

US EPA ARCHIVE DOCUMENT

**N**ow that you have planned and designed your recycling measurement system, you are ready to distribute the survey forms, compile the data, and calculate your annual recycling rate. This section outlines the steps involved in implementing your measurement system after it has been developed.

## Step One

### Institute Measures to Increase Your Survey Response Rate.

Mailing survey forms to potential respondents does not guarantee they will comply with your information request. A variety of techniques can be employed to increase your survey response rate, and you should pick those that meet your particular needs. Some examples include:

- *Send a cover letter.* Attach a cover letter to the survey forms explaining the what, why, and how of your program. Sample cover letters for three types of respondents are provided in Appendix G.
- *Designate a contact person.* Offer assistance to respondents by providing a contact name and telephone number to call if they have questions. Space is provided on the survey

forms in Appendix C for this information.

- *Fill out survey information in advance.* Filling out as much of the information on the survey form for the respondents as possible will help expedite the survey process.
- *Use the media.* The media also can be used to enhance reporting. Special events are another opportunity to showcase positive results.
- *Send survey forms with grant applications.* If applicable, attach survey forms to recycling grant applications. Indicate that recycling grant applications must be submitted with a completed survey form in order to be eligible.

## Implementation Steps

1. Institute measures to increase your survey response rate.
2. Educate survey respondents.
3. Distribute survey forms.
4. Maintain frequent communication with survey respondents.
5. Compile data and calculate an MSW recycling rate.
6. Verify and double-check data.
7. Share information.



**Minnesota** merges its survey mailing list with its survey form so that the respondent information is already filled in. The state also fills in recycling data for certain materials, such as lead-acid batteries, based on statewide figures. If the local government has better data, it can revise the state's estimate.



**New York State** publishes a recycling bulletin that lists each county's recycling rate. To encourage businesses to report, **Steele County, Minnesota, and Onondaga County, New York**, both publish newspaper columns featuring recycling businesses that report high rates.



## Mandatory Program Enforcement

Some mandatory reporting programs carry penalties for noncompliance. In **Monroe County, New York**, for example, potential liabilities are written into the county's recycling law. First, the offenders receive a written warning, which can be followed by a \$50 fine if the violation occurs again. Many states and localities, including Monroe County, prefer to contact the company or facility to encourage participation and rely on the penalty as a last resort. In many cases, persistence pays. Letters, phone calls, or site visits often encourage reporting.

## Step Two

### Educate Survey Respondents.

It is essential to explain to respondents the purpose, requirements, and benefits of your recycling measurement program, as well as any penalties associated with noncompliance. If you have a voluntary reporting system, education is the main tool for ensuring a high response rate. By the same token, educating survey respondents can reduce the amount of enforcement necessary under a mandatory reporting system. Education can be provided through training seminars, technical assistance materials, and frequent communication.

Training can greatly enhance the quality of the data you receive. It also gives you an excellent opportunity to develop relationships with respondents and explain your program. Training sessions can be held around your region, or you can host a workshop in tandem with an annual recycling meeting. You may elect to hold special sessions for different groups of respondents (waste haulers, recyclers, local governments), or divide the sessions into public and private sectors. Whatever you decide, your recycling measurement training seminar should:

- Explain WHY you are engaged in recycling measurement.
- Describe HOW the data you collect will be used.
- Promote the BENEFITS of recycling measurement and respondents' participation.
- Detail the REQUIREMENTS of your program.

- Explain any PENALTIES for noncompliance.
- Seek attendees' INPUT and suggestions on the program.
- Describe any available TECHNICAL ASSISTANCE.
- Distribute and explain the SURVEY FORMS.

Recycling measurement training can be combined with other meetings or training topics. Recycling organizations are usually eager to provide state and local agencies with time for workshops or training sessions during their annual conferences.

Providing technical assistance to respondents also can help ensure that you obtain the necessary data. Technical assistance might include having a staff person available to answer telephone calls or publishing guidebooks or other printed materials. It is crucial that staff are available to answer questions about the recycling measurement program. This person's name and telephone number should be clearly identified on the survey forms, instructions, and all correspondence from your agency. This contact will be the principal liaison with the recycling and waste management community and should be equipped to answer questions about reporting requirements and offer suggestions for collecting data. Publishing an e-mail address or starting a recycling measurement bulletin board on the Internet also helps provide support to respondents.

Technical assistance can help increase the response rate in areas with a voluntary reporting program. In areas without facility permit requirements or other types of mandated reporting, offering

technical assistance with survey forms might encourage routine responses from disposal facilities. In addition, the more these respondents understand about the reporting process, the more accurate and complete their data will be.

