland | 10,678,596 | x | x | x | x | | | x |
| Massachusetts ³ | 12,779,688 | x | x | x | | | x | |
| Michigan | 19,041,775 | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| Minnesota | 5,881,543 | x | x | | | | | |
| Mississippi | 3,909,508 | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| Missouri | 10,935,989 | x | x | x | x | x | | |
| Nebraska ³ | 2,395,101 | x | x | | x | | x | |
| Nevada | 5,313,203 | x | x | x | x | | | x |
| New Hampshire | 1,327,598 | x | x | | x | | | |
| New Jersey ³ | 18,865,390 | x | x | x | x | x | | x |
| New Mexico | 2,968,729 | x | x | x | x | | | x |
| New York ⁴ | 24,775,000 | x | x | x | x | | x | x |
| North Carolina | 13,500,000 | x | x | x | x | | | x |
| North Dakota | 4,270,000 | x | x | | x | | | x |
| Ohio ⁵ | 32,184,841 | x | x | x | x | x | | x |
| Oklahoma | 4,489,028 | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| Oregon | 4,772,536 | x | x | x | | | | x |
| Pennsylvania | 10,881,798 | x | x | | | | | |
| Rhode Island | 1,497,240 | x | x | x | x | x | | x |
| South Carolina | 11,464,547 | x | x | x | x | | | x |
| South Dakota | 688,000 | x | x | x | x | | x | |
| Tennessee | 9,852,194 | x | x | x | x | x | x | x |
| Texas | 45,300,000 | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| Utah | 3,949,096 | x | x | x | x | x | | |
| Vermont ⁵ | 700,000 | x | x | x | x | | x | |
| Virginia | 17,499,022 | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| Washington ^{5,6} | 10,470,805 | x | x | x | x | x | | x |
| West Virginia | 1,963,791 | x | x | x | x | | x | x |
| Wisconsin | 13,542,140 | x | x | x | x | | | x |
| Wyoming | 682,000 | x | | | | | | |
| Total | 482,770,983 | | | | | | | |

¹The following states did not report a solid waste (nonhazardous) generation amount: Alabama, Alaska and Montana; ²2000 data; ³2001 data; ⁴1999 and 2002 data; ⁵Includes wastewater treatment plant biosolids; ⁶Includes petroleum contaminated soil and biosolids.

Table 3. Reported solid waste generated, estimated MSW generated, estimated MSW generated per capita, and percents of MSW recycled, combusted via waste-to-energy (WTE) and landfilled (2002 data unless noted)

| State | Population (2002) | Reported Solid Waste Generated (tons/yr) | Estimated ² MSW Generated (tons/yr) | Estimated MSW Generated Per Capita ³ (tons/person) | MSW Recycled (%) | MSW To Waste-To-Energy (%) | MSW Landfilled (%) |
|----------------------------|--------------------|--|--|---|------------------|----------------------------|--------------------|
| Alabama | 4,486,508 | n/a | n/a | n/a | n/a | n/a | n/a |
| Alaska | 643,786 | n/a | n/a | n/a | n/a | n/a | n/a |
| Arizona | 5,456,453 | 4,962,000 | 6,012,359 | 1.10 | 17.5 | 0 | 82.5 |
| Arkansas | 2,710,079 | 4,061,128 | 3,838,217 | 1.42 | 36.3 | 1.5 | 62.3 |
| California ⁴ | 35,116,033 | 72,000,000 | 54,429,851 | 1.55 | 40.2 | 1.6 | 58.1 |
| Colorado | 4,506,542 | 7,673,778 | 5,051,132 | 1.12 | 2.8 | 0 | 97.2 |
| Connecticut | 3,460,503 | 3,474,981 | 4,734,132 | 1.37 | 18.8 | 45 | 36.2 |
| Delaware | 807,385 | 2,747,205 | 1,069,042 | 1.32 | 20.4 | 0 | 79.6 |
| Florida ⁵ | 16,713,149 | 25,726,175 | 19,706,584 | 1.18 | 24 | 28.2 | 47.8 |
| Georgia ⁶ | 8,560,310 | 12,302,534 | 11,214,006 | 1.31 | 8.3 | 0.5 | 91.3 |
| Hawaii | 1,244,898 | 1,275,913 | 1,706,018 | 1.37 | 25.2 | 24.4 | 50.4 |
| Idaho ⁷ | 1,341,131 | 1,090,000 | 1,090,000 | 0.81 | 8.4 | 0 | 91.6 |
| Illinois | 12,600,620 | 15,428,491 | 15,951,037 | 1.27 | 32.5 | 0 | 67.5 |
| Indiana ⁸ | 6,159,068 | 16,228,824 | 9,542,378 | 1.55 | 35 | 7 | 58 |
| Iowa | 2,936,760 | 3,828,808 | 3,416,268 | 1.16 | 41.7 | 1 | 57.3 |
| Kansas | 2,715,884 | 7,846,080 | 4,698,338 | 1.73 | 11.5 | 0 | 88.5 |
| Kentucky | 4,092,891 | 6,529,846 | 5,465,608 | 1.34 | 11.4 | 0 | 88.5 |
| Louisiana | 4,482,646 | 3,272,331 | 4,952,900 | 1.10 | 8.1 | 0 | 91.9 |
| Maine ⁹ | 1,294,464 | 1,844,059 | 1,327,164 | 1.03 | 49 | 33.8 | 17.2 |
| Maryland | 5,458,137 | 11,172,882 | 8,904,464 | 1.63 | 29.2 | 16 | 54.8 |
| Massachusetts ⁹ | 6,427,801 | 12,779,688 | 8,307,387 | 1.29 | 31.1 | 37.6 | 31.3 |
| Michigan | 10,050,446 | 19,041,775 | 16,916,076 | 1.68 | 15.1 | 7 | 77.9 |
| Minnesota | 5,019,720 | 5,881,543 | 5,043,752 | 1.00 | 45.6 | 25.1 | 29.3 |
| Mississippi | 2,871,782 | 3,909,508 | 2,918,407 | 1.02 | 0.3 | 0 | 99.7 |
| Missouri | 5,672,579 | 10,935,989 | 7,256,744 | 1.28 | 38.9 | 0.3 | 60.8 |
| Montana | 909,453 | n/a | n/a | n/a | n/a | n/a | n/a |
| Nebraska ⁹ | 1,729,180 | 2,395,101 | 2,395,100 | 1.39 | 15.4 | 0 | 84.6 |
| Nevada | 2,173,491 | 5,313,203 | 3,365,570 | 1.55 | 15.8 | 0 | 84.2 |
| New Hampshire | 1,275,056 | 1,327,598 | 1,214,777 | 0.95 | 23.7 | 17 | 59.4 |
| New Jersey ⁹ | 8,590,300 | 18,865,390 | 10,606,326 | 1.23 | 37.9 | 9.1 | 53.1 |
| New Mexico | 1,855,059 | 2,968,729 | 2,095,052 | 1.13 | 6.5 | 0 | 93.5 |
| New York ¹⁰ | 19,157,532 | 24,784,000 | 24,775,000 | 1.29 | 29.8 | 17.1 | 53.1 |
| North Carolina | 8,320,146 | 13,500,000 | 8,981,349 | 1.08 | 11 | 1.3 | 87.6 |
| North Dakota | 634,110 | 4,270,000 | 638,804 | 1.01 | 9.4 | 0 | 90.6 |
| Ohio ¹¹ | 11,421,267 | 13,748,996 | 16,211,198 | 1.42 | 23.5 | 0 | 76.5 |
| Oklahoma | 3,493,714 | 4,489,028 | 4,489,028 | 1.28 | 1 | 0 | 99 |
| Oregon | 3,521,515 | 4,772,536 | 4,074,945 | 1.16 | 48.8 | 4.9 | 46.3 |
| Pennsylvania | 12,335,091 | 10,881,798 | 12,675,854 | 1.03 | 26.8 | 16.5 | 56.7 |
| Rhode Island | 1,069,725 | 1,497,240 | 1,248,745 | 1.17 | 12.8 | 0 | 87.2 |
| South Carolina | 4,107,183 | 11,464,547 | 5,973,059 | 1.45 | 28.4 | 3.9 | 67.7 |
| South Dakota | 761,063 | 688,000 | 518,493 | 0.68 | 3 | 0 | 97 |
| Tennessee | 5,797,289 | 9,852,194 | 7,365,920 | 1.27 | 26.4 | 2 | 71.6 |
| Texas ¹² | 21,779,893 | 45,300,000 | 28,531,660 | 1.31 | 24.9 | 0 | 75.1 |
| Utah | 2,316,256 | 3,949,096 | 2,471,404 | 1.07 | 4.8 | 4.9 | 90.4 |
| Vermont | 616,592 | 700,000 | 611,617 | 0.99 | 29.8 | 9.2 | 60.9 |
| Virginia | 7,293,542 | 21,331,253 | 10,877,723 | 1.49 | 29.1 | 19.8 | 51.2 |
| Washington ⁹ | 6,068,996 | 10,470,805 | 8,666,755 | 1.43 | 34.1 | 5.6 | 60.2 |
| West Virginia | 1,801,873 | 1,963,791 | 1,754,523 | 0.97 | 6.9 | 0 | 93.1 |
| Wisconsin | 5,441,196 | 13,542,140 | 5,592,862 | 1.03 | 24.6 | 3.4 | 72 |
| Wyoming | 498,703 | 682,000 | 693,783 | 1.39 | 1.7 | 0 | 98.3 |
| Totals | 287,797,800 | 482,770,983 | 369,381,411 | 1.31 | 26.7 | 7.7 | 65.6 |

