



MICHIGAN  
RECYCLING  
INDEX



# MEASURING RECYCLING IN THE STATE OF MICHIGAN

FINAL REPORT | MAY 2015



A PROJECT OF THE MICHIGAN RECYCLING COALITION WITH GRANT  
FUNDING FROM THE DEPARTMENT OF ENVIRONMENTAL QUALITY

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# I. EXECUTIVE SUMMARY

## INTRODUCTION

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In April 2014, Governor Snyder announced a statewide recycling initiative with the aim of boosting material recovery through public education and technical assistance, provision of convenient access to recycling and development of markets that will capture an increasing stream of recycled content. The plan established benchmarking and measurement as a first step, and the Michigan Recycling Coalition received a pollution prevention grant from the Michigan Department of Environmental Quality (MDEQ) to launch the Michigan Recycling Index. The project's task was to measure access to recycling throughout Michigan, evaluate participation in recycling, and calculate the rate of recycling for municipal solid waste (MSW).

To achieve this goal, the Michigan Recycling Index team worked with sponsors and partners to gather information from many recycling stakeholders in the state including Michigan communities, material recovery facilities, yard waste facilities and take-back program operators. Information sharing was voluntary for all parties, and the MRI team did not receive full data from every recycler in the state, with different types of data proving more readily available than others. To account for data gaps, the project team developed an extrapolation model to make reasonable projections for those regions. In addition to a base recycling rate calculation, conservative and aggressive scenarios were examined for each material category to reflect levels of certainty, and are expressed as a range. The result of the MRI project is a better understanding of Michigan's recycling systems, and the learnings may be used to support state leadership and funding in this arena, attract public and private sector investments, increase the availability of low cost, environmentally beneficial feedstock to manufacturers, and improve program performance at all levels.

## HIGHLIGHTS

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### ACCESS

- At least 61% of Michigan households have access to curbside recycling services. 49% have access through municipal or contracted services while 13% have access via subscription services.
- 33% of Michigan households have minimal or no access to convenient recycling – either curbside or convenient drop-off locations.
- At least 34% of Michigan households have access to curbside compost collection for materials such as leaves and yard waste.

### PARTICIPATION

- Participation in recycling programs varies widely across Michigan, from less than 1% of eligible households participating in some programs to over 95% participation in others.
- Curbside recycling programs on the whole reported substantially higher participation compared to drop-off recycling. Across the state, an estimated 38.5% of Michigan households participate in recycling programs in their community.
- Municipalities and counties have very limited information on participation in the recycling programs they offer, leaving them at a potential disadvantage in targeting program improvements.

## RATE OF RECYCLING

- Michigan achieved an estimated MSW recycling rate of 15% in 2013, with a possible range of 12.9%-18.7% based on the parameters in this study.
- Container deposits account for 11% of recycled MSW in Michigan, or 1.7% of total MSW.
- 44% of MSW recycled is made up of 'traditional' recyclable materials collected from commercial and residential sources, while 26% of the total is composted organics, and other source separated streams (such as lead-acid batteries, white goods, tires, e-waste, and textiles) make up the remaining 19%.