## Step Three

### Distribute Survey Forms.

The recycling measurement season begins when the survey forms are mailed out to respondents. Distribute survey forms at least 6 months before you wish to arrive at a final recycling rate determination. If you survey data sources directly, respondents should be given 4 to 6 weeks to complete the survey forms and return them. If you are not surveying directly but are receiving assistance from county or city governments, allow 3 months for them to fill out the forms. In this case, local agencies will need additional time to distribute surveys and compile data within their boundaries. Regardless of who is responsible for collecting data, you will need approximately 3 months to compile data, verify information, and calculate the recycling rate after all survey forms have been returned.

Table 11 on page 40 outlines the six survey forms included with this guide. Each survey form is intended for a different type of respondent, who can provide information about the amount of MSW recycled or disposed of in your jurisdiction. The table lists the forms, their intended respondents, and examples of respondents who should fill out each form.

A cover page entitled “About This Form” is attached to each



In **Onondaga County, New York**, a business recycling specialist on the county’s staff offers free services to area recyclers, including technical assistance on waste reduction. Providing these services helps the private sector respondents and assists the county in keeping track of those businesses that are recycling in the area.

In **Minnesota**, the Office of Environmental Assistance (OEA) provides telephone assistance to counties to help them understand what materials should be tabulated in the recycling rate. OEA also created a guidebook to help counties complete the annual survey forms. The guidebook instructs counties on how to collect and report recycling and MSW data, and provides guidance on measuring recycling revenues and expenditures.



form. This cover page explains the purpose of the form, who the form is intended for, and what you should do before mailing the form. This page is for the use of the measuring agency only and should not be sent out with the form. It is important to fill out the relevant information in the “To Be Completed by the Surveyor” section before mailing the form.

While each survey form is specific to the type of respondent, the following common elements are found:

- Each form allows for the reporting of data on MSW as well as other types of solid waste outside the scope of the standard recycling rate. (See Table A on page 11 for a description of Other Solid Waste.)
- Respondents are asked to report data according to the source of the material, whether residential or commercial.
- Respondents are asked to report data in tons. Instructions and standard volume-to-weight conversion factors are provided for converting data if necessary. (See Appendix B.)

In **Florida**, the state runs a 2- to 3-hour session for county recycling coordinators at the Recycle Florida! annual meeting. The meeting gives the state a chance to explain its recycling grant application process and reporting requirements.



The state of **Washington** conducts 2-hour training workshops for its 39 county recycling coordinators. Haulers, collectors, processors, and others responsible for completing survey forms also are invited to participate in the sessions. The state uses this time to go over the reporting forms in detail, explaining each step to survey respondents and answering questions.



**TABLE II. SURVEY FORMS**

	Survey Form	Respondent Type	Examples of Respondent
<b>RECYCLING</b>	Form 1	Collectors of recyclables.	Private haulers, government agencies with collection crews, and large generators (grocery stores, retail chains, and government facilities) that self-haul directly to a processor or end user.
	Form 2	Processors of recyclables.	Scrap metal, paper, plastic, tire, and yard trimmings processors, glass beneficiation plants, MRFs, buy-back centers, drop-off centers, and transfer stations that recover recyclables from waste on site.
	Form 3	End users of recyclables.	Public and private composting facilities, recycling plants, and disposal facilities that recover recyclables from waste on site.
<b>WASTE DISPOSAL</b>	Form 4	Collectors of MSW and Other Solid Waste.	Private waste haulers, government agencies with collection crews, and large generators (grocery stores, retail chains, and government facilities) that self-haul directly to a disposal facility or transfer station or end user.
	Form 5	Transfer stations.	Public and private transfer stations.
	Form 6	Waste disposal facilities.	Public and private landfills, incinerators, and waste-to-energy facilities.

- Imports and exports of waste are tracked.
- Collectors, processors, and end users of recyclables are asked to report data only on materials that originated in the particular jurisdiction.
- Data can be reported either on broad categories of recyclables or on specific commodities.

These common elements adhere to the standard measurement approach but also allow flexibility in collecting information on recycling and waste disposal outside the scope of the standard approach. Space is provided on the survey forms for collecting this kind of information because some jurisdictions may wish to track these data for planning purposes or may be required under their legislature to do so.

If local governments are consolidating data and reporting to you,

the entire set of survey forms should be sent to the agency conducting the survey. Otherwise, the forms can be sent directly by the measuring agency to specific respondents.