¹Alabama, Alaska and Montana did not report any data for the 2003 "State of Garbage in America" survey; ²Unless otherwise noted, MSW generated is computed from reported tonnages of: [Landfill + Exported Landfill + WTE + Exported WTE + MSW Recycled] - [C&D Landfill + Industrial Landfill + Imported Landfill + Imported WTE]; ³U.S. per capita generation excludes Alabama, Alaska and Montana; ⁴MSW generation calculated using state population multiplied by 1.55 tons per capita (Nevada's per capita generation rate, chosen because highest rate in neighboring state). State provided tons landfilled and combusted via WTE; ⁵2000 data; ⁶MSW generation calculated using state population multiplied by 1.31 tons per capita (national rate). State provided tons landfilled and combusted via WTE; ⁷State reported MSW generation and no WTE facilities. 2002 landfill tonnage provided by Chartwell Information (www.wasteinfo.com); ⁸MSW generation assumed to be equal to reported tons landfilled + recycled, at same recycling rate as in 2000 (35%); ⁹2001 data; ¹⁰Detailed data for the state provided in New York State Assembly Report, "Where Will the Garbage Go?", 2002; ¹¹Tons of industrial wastes (10,502,763) were subtracted from reported total tons recycled; ¹²MSW generation calculated using state population multiplied by 1.31 tons per capita (national rate). State provided tons landfilled and there are no WTE plants.

The 5.3 percentage points decrease in the national recycling rate between the 2000 and 2002 surveys can be attributed in part to the different approach to calculating the national rates in the 2003 State of Garbage in America report.

opened in some states. As in 2000, Pennsylvania leads in the MSW importing category, receiving 10 million tons of solid waste in 2002 (the bulk of which was landfilled). Illinois is second with 5.8 million tons and Virginia is third with 4.5 million tons imported. Michigan is fourth with 3.8 million tons imported. As with Pennsylvania, almost all imported waste is landfilled in these four states.

Table 4. Estimated MSW tonnage generated and MSW tons recycled, combusted via waste-to-energy (WTE) and landfilled (by state, 2002 data unless noted)