## KEY RECOMMENDATIONS

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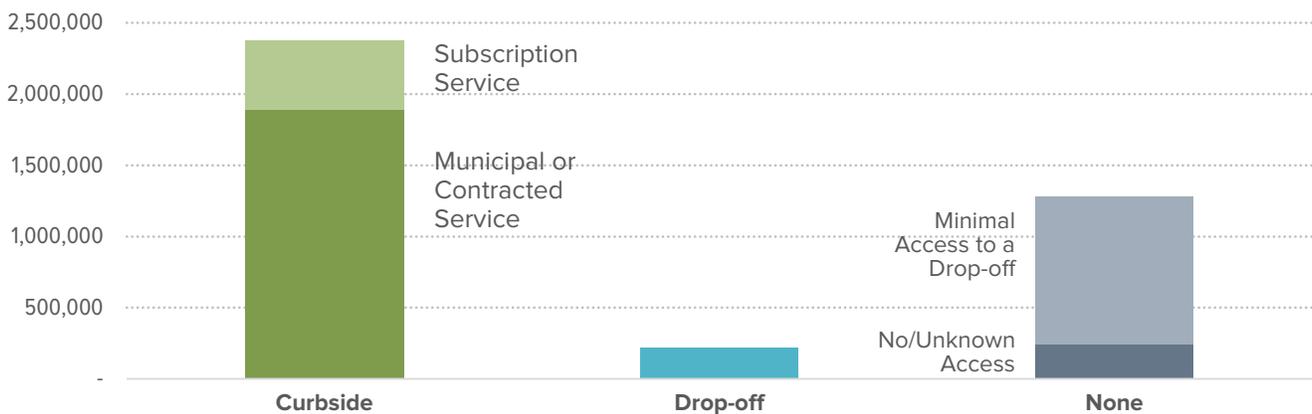
- An aggressive multi-pronged strategy will be required to achieve recycling rate of 30%.
  - Residential recycling improvements alone will not be sufficient to achieve this goal
    - If all households in every city in Michigan with a population greater than 25,000 recycled at the same proportion as reported curbside programs (i.e. 433 lbs recyclables per household annually), the state recycling rate would increase to 16%.
    - If all households in the state (including single family and multi-family) recycled at the same proportion as reported curbside programs (i.e. 433 lbs recyclables per household annually), the state recycling rate would increase to 18.2%.
    - If all households in the state (including single family and multi-family) recycled at the expected level of a high-participation curbside programs (i.e. generating 550 lbs recyclables per household annually), the state recycling rate would increase to 20.2%.
  - Commercial recycling needs to be better tracked and participation increased.
    - Commercial recycling was not well documented in reported data.
  - Increasing the corrugated cardboard recycling rate to be similar to data reported by South Carolina and Delaware, would increase the recycling rate to 18.6%.
- Establishment of systematic and consistent reporting protocols for recyclers will enable MDEQ to more precisely track the performance and improvement of recyclers.
- Additional aspects of the recycling rate calculation should be considered. For example, consider capturing recovered portions of construction and demolition (C&D) materials as a component of diversion rate calculations.
  - For reference, if half of all C&D waste were recycled and included in the calculation, the baseline recycling rate would be 21%.
- Confirm accuracy of reported disposal data
  - If the landfill tonnage were converted from cubic yards using the US EPA conversion ratio of 3.3 tons per cubic yard instead of 3 tons per cubic yard as calculated by DEQ, the baseline recycling rate would be over 16%.

# THE STATE OF RECYCLING IN MICHIGAN

## ACCESS

The Michigan Recycling Index evaluated over 1,700 communities representing at least 95% of the state’s population to evaluate the level of access to recycling and composting services statewide. These services are provided in a variety of ways, including curbside pickup provided by communities, curbside pickup available through subscriptions with private waste haulers, and drop-off locations for recycled materials. The study found that two-thirds (67%) of Michigan households have access to some form of convenient recycling – either municipal or subscription curbside recycling, or convenient drop-off locations (defined by MDEQ as one location for every 10,000 residents of a county). Curbside recycling provided by municipalities is available to 49% of Michigan households, while another 13% have curbside services available via subscription. Drop-off stations are found in the vast majority of Michigan counties and support 94% of the state’s households, but these facilities only reach the 10,000 residents per drop-off threshold for 7% of Michiganders. The MRI project also measured access to compost drop-off and curbside collection services, concluding that at least 43% of Michigan households have access to composting services for materials like yard waste and leaves.