## Step Four

### Maintain Frequent Communication With Survey Respondents.

While respondents are completing the survey forms, it is important to maintain contact with them in order to encourage timely response and quality data. Frequent communication can help to foster positive relationships with the survey community, gain insights into their concerns, and provide an avenue for clarifying reporting requirements. This helps to personalize the recycling mea-



The **Oregon** Department of Environmental Quality (DEQ) follows up with postcards and phone calls 2 to 3 weeks after its surveys are distributed. The postcards remind respondents to fill out the survey and mention that technical assistance is available from DEQ. Oregon has found this communication helps to improve data quality.

surement program and results in a higher quality of data. Effective communication vehicles include telephone calls, postcards, letters, electronic bulletin boards, e-mail, and site visits. The methods you choose will depend on the size of your survey community and available staff, budget, and timeframe for filling out forms.



## Relationship Between the Worksheets and the Standard Recycling Rate

$$\text{MSW Recycling Rate (\%)} \text{ (Worksheet B3)} = \frac{\text{Total MSW Recycled (Worksheet B1)}}{\text{Total MSW Generated (Worksheet B2)}} \times 100$$

### Step Five

#### Compile Data and Calculate an MSW Recycling Rate.

After all respondents have submitted their survey forms, your job is to organize the data into an accessible format, determine the total amount of MSW generated and recycled, and calculate a recycling rate. The worksheets included with this guide in Appendix D have been designed to allow data to be compiled in a concise and organized manner.

#### Worksheet A

Worksheet A is intended for those measurers that already have calculated a recycling rate and simply want to calculate a revised recycling rate based on the standard equation. The standard recycling rate equation uses standard definitions of MSW and recycling. To use the standard equation, therefore, you must include only those wastes and recycling activities that are included in the definitions of MSW and recycling. Worksheet A helps you accomplish this.

#### Worksheets B1, B2, and B3

Worksheets B1, B2, and B3 are intended for those measurers that have never calculated a recycling rate and those intending to redesign their measurement systems in order to calculate an MSW recycling rate. These worksheets help you assemble recycling and waste disposal data from the sample survey forms and calculate your recycling rate. The relationship between the worksheets and the standard recycling rate equation is depicted above.

#### Worksheet B1

##### Compiled From Survey Forms 1, 2, and 3

The survey forms that correspond to Worksheet B1 are listed above. This worksheet allows for the aggregation of data on the amount of MSW recycled in your jurisdiction, as reported on Forms 1, 2, and 3 by collectors, processors, and end users, respectively. Total MSW recycled is the numerator of the standard recycling rate equation. If you obtained data from more than one point in the recycling chain, Worksheet B1 explains how to analyze the data in

order to eliminate possible double counting. In addition, a detailed method for estimating the composition of commingled recyclables is included.

#### Worksheet B2

##### Compiled From Survey Forms 4, 5, and 6

This worksheet is used to total data on the amount of MSW disposed of in your jurisdiction, as reported on Forms 4, 5, and 6 by collectors, transfer stations, and disposal facilities, respectively. The worksheet allows you to subtract waste imports and add exports in order to arrive at the total amount of MSW from your state or locality that was disposed of. In addition, space is provided to determine your jurisdiction's total MSW generation by adding together the total amount disposed of and the total amount recycled (from Worksheet B1). Total MSW generation is the denominator of the standard recycling rate equation.

Other features of Worksheet B2 include:

- An optional section for extrapolating waste disposal data if you

## Commingled Materials

Since many residential recycling programs today are based on commingled curbside collection, commodity-specific information may not be available. The survey forms included with this guide allow respondents to report data on commingled materials as an individual category, but the data must be broken down into the component materials in order to implement the standard methodology. You can estimate the composition of commingled recyclables in one of two ways: by using national, state, or local recovery data on recyclable materials, or by using sampling data.

The preferred approach for estimating the composition of commingled recyclables is to use local, state, or national recovery data. Although using sampling techniques may generate more accurate data in specific locations, local, state, or national data will

provide comparable recycling rates among jurisdictions and is less resource-intensive. Worksheet B1 includes detailed instructions on how to estimate the breakdown of commingled materials using the national recovery data found in EPA's *Characterization of Municipal Solid Waste in the United States: 1996 Update*. This same methodology can be employed using recovery data specific to your area, if available. In both cases, recovery data are used as default numbers to estimate the percentage of each recyclable material in the commingled mix. These percentages are then multiplied by the total tonnage of the mix to arrive at a weight for each material.