| State | Estimated ¹ MSW Generated (tons/yr) | MSW Recycled (tons/yr) | MSW To WTE (tons/yr) | MSW Landfilled (tons/yr) |
|----------------------------|--|------------------------------|----------------------------|--------------------------------|
| Arizona | 6,012,359 | 1,050,359 | 0 | 4,962,000 |
| Arkansas | 3,838,217 | 1,391,978 | 56,048 | 2,390,191 |
| California ² | 54,429,851 | 21,902,181 | 887,270 | 31,640,400 |
| Colorado | 5,051,132 | 142,352 | 0 | 4,908,779 |
| Connecticut | 4,734,132 | 888,207 | 2,130,125 | 1,715,800 |
| Delaware | 1,069,042 | 217,842 | 0 | 851,200 |
| Florida ³ | 19,706,584 | 4,721,972 | 5,563,565 | 9,421,047 |
| Georgia ⁴ | 11,214,006 | 928,678 | 51,707 | 10,233,621 |
| Hawaii | 1,706,018 | 430,106 | 416,668 | 859,244 |
| Idaho ⁵ | 1,090,000 | 92,000 | 0 | 998,000 |
| Illinois | 15,951,037 | 5,191,388 | 0 | 10,759,649 |
| Indiana ⁶ | 9,542,378 | 3,339,832 | 647,546 | 5,555,000 |
| Iowa | 3,416,268 | 1,425,624 | 34,407 | 1,956,237 |
| Kansas | 4,698,338 | 539,887 | 0 | 4,158,451 |
| Kentucky | 5,465,608 | 625,083 | 2,250 | 4,838,275 |
| Louisiana | 4,952,900 | 402,200 | 0 | 4,550,700 |
| Maine ⁷ | 1,327,164 | 650,037 | 448,368 | 228,759 |
| Maryland | 8,904,464 | 2,599,675 | 1,425,915 | 4,878,874 |
| Massachusetts ⁷ | 8,307,387 | 2,583,736 | 3,127,582 | 2,596,069 |
| Michigan | 16,916,076 | 2,550,246 | 1,183,382 | 13,182,448 |
| Minnesota | 5,043,752 | 2,301,455 | 1,265,563 | 1,476,734 |
| Mississippi | 2,918,407 | 10,000 | 0 | 2,908,407 |
| Missouri | 7,256,744 | 2,823,100 | 20,350 | 4,413,294 |
| Nebraska ⁷ | 2,395,100 | 368,867 | 0 | 2,026,233 |
| Nevada | 3,365,570 | 531,804 | 0 | 2,833,766 |
| New Hampshire | 1,214,777 | 287,612 | 206,143 | 721,022 |
| New Jersey | 10,606,326 | 4,014,960 | 961,508 | 5,629,858 |
| New Mexico | 2,095,052 | 135,496 | 0 | 1,959,556 |
| New York | 24,775,000 | 7,384,000 | 4,247,600 | 13,143,400 |
| North Carolina | 8,981,349 | 992,009 | 120,751 | 7,868,589 |
| North Dakota | 638,804 | 60,000 | 0 | 578,804 |
| Ohio ⁷ | 16,211,198 | 3,808,058 | 0 | 12,403,140 |
| Oklahoma | 4,489,028 | 44,667 | 0 | 4,444,361 |
| Oregon | 4,074,945 | 1,987,246 | 201,161 | 1,886,538 |
| Pennsylvania | 12,675,854 | 3,399,002 | 2,094,778 | 7,182,074 |
| Rhode Island | 1,248,745 | 159,863 | 0 | 1,088,882 |
| South Carolina | 5,973,059 | 1,697,706 | 231,357 | 4,043,996 |
| South Dakota | 518,493 | 15,493 | 0 | 503,000 |
| Tennessee | 7,365,920 | 1,942,512 | 150,343 | 5,273,065 |
| Texas ⁸ | 28,531,660 | 7,106,747 | 0 | 21,424,913 |
| Utah | 2,471,404 | 117,686 | 120,146 | 2,233,572 |
| Vermont | 611,617 | 182,562 | 56,320 | 372,735 |
| Virginia | 10,877,723 | 3,160,931 | 2,151,778 | 5,565,011 |
| Washington ⁷ | 8,666,755 | 2,959,534 | 489,180 | 5,218,041 |
| West Virginia | 1,754,523 | 120,276 | 0 | 1,634,247 |
| Wisconsin | 5,592,862 | 1,378,470 | 187,824 | 4,026,568 |
| Wyoming | 693,783 | 11,783 | 0 | 682,000 |
| Totals | 369,381,411 | 98,675,222 | 28,479,635 | 242,226,551 |

¹Unless otherwise noted, MSW generated is computed from reported tonnages of: [Landfill + Exported Landfill + WTE + Exported WTE + MSW Recycled] - [C&D Landfill + Industrial Landfill + Imported Landfill + Imported WTE]; ²In absence of information on C&D and other non-MSW materials, the MSW generation was assumed to be 1.55 tons per capita (same as Nevada, which is in the same region); ³2000 data; ⁴MSW generation calculated using state population multiplied by 1.31 tons per capita (national rate). State provided tons landfilled and combusted via WTE; ⁵State reported MSW generation and no WTE facilities. 2002 landfill tonnage provided by Chartwell Information (www.wasteinfo.com); ⁶MSW generation assumed to be equal to reported tons landfilled+recycled, at same recycling rate as in 2000 (35%); ⁷2001 data; ⁸MSW generation calculated using state population multiplied by 1.31 tons per capita (national rate). State provided tons landfilled and there are no WTE plants.

On the export side, New York is the highest with 5.4 million tons exported in 2002 (slightly down from the 5.6 million tons exported in 2000, when New York also was the leader in this category). New Jersey is in second place, with 3.5 million tons. Third and fourth places are a close tie between Missouri (1,993,136 tons) and Maryland (1,943,124 tons). Fifth place goes to Massachusetts, with 1.7 million tons. Washington is the only other state exporting over a million tons of solid waste (1,146,331 tons). In all cases, most of the tonnages exported were landfilled in the receiving states.

THE RECYCLING SCENE

The recycling numbers in this report include organic materials composted. The 5.3 percentage points decrease (from 32% to 26.7%) in the national recycling rate, between the 2000 and 2002 surveys, can be attributed in part to the different approach to calculating the national rates in the 2003 State of Garbage in America report (i.e., using actual tonnage data versus estimated percentages). California is a case in point. The state reported that its diversion rate (i.e., materials that were not combusted or landfilled) in 2002 was 48 percent of total solid waste generated (72 million tons). This corresponds to about 35 million tons diverted. However, when we divided the 72 million tons of solid wastes by the population of California, the per capita generation was 2.05 tons, considerably higher than any other state. This indicated to us that the 72 million tons included non-MSW materials, such as C&D and industrial wastes.

Given the lack of adequate information on MSW generation in California, we assumed that the per capita generation in California was the same as in the neighboring state of Nevada (1.55 tons/person). This number is 0.24 tons higher than the U.S. average of 1.31 tons/person. At that rate, the 2002 MSW generation in California was estimated at 54.4 million tons. Then, by subtracting from 54.4 million the known tonnages of MSW combusted and landfilled, we arrived at about 22 million tons of MSW recycled. In the following months we will examine the validity of this estimate, by determining the actual tonnages of the recycled streams in California — organics composted, and wood, paper, plastic, metal, and glass recycled.

As shown in Table 3, Maine and Oregon had the highest estimated recycling rates in the U.S. (49 percent and 48.8 percent, respectively), followed by Minnesota (45.6 percent), Iowa (41.7 percent) and California (40.2 percent). In the case of Maine and Oregon, the estimated rates increased significantly since the 2000 survey (by 9% and 9.8%, respectively).

Because of the differentiation between MSW and total solid wastes generation in the 2002 survey, some states had decreases greater than 10 percent, including Delaware (59% to 20.4%), Louisiana (17% to 8.1%), Mississippi (16% to 0.3%), New York (42% to 29.8%), Rhode Island (24% to 12.8%), West

Virginia (25% to 6.9%) and Wisconsin (36% to 24.6%). It is most likely that the primary explanation for the decrease has to do with the new methodology employed this year.

Table 5 highlights the contribution of organics to the overall recycling rate. Thirty-five of the 47 states reporting had tonnage data for recycled organics (including yard trimmings and food residuals) and/or wood (non-C&D). (Note that tonnages of C&D recycled, where provided by states, is reported in Table 10.) The last column of Table 5 calculates the percentage that organics and wood represent in the MSW recycling rate. Based on data from those 35 states, organics and wood contributed an average of 28 percent of all materials recycled.

CURBSIDE COLLECTION PROGRAMS

Since the State of Garbage In America survey began in 1989, *BioCycle* has tracked the number of residential curbside collection programs in the U.S. In 1988, there were 1,042 curbside collection programs. That number quickly doubled within two years, and grew rapidly thereafter. A total of 9,709 programs

were reported in the 2001 survey.

According to our data, the number of curbside collection programs in the U.S. dropped between 2000 and 2002 to 8,875 (Table 6). This is the second time a decrease has been reported. There is no way to assess whether there actually are fewer programs or if states have refined their data collection capabilities from reporting jurisdictions. Comparing data

Table 5. Organics and wood recycled (tons/year); Contribution to state MSW recycling rate (2002 data unless noted)

| State | Organics ¹ (tons) | Wood (tons) | Total MSW Recycled (tons) | MSW Recycling Rate (%) | Organics/Wood Contribution To Recycling ² (%) |
|----------------|---------------------------------|----------------|---------------------------------|------------------------------|---|
| Arizona | 316,124 | 44,530 | 1,050,359 | 17.5 | 34 |
| Arkansas | — | 145,106 | 1,391,978 | 36.3 | 10 |
| Colorado | 15,871 | 36,530 | 142,352 | 2.8 | 37 |
| Connecticut | 235,816 | — | 888,207 | 18.8 | 27 |
| Delaware | 32,360 | — | 217,842 | 20.4 | 15 |
| Florida | — | 1,471,782 | 4,721,972 | 24 | 31 |
| Hawaii | 79,401 | — | 430,106 | 25.2 | 18 |
| Indiana | 424,053 | — | 3,339,832 | 35 | 13 |
| Iowa | 294,978 | 103,194 | 1,425,624 | 41.7 | 28 |
| Kansas | 154,100 | — | 539,887 | 11.5 | 29 |
| Kentucky | 16,645 | — | 625,083 | 11.4 | 3 |
| Louisiana | 83,444 | — | 402,200 | 8.1 | 21 |
| Maine | 50,084 | 40,443 | 650,037 | 49 | 14 |
| Maryland | 645,230 | 122,101 | 2,599,675 | 29.2 | 30 |
| Massachusetts | 443,147 | — | 2,583,736 | 31.1 | 17 |
| Michigan | 739,904 | — | 2,550,246 | 15.1 | 29 |
| Minnesota | 167,529 | — | 2,301,455 | 45.6 | 7 |
| Missouri | 394,966 | — | 2,823,100 | 38.9 | 14 |
| Nevada | 12,675 | 26,433 | 531,804 | 15.8 | 7 |
| New Hampshire | 37,114 | — | 287,612 | 23.7 | 13 |
| New Jersey | 1,720,069 | 105,476 | 4,014,960 | 37.9 | 45 |
| New Mexico | 12,122 | 8,266 | 135,496 | 6.5 | 15 |
| North Carolina | 468,901 | — | 992,009 | 11 | 47 |
| Ohio | 1,012,951 | 1,346,511 | 3,808,058 | 23.5 | 62 |
| Oregon | 443,966 | 386,053 | 1,987,246 | 48.8 | 42 |
| Pennsylvania | 498,391 | 141,628 | 3,399,002 | 26.6 | 19 |
| Rhode Island | 72,500 | — | 159,863 | 12.8 | 45 |
| South Carolina | 134,712 | 251,042 | 1,697,706 | 28.4 | 23 |
| South Dakota | 13,000 | — | 15,493 | 3 | 84 |
| Tennessee | 162,347 | 30,600 | 1,942,512 | 26.4 | 10 |
| Vermont | 29,626 | 225 | 182,562 | 29.8 | 16 |
| Virginia | 540,282 | 361,565 | 3,160,931 | 29.1 | 29 |
| Washington | 539,717 | 689,706 | 2,959,534 | 34.1 | 42 |
| West Virginia | 680 | — | 120,276 | 6.9 | 1 |
| Wisconsin | 225,240 | 23,630 | 1,378,470 | 24.6 | 18 |

"—" = tonnages not provided; ¹Organics include yard trimmings and food residuals; ²Represents percent contribution of organics and wood recycled to MSW recycling rate.

Table 6. Number of residential curbside recycling programs, population served, and yard trimmings composting sites by state (2002 data unless noted)

| State | Curbside Programs | Population With Access To Curbside Collection | Yard Trimmings Composting Sites |
|----------------------------|--------------------|---|---------------------------------|
| Arizona | 27 | 2,570,000 | n/a |
| Arkansas | 67 | n/a | 24 |
| California | 396 | 31,146,000 ¹ | 100 |
| Colorado | 22 ² | 618,848 | 5 ² |
| Connecticut | 169 | 3,460,503 | 92 |
| Delaware | 2 | 4,000 | 0 |
| Florida ³ | 333 | 9,100,000 | 0 ⁴ |
| Georgia | 184 | n/a | 63 |
| Hawaii | 4 | 41,000 | 5 |
| Idaho | 12 | n/a | n/a |
| Illinois | n/a | n/a | 40 |
| Indiana | 79 | 4,170,000 ¹ | 107 |
| Iowa | 627 | 1,862,314 | 80 |
| Kansas | 113 | 1,100,000 | 105 |
| Kentucky | 54 | 1,211,085 | 30 |
| Louisiana | 20 | n/a | 3 |
| Maine ⁵ | 40 | 500,000 | <25 |
| Maryland | 99 ⁶ | 4,000,000 | 37 |
| Massachusetts ⁵ | 160 | 4,862,806 | 223 |
| Michigan ⁶ | 347 | 3,670,072 | 163 |
| Minnesota | 733 | 3,750,000 | n/a |
| Mississippi | 14 ⁷ | 325,000 ¹ | 6 |
| Missouri | 216 | n/a | 152 ⁷ |
| Nebraska ⁵ | 8 | 500,000 | n/a |
| Nevada | 3 | 1,963,924 | 1 |
| New Hampshire | 42 | >518,000 | 192 |
| New Jersey ⁵ | 510 | 7,500,000 ¹ | 170 |
| New Mexico | 10 | 400,000 ¹ | 8 |
| New York | 1,500 ⁸ | 17,230,000 ⁸ | 32 |
| North Carolina | 256 | 3,200,000 | 120 |
| North Dakota | 4 | 100,000 ¹ | 40 |
| Ohio ⁵ | 459 | 6,459,072 | 534 |
| Oklahoma | 7 | 905,790 | 4 |
| Oregon | 133 | 2,641,136 | 41 |
| Pennsylvania | 945 | 9,310,252 | >300 |
| Rhode Island | 26 | 897,000 | 15 |
| South Carolina | 135 ¹ | 564,552 | 128 |
| South Dakota | 3 | 60,000 | 120 |
| Tennessee | 58 | n/a | n/a |
| Texas | 160 ¹ | 5,000,000 ¹ | 160 |
| Utah | n/a | n/a | 20 |
| Vermont ⁵ | 93 ¹ | 545,000 | 12 |
| Virginia | 60 | 1,144,000 ⁹ | 14 ¹ |
| Washington ⁵ | 150 | 4,923,318 | 41 |
| West Virginia | 51 ¹ | 425,134 | 0 ¹⁰ |
| Wisconsin | 544 | 2,695,958 | n/a |
| Wyoming | 0 | 0 | 15 |
| Totals | 8,875 | 139,374,764 | 3,227 |