Another way to determine the breakdown of the commingled materials stream is to use the sampling technique described below. This method uses actual

tonnage data from the processing facility where the commingled materials are separated:

1. Request that the MRF or processing facility process your materials separately on a particular day so that you can conduct sampling.
2. Use a sample size large enough to accurately reflect the types of recyclables generated in your area. This will help to ensure the precision of your sampling methodology.
3. From the sample results, determine the percentage of each recyclable material in the commingled mix.
4. Identify the total tonnage of material from your area.
5. Apply these percentages to the total tons of commingled materials from your jurisdiction to determine each constituent's tonnage.

received less than a 100 percent response rate to your survey.

- A methodology for estimating waste generation using waste characterization data for those who do not conduct annual surveys of disposal facilities.

### Appendix H

In some cases, a jurisdiction may have conducted a waste characteri-

zation study or survey of disposal facilities in the past but does not have accurate information from a current survey. Appendix H contains an optional equation for adjusting waste generation information obtained in the past. The equation enables you to adjust the past data to account for changes in population and economic conditions. This method may be used to estimate waste generation for the current measurement year.

## Worksheet B3

### Combines Information Obtained on Worksheets B1 and B2

Worksheet B3 is used to combine the information obtained in Worksheets B1 and B2 to calculate a recycling rate. This worksheet contains the standard recycling rate equation.

## Using Waste Characterization Data

The preferred approach for determining MSW generation is to obtain data from surveys of waste haulers, transfer stations, and/or disposal facilities. If you do not have the resources or legislative authority to conduct surveys, an alternative is to use data from waste characterization studies. These studies determine a per capita annual waste generation rate that, when multiplied by the current year's population, yields an estimate of total waste generation. A methodology for estimating waste generation in this way is outlined in Worksheet B2.

### Step Six

#### Verify and Double-Check Data.

If time and resources permit, it is a good idea to verify the accuracy of the data you received before you calculate a recycling rate. This step can be performed at the same time you are compiling data from the survey forms. Options for verifying data accuracy include:

- ✓ Compare current data with data from the previous year. If large discrepancies are noticed, follow up by contacting survey respondents.
- ✓ Use data from secondary sources to cross-check data from primary sources.
- ✓ Compare totals for specific recyclable commodities with data from state or local waste characterization studies.

In addition to verifying the accuracy of data, it is important to double-check your data compilations after completing Worksheets

B1 and B2. Examine the data closely and answer the following questions:

- Was all exported waste counted?
- Was all imported waste excluded?
- Was only MSW counted? (Was any Other Solid Waste inadvertently included?)
- Were all recyclables counted only once? Was any of the same MSW reported by more than one survey respondent?
- Were all data reported in tons?
- Were the EPA standard volume-to-weight conversion factors used by survey respondents?
- Were any data omitted due to leakage?

Depending on the amount of data you collect and the number of survey respondents, verifying and double-checking can be resource-intensive. This step is important, however, for ensuring that your recycling rate is as accurate as possible and will help give you confidence in your recycling measurement efforts.



**Oregon** surveys processors and end users directly, while counties survey

collectors and then report to the state. Data from processors and end users are used to verify data reported by collectors.

#### Washington

conducts an informal telephone survey of end users



in the state in order to check the accuracy of data reported by collectors.

**Oregon** uses a computer program that, for each county and each commodity, multiplies the population by a projected per capita generation rate to arrive at a projected recycling total. The program then compares this total with the total reported by the respective county to verify the data.

To double-check

its data, **Ohio** compares the national waste generation rate



of 0.80 tons per person per year to the average for each of the reporting solid waste management districts (SWMD). If there is a large discrepancy which cannot be accounted for by the rural or urban nature of the SWMD, other factors, such as open dumping of waste, unreported recycling, or undetected waste exports, are investigated.



## Step Seven

### Share Information.

After you have calculated your MSW recycling rate, it is important to share the results of your recycling measurement efforts. Not only is it professional and courteous to share the final results with survey respondents, but there are also tangible benefits to providing such feedback. Communication on the status of state or local recycling efforts helps officials assess their recycling programs and their progress in meeting recycling goals. It also can identify potential areas of improvement and help communities learn about recycling

activities beyond their immediate jurisdiction, which could prove useful in areas such as market development. Information sharing also provides opportunities to share new ideas about recycling measurement.

Sharing the results of your measurement effort with the public is also beneficial. If you would like your recycling rate to be higher, use the results to educate citizens and businesses about the importance of recycling. If, on the other hand, your measurement results indicate that recycling is high in your area, build on that momentum by recognizing people's efforts and encouraging additional opportunities for waste reduction.

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**Florida**, a state that collects data directly from sources, keeps in close touch with local governments throughout the year via phone, e-mail, meetings, and conferences. Through these vehicles, the state updates local officials on measurement results, state policy decisions, funding, and other news.