¹2001 *BioCycle*, "The State of Garbage In America" data; ²Based only on data from 12 cities and/or counties; ³2000 data; ⁴State reports 140 sites only grinding (i.e., not composting) collected yard trimmings for mulch; ⁵2001 data; ⁶1999 data; ⁷May include yard trimmings grinding (only) facilities; ⁸1998 data; ⁹Based on conversion of 2.86 people/household; ¹⁰State reports 22 sites only grinding (i.e., not composting) collected yard trimmings for mulch

from the 2001 and 2003 surveys, however, the following can be noted:

—Illinois did not report any curbside data for 2002, but noted 474 programs in 2000.

—Five states had hefty declines in curbside programs. These include Georgia (-275), California (-150), Washington (-133), Indiana (-89) and Wisconsin (-87).

—Ohio reported an increase in curbside programs (+227). Other states with increases since 2000 include Pennsylvania (+53), Missouri (+39) and Florida (+34).

Interestingly, despite the drop in curbside

Table 7. Number of municipal solid waste landfills and waste to energy plants, average tip fees, and capacity by state for 2002

| State | Number of MSW Landfills | Average Landfill Tip Fee (\$/ton) | Total Landfill Capacity Remaining (tons) | Number Of WTE Plants | Average WTE Tip Fee (\$/ton) |
|----------------------|-------------------------|-----------------------------------|--|----------------------|------------------------------|
| Arizona | 41 | n/a | n/a | 0 | — |
| Arkansas | 24 | 28.45 | n/a | 2 | n/a |
| California | 161 | 13.63 | 410,501,190 | 3 | n/a |
| Colorado | 65 | n/a | n/a | 0 | — |
| Connecticut | 2 | n/a | n/a | 6 | 65 |
| Delaware | 3 | 58.50 | 20,000,000 | 0 | — |
| Florida | 100 | 42.47 | n/a | 13 | 59 |
| Georgia | 60 | 33.50 | 135,349,274 ¹ | 1 | 45 |
| Hawaii | 9 | n/a | n/a | 1 | n/a |
| Idaho | 29 | n/a | n/a | 0 | — |
| Illinois | 51 | n/a | 212,393,636 ¹ | 0 | — |
| Indiana | 35 | n/a | 52,231,795 ¹ | 1 | n/a |
| Iowa | 59 | 33.25 | 40,182,628 | 1 | 53 |
| Kansas | 51 | 28 | n/a | 0 | — |
| Kentucky | 25 | 27.57 | 36,363,636 ¹ | 1 | n/a |
| Louisiana | 24 | 25 | n/a | 0 | — |
| Maine | 8 | 55 | 3,030,303 ¹ | 4 | 65 |
| Maryland | 20 | 50 | n/a ² | 3 | 49 |
| Massachusetts | 19 | 72.60 | n/a | 7 | 71 |
| Michigan | 52 | n/a | 143,939,394 ¹ | 4 | 76 |
| Minnesota | 21 | 50 | 18,700,000 | 15 | 50 |
| Mississippi | 17 | 26 | n/a | 0 | — |
| Missouri | 24 | 33.54 | 41,432,836 ¹ | 0 ³ | — |
| Montana ⁴ | 30 | 32 | 32,727,273 | 0 | — |
| Nebraska | 24 | 25 | n/a | 0 | — |
| Nevada | 23 | 30 | 60,742,056 ¹ | 0 | — |
| New Hampshire | 10 | 68 | 15,000,000 | 2 | 81 |
| New Jersey | 12 | 60 | 40,000,000 | 5 | 60 |
| New Mexico | 35 | n/a | 190,966,142 ¹ | 0 | — |
| New York | 26 | 50 | 90,000,000 | 10 | 65 |
| North Carolina | 41 | 30 | 100,000,000 | 1 | 50 |
| North Dakota | 14 | 26.56 | n/a | 0 | — |
| Ohio | 44 | 32.20 | 124,079,624 ¹ | 0 | — |
| Oklahoma | 40 | 20 | n/a | 1 | n/a |
| Oregon | 30 | 34.50 | n/a | 1 | 68 |
| Pennsylvania | 49 | 48 | 298,585,524 | 6 | 74 |
| Rhode Island | 2 | 41.50 | n/a | 0 | — |
| South Carolina | 19 | 27 | 109,534,023 | 4 | n/a |
| South Dakota | 15 | 30 | 16,757,576 ¹ | 0 | — |
| Tennessee | 34 | 28.38 | n/a | 1 | n/a |
| Texas | 175 | 27 | 970,000,000 | 2 | n/a |
| Utah | 38 | n/a | n/a | 1 | n/a |
| Vermont | 5 | 80 | 1,453,778 | 0 | — |
| Virginia | 67 | n/a | 251,810,045 | 5 | n/a |
| Washington | 21 | 46.48 | 180,002,767 | 4 | n/a |
| West Virginia | 18 | 43 | >5,674,330 | 0 | — |
| Wisconsin | 42 | 36.43 | 30,440,024 ¹ | 2 | n/a |
| Wyoming | 53 | n/a | n/a | 0 | — |
| Totals | 1,767 | | | 107 | |

¹Tonnage based on conversion from cubic yards reported (conversion of 3.3 cubic yards/ton); ²Landfill capacity remaining exceeds ten years; ³Waste-to-energy plant burns tires for fuel; ⁴2001 data from MSW Management

collection programs between 2000 and 2002 (a decrease of 834), the total population with access to curbside collection only decreased slightly (from 139,766,000 to 139,374,764). This may indicate that there has been a consolidation of some collection programs.

YARD TRIMMINGS COMPOSTING

As in the case with curbside programs, data have been collected on the number of yard trimmings composting sites since the first State of Garbage survey in 1989. According to that first report, there were 651 yard trimmings composting sites in 1988. Due to both rapid growth and better data tracking, that number more than doubled to 1,407 by 1990, and doubled again to 2,981 by 1992. Growth between 1992 and 2000 was more steady, increasing to 3,846 yard trimmings composting sites in the U.S. by 2000.

In 2002, the reported number of yard

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trimmings composting sites was 3,227, a decrease of 619 from the 2000 data. It is believed the primary reason for the drop was that five states providing numbers for 2000 were not able to do so for 2002 (e.g., Minnesota reported 454 in 2000 and Wisconsin reported 140).

Florida, which in 2000 noted it had 26 yard trimmings composting sites, reported no composting sites in 2002. Instead, the state explained there are 140 sites only grinding (i.e., not composting) yard trimmings for mulch. West Virginia, which noted that it had 23 composting sites in 2000, also reported none in 2002. Like Florida, this state reported that there are 22 sites grinding collected yard trimmings into mulch.

Some states reported a significant increase in the number of yard trimming composting sites between 2000 and 2002. These include Georgia (+48), Indiana (+21), Iowa (+37) and

Table 8. C&D landfills and MSW transfer stations by state for 2002 (unless noted)

| State | C&D Landfills | MSW Transfer Stations |
|----------------------------|---------------|-----------------------|
| Arizona | 11 | 120 |
| Arkansas | 35 | 87 |
| California | 154 | 458 |
| Connecticut | 27 | 120 |
| Delaware | 1 | 1 |
| Florida | 185 | 98 |
| Georgia | 46 | 70 |
| Hawaii | 2 | 11 |
| Illinois | n/a | 86 |
| Indiana | 9 | 59 |
| Iowa | 4 | 35 |
| Kansas | 129 | 65 |
| Kentucky | 128 | 50 |
| Maine ¹ | 24 | 242 |
| Maryland | 5 | 11 |
| Massachusetts ¹ | 9 | 194 |
| Michigan | 3 | 69 |
| Minnesota | 79 | 80 |
| Mississippi | 72 | 41 |
| Missouri | 4 | 47 |
| Nebraska ¹ | 19 | 46 |
| Nevada | 11 | 9 |
| New Hampshire | n/a | 201 |
| New Jersey ¹ | 1 | 43 |
| New Mexico | 5 | 130 |
| New York | 30 | 476 |
| North Carolina | 56 | 80 |
| North Dakota | 182 | 28 |
| Ohio | 75 | 59 |
| Oklahoma | 7 | 38 |
| Oregon | 5 | 135 |
| Pennsylvania | 6 | 73 |
| Rhode Island | 0 | 26 |
| South Carolina | 138 | 38 |
| South Dakota | 170 | 15 |
| Tennessee | 71 | 29 |
| Texas | 45 | 150 |
| Utah | 47 | 11 |
| Vermont | 1 | 90 |
| Virginia | 22 | 61 |
| Washington | 53 | 95 |
| West Virginia | 17 | 17 |
| Wisconsin | 41 | 81 |
| Wyoming | 2 | 20 |
| Total | 1,931 | 3,895 |

¹2001 data; n/a = not available

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Missouri (+52) — although Missouri explained that some of its 152 sites may only be producing mulch. The only state reporting a sizable decrease is New York (-73).

LANDFILLING AND WASTE-TO-ENERGY STATISTICS

Based on data from 47 states, the total number of landfills in operation in 2002 is 1,767, a decrease of 375 from the total of 2,142 reported in 2000 (Table 7). A major reason for the decrease is not including landfills in Alabama and Alaska (which accounted for 304 landfills in 2000). Texas had 52 fewer landfills in 2002, which may be explained by the fact that, in 2000, the state noted that only 183 of its 227 landfills were active. In 2002, Texas reported 175 landfills (which is more in line with the 183 landfills in 2000). Tennessee reports a decrease of 14 landfills between 2000 and 2002. The only state reporting a significant increase of landfills in 2002 was Florida — from 61 in 2000 to 100 in 2002.

Table 7 also shows that average landfill tip fees ranged from a low of \$13.63/ton in California to a high of \$72.60/ton in Massachusetts.

The states also were asked to provide the amount of total landfill capacity remaining

Table 9. Waste imports and exports by state for 2002 (unless noted)

| State | Imported (tons/yr) | Exported (tons/yr) |
|----------------|--------------------|--------------------|
| Arizona | 383,000 | 10,000 |
| Arkansas | 168,352 | 370 |
| California | 26,477 | 616,639 |
| Connecticut | 63,396 | 366,003 |
| Georgia | 963,419 | n/a |
| Illinois | 5,800,977 | n/a |
| Indiana | 1,573,726 | n/a |
| Iowa | 402,780 | 127,785 |
| Kansas | 663,103 | n/a |
| Kentucky | n/a | 246,702 |
| Maine | 218,941 | 77,765 |
| Maryland | 456,663 | 1,943,124 |
| Massachusetts | 186,356 | 1,687,084 |
| Michigan | 3,831,481 | n/a |
| Minnesota | n/a | 636,225 |
| Mississippi | 537,504 | n/a |
| Missouri | 10,700 | 1,993,136 |
| Nevada | 534,018 | 0 |
| New Hampshire | 745,853 | 33,000 |
| New Jersey | 576,012 | 3,500,000 |
| New Mexico | 377,880 | 0 |
| New York | 567,500 | 5,400,000 |
| North Carolina | n/a | 882,247 |
| North Dakota | 101,196 | 10,000 |
| Ohio | 1,977,833 | 986,693 |
| Oregon | 1,625,962 | 18,668 |
| Pennsylvania | 9,999,557 | 300,000 |
| South Carolina | 954,854 | 507,661 |
| Tennessee | n/a | 549,053 |
| Texas | 65,603 | n/a |
| Utah | 138,700 | n/a |
| Vermont | 6,900 | 124,320 |
| Virginia | 4,508,839 | n/a |
| Washington | 172,708 | 1,146,331 |
| West Virginia | 203,869 | 431,956 |
| Wisconsin | 1,407,052 | n/a |

measured in total tons or cubic yards. (Previous State of Garbage surveys requested total landfill capacity remaining in years.) The remaining capacity varies greatly among states providing that data (see Table 7). For example, Texas reports 970 million tons of landfill capacity remaining which, based on its 2002 MSW landfilling of about 21 million tons, corresponds to 46 years of landfill space. California, with 410 million tons of remaining capacity, has 13 years of landfill space, at current MSW landfilling rates. Other states with over 200 million tons of capacity include Illinois (212.4 million tons), Pennsylvania (299 million tons), and Washington (252 million tons).

As a final note on landfill data, in the current survey we asked states if landfill capacity is being added. Of the 47 states responding, only six replied "no" (Arizona, Nebraska, New Jersey, Oklahoma, Oregon and Virginia). Colorado, Connecticut and Texas did not answer the question.

Table 7 also includes data on waste-to-energy plants in the U.S. As noted earlier in this article, previous State of Garbage in America surveys did not specifically ask states for data on waste-to-energy combus-

The average landfill tip fees ranged from a low of \$13.63/ton in California to a high of \$72.60/ton in Massachusetts.

tion, but instead only asked about incineration (which may or may not include energy recovery). There were 107 WTE facilities reported for 2002, in comparison to the 132 WTE/incineration plants reported for 2000. Tipping fees at waste-to-energy plants ranged from \$45/ton in Georgia (with only one WTE plant) to \$81/ton in New Hampshire (with two WTE plants).

Table 8 provides data on C&D landfills and MSW transfer stations. In 2002, there were a total of 1,931 C&D landfills, as compared to 1,825 reported for 2000. The total number of MSW transfer stations reported for 2002 is 3,895, versus 3,970 for 2000. Table 9 provides data on waste imports and exports, most of which flow through the nation's infrastructure of transfer stations.

Table 10 includes recycling tonnages reported by the states. Of the 47 states participating in the 2003 survey, only 32 provided a breakdown of the tonnages of various materials recycled. Finally, Table 11 show materials that are banned from MSW landfills in various states. For example, 21 states have bans on the landfill disposal of leaves, grass clippings and/or all yard trimmings.

Table 10. Quantity of materials recovered via recycling in 2002 (tons/year); unless noted, 32 states reporting

| State | Glass | Steel | Aluminum | Other Metals | C&D | Wood | Paper | Plastic | Tires | Organics | Other |
|------------------------------|---------|----------------------|----------------|-----------------------|-----------|------------------------|-----------|---------|--------|-----------------------|-----------------------|
| Arizona | 13,521 | 54,933 | 8,857 | 28,038 | n/a | 44,530 | 317,015 | 10,205 | 29,608 | 316,124 | 227,528 |
| Arkansas | 2,712 | 430,687 | 4,179 | 73,355 | n/a | 145,106 | 317,444 | 35,107 | 9,650 | n/a | 373,738 |
| Colorado ¹ | 12,054 | 2,405 | 775 | 590 | 50,000 | 36,530 | 63,383 | 1,713 | 250 | 15,871 | 8,781 |
| Connecticut | 33,406 | n/a | n/a | 101,917 ² | n/a | n/a | 499,406 | 11,377 | n/a | 235,816 | 6,285 |
| Delaware | 4,694 | 17,744 | 5,408 | 0 | 768,172 | 0 | 88,841 | 37,388 | 22,629 | 32,360 | 9,778 |
| Florida ³ | 166,475 | 87,581 | 32,096 | 1,514,047 | 515,571 | 1,471,782 ⁴ | 1,341,399 | 54,729 | 53,863 | n/a | n/a |
| Hawaii | 6,559 | 118,634 | 6,560 | 4,325 | n/a | n/a | 33,012 | n/a | n/a | 79,401 | 181,615 |
| Iowa ⁵ | 47,409 | 601,569 | 7,058 | n/a | n/a | 103,194 | 341,691 | 29,724 | n/a | 294,978 | n/a |
| Kentucky | 6,898 | 171,287 | 14,009 | n/a | n/a | n/a | 410,912 | 3,431 | 1,901 | 16,645 | n/a |
| Louisiana | 30,596 | 13,391 | 30,000 | n/a | n/a | n/a | 205,829 | 38,940 | n/a | 83,444 | n/a |
| Maine ⁶ | 31,226 | - ⁷ | - ⁷ | 153,564 | 38,848 | 40,443 | 333,784 | 13,791 | 19,631 | 50,084 | 7,514 |
| Maryland ⁸ | 55,481 | - ⁷ | 4,451 | 251,703 | 2,895,499 | 122,101 | 909,447 | 35,930 | 17,282 | 645,230 | 558,050 |
| Massachusetts ⁶ | 412,016 | - ⁷ | - ⁷ | 240,144 | 3,146,394 | n/a | 1,443,453 | 44,976 | n/a | 443,147 | n/a |
| Michigan ⁹ | 167,447 | - ⁷ | - ⁷ | 869,837 | n/a | n/a | 712,526 | 40,624 | n/a | 739,904 | 19,908 |
| Minnesota | 106,877 | 41,982 ¹⁰ | 29,673 | 311,278 ¹¹ | n/a | n/a | 841,911 | 45,148 | n/a | 167,529 ¹² | 757,057 |
| Missouri | 170,462 | 224,116 | 91,916 | 61,972 | n/a | - ¹³ | 1,726,088 | 84,649 | 42,750 | 394,966 | 26,181 ¹⁴ |
| Nebraska ⁶ | 7,894 | 41,974 ¹⁵ | 12,957 | n/a | n/a | n/a | 301,708 | 4,334 | n/a | n/a | n/a |
| Nevada | 8,433 | 181,678 | 1,536 | 5,324 | 25,682 | 26,433 | 179,512 | 3,751 | 1,032 | 12,675 | 111,430 ¹⁶ |
| New Hampshire | 6,382 | 25,040 | 686 | n/a | n/a | n/a | 20,139 | 11,246 | n/a | 37,114 | 187,005 |
| New Jersey ⁶ | 259,723 | - ⁷ | 59,791 | 520,329 | 5,774,993 | 105,476 | 1,215,665 | 42,762 | 46,188 | 1,720,069 | 44,958 |
| New Mexico | 1,473 | 62,431 | 3,997 | 1,776 | n/a | 8,266 | 39,414 | 656 | 1,229 | 12,122 | 4,132 |
| North Carolina ¹⁷ | 49,891 | 83,886 ¹⁵ | 5,311 | 25,589 | 17,648 | - ¹⁸ | 267,840 | 17,269 | 62,000 | 468,901 | 11,322 |
| Oregon | 94,833 | - ⁷ | n/a | 262,390 | 37,151 | 386,053 | 679,971 | 23,647 | 23,327 | 443,966 | 73,059 |
| Pennsylvania | 64,890 | 393,317 | 18,732 | 226,934 | 690,019 | 141,628 | 1,184,181 | 36,098 | 31,067 | 498,391 | 803,765 |
| Rhode Island | 16,839 | 6,146 | 1,013 | 3,755 | n/a | n/a | 54,623 | 4,987 | n/a | 72,500 | n/a |
| South Carolina | 9,848 | - | - | 333,073 | 732,679 | 251,042 ¹⁹ | 438,804 | 25,588 | 49,621 | 134,712 | 455,018 |
| Tennessee | 34,214 | 711,688 | 81,035 | 63,584 | 1,332,090 | 30,600 | 511,025 | 33,082 | 61,582 | 162,347 | 253,355 |
| Vermont | 19,202 | 35,240 | 1,840 | 1,705 | 15,023 | 225 | 85,788 | 3,258 | n/a | 29,626 | 5,678 |
| Virginia | 72,579 | - ⁷ | - ⁷ | 570,871 | 280,608 | 361,565 | 872,044 | 134,447 | 55,888 | 540,282 | 553,255 ²⁰ |
| Washington | 81,632 | 293,284 | 12,540 | 50,663 | 1,304,838 | 689,706 | 957,462 | 20,172 | 11,315 | 539,717 | 303,043 |
| West Virginia | 5,707 | 36,444 | 10,799 | 14,789 | n/a | n/a | 46,112 | 3,780 | n/a | 680 | 1,965 |
| Wisconsin | 109,470 | 29,890 | 18,220 | n/a | n/a | 23,630 | 896,170 | 30,980 | 6,150 | 225,240 | 38,720 |

¹Based on data from 13 cities and/or counties; ²Includes 11,852 tons of metal containers and 90,065 tons of scrap metal; ³2000 data; ⁴In 2002, 3,283,173 tons of wood waste generated by natural disasters and/or forest thinning, of which 1,471,782 tons diverted to wood-fired biomass plants; ⁵All recycled tonnages except organics are 1999 data from "Economic Impacts of Recycling In Iowa," by R.W. Beck for Recycle Iowa (organics tonnages from 2003 "State of Garbage In America" survey response); ⁶2001 data; ⁷Included in "other metals"; ⁸Based on data reported in 2003 "State of Garbage In America" survey response and in Maryland Dept. of Environment summary table, "County Recyclables By Commodity In tons for 2002"; ⁹1999 data; ¹⁰Steel cans only; ¹¹Includes mixed metals and ferrous scrap metals; ¹²Food scraps only; ¹³Included in organics tonnage; ¹⁴Lead-acid batteries; ¹⁵Steel cans and white goods; ¹⁶Includes reported 177,317 tons of commercial recyclables and 9,688 miscellaneous tons; ¹⁷Data from local government programs only — tonnages recycled by private businesses not available; ¹⁸Included in C&D and organics tonnages; ¹⁹Includes wood from yard trimmings and land clearing debris; ²⁰Includes commingled recyclables, textiles, used oil and oil filters, antifreeze, batteries, electronics and miscellaneous "other."

Table 11. MSW landfill disposal bans for selected materials

| State | Yard Trimmings | Whole Tires | Used Oil | Lead-Acid Batteries | Batteries (General) | White Goods | Electronics | Others |
|----------------|-----------------|-------------|----------|---------------------|---------------------|----------------|----------------|-----------------|
| Arizona | | x | x | x | | | | |
| Arkansas | x ¹ | | | | x | | | |
| California | | x | | | | | x | |
| Connecticut | x ² | | | x | | | | |
| Delaware | | x | | | | | | |
| Florida | x | | x | | | x | | |
| Georgia | x | x | | x | | | | |
| Hawaii | | x | | | | | | |
| Idaho | | | | | x | | | |
| Illinois | x | x | x | x | | x | | |
| Indiana | x ³ | x | | x | | | | |
| Iowa | x | x | x | x | | | | |
| Kansas | | x | | | | | | |
| Kentucky | | x | | x | | | | |
| Louisiana | | x | x | x | | x | | x ⁴ |
| Maine | | x | | x | | x | | |
| Maryland | | x | x | | x | | | |
| Massachusetts | x | x | | x | | x | x ⁶ | x ⁷ |
| Michigan | x | | x | x | | x ⁸ | | |
| Minnesota | x | x | x | x | | x | x ⁶ | x ⁹ |
| Missouri | x | x | | x | | x | | |
| Nebraska | x ¹ | x | x | x | | x | | |
| New Hampshire | x | | x | x | | | | |
| New Jersey | x ¹¹ | | | | | | | x ¹⁰ |
| New Mexico | | | | | x | | | x ¹² |
| New York | | | x | x | | | | |
| North Carolina | x | x | x | x | | x | | x ¹³ |
| North Dakota | | | x | x | | x | | |
| Ohio | | x | | x | | | | x ¹⁴ |
| Oregon | | x | x | x | | x | | x ¹⁵ |
| Pennsylvania | x ¹⁶ | x | | x | | | | |
| Rhode Island | | x | | | | x | | |
| S. Carolina | x ¹⁷ | x | x | x | | x | | |
| S. Dakota | x | | x | x | | x | | |
| Tennessee | | x | x | x | | | x | x ¹⁸ |
| Texas | | x | x | x | | | | |
| Utah | | x | x | | x | | | |
| Vermont | | x | x | x | x | x | | x ¹⁹ |
| Virginia | | x | | x | | | | |
| W. Virginia | x | x | | | x | | | |
| Wisconsin | x | x | x | x | | x | | x ¹² |
| Wyoming | | | | x | | | | |

¹Leaves and grass; ²Grass clippings; ³Leaves, brush and woody vegetative matter >3 feet; ⁴Yard trimmings are banned from a few landfills; ⁵Separately collected loads of yard trimmings are banned from disposal; ⁶Cathode ray tubes; ⁷Glass, metal and plastic containers and recyclable paper; ⁸Containing refrigerants; ⁹Source separated recyclables; ¹⁰Ni-Cad batteries; ¹¹Leaves only; ¹²All recyclables in MSW stream; ¹³Aluminum cans; ¹⁴Yard trimmings are not banned but disposal is restricted; ¹⁵Cars and other vehicles; ¹⁶Truckloads comprised primarily of leaves; ¹⁷Includes landclearing debris; ¹⁸Oil-based paints and mercury bulbs; ¹⁹Oil-based paint.

As noted throughout this report, a follow-up article will explore the 2003 State of Garbage In America findings in more depth. What seems to be evident (and thus safe to conclude), is that to truly understand solid waste management practices and trends — and the progress being made with source reduction, recycling and recovery — actual tonnages need to be recorded. We firmly believe the 2003 State of Garbage in America report is an excellent step in that direction. ■

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