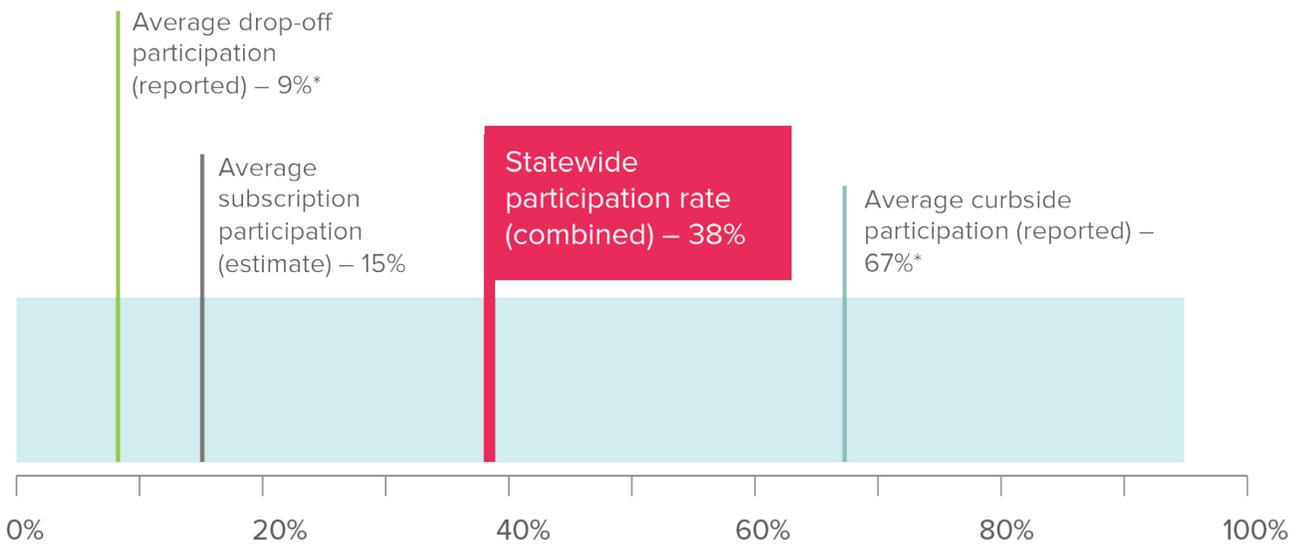
### HOUSEHOLDS WITH ACCESS TO CONVENIENT RECYCLING



## PARTICIPATION

The Michigan Recycling Index compiled data from communities on participation rates for their recycling programs, defined as the percent of households who make use of the program over the course of a year. Although data on participation is limited as this information is challenging for recycling programs to collect, the MRI found a wide range of participation in recycling programs, ranging from less than 1% of households participating to over 90%. This wide range held true for both curbside and drop-off recycling, but outside of the extremes on either end, curbside programs tended to have much greater participation. The average participation rate for drop-off, weighted by program size, was just 9%, compared to 67% for curbside. Based on the availability of access to each type of recycling program, the study estimated that approximately 38.5% of households statewide participated in recycling in 2013.

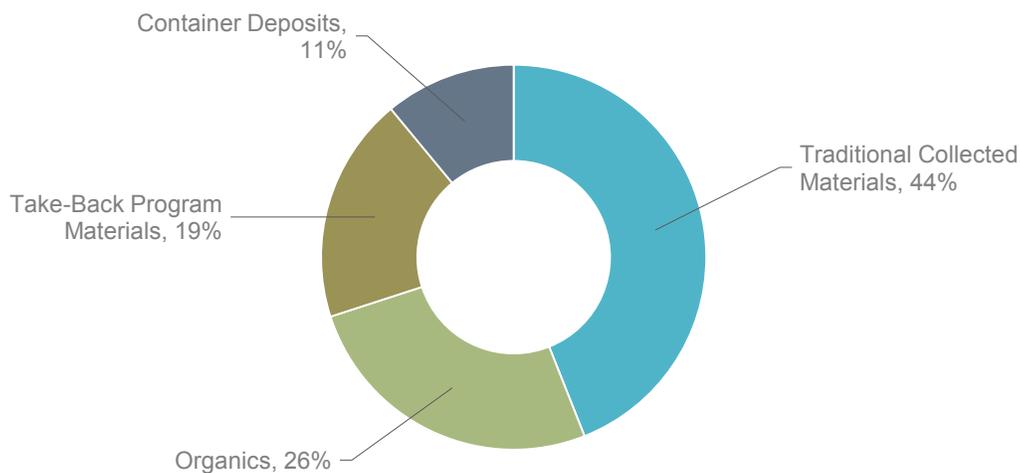
## RANGE OF PROGRAM PARTICIPATION RATES



### RECYCLING RATE

Based on EPA's guidelines for measuring recycling, the MRI project conducted a series of voluntary information-gathering surveys with direct outreach to Michigan municipalities, counties, material recovery facilities, and haulers, and also reached out to Michigan-based paper mills, plastics re-processors and a variety of take-back programs. Through this process, sources and quantities of materials from Michigan curbside and drop-off programs were collected from a respondents and analyzed, in addition to materials that are sent from commercial sources and recycled into new products. In addition to curbside and drop-off collection programs, direct outreach and research was conducted to measure materials collected through take-back programs for e-waste, tires, organics, beverage container deposits, textiles, hazardous household waste and batteries.

## MATERIAL RECYCLED BY CATEGORY IN 2013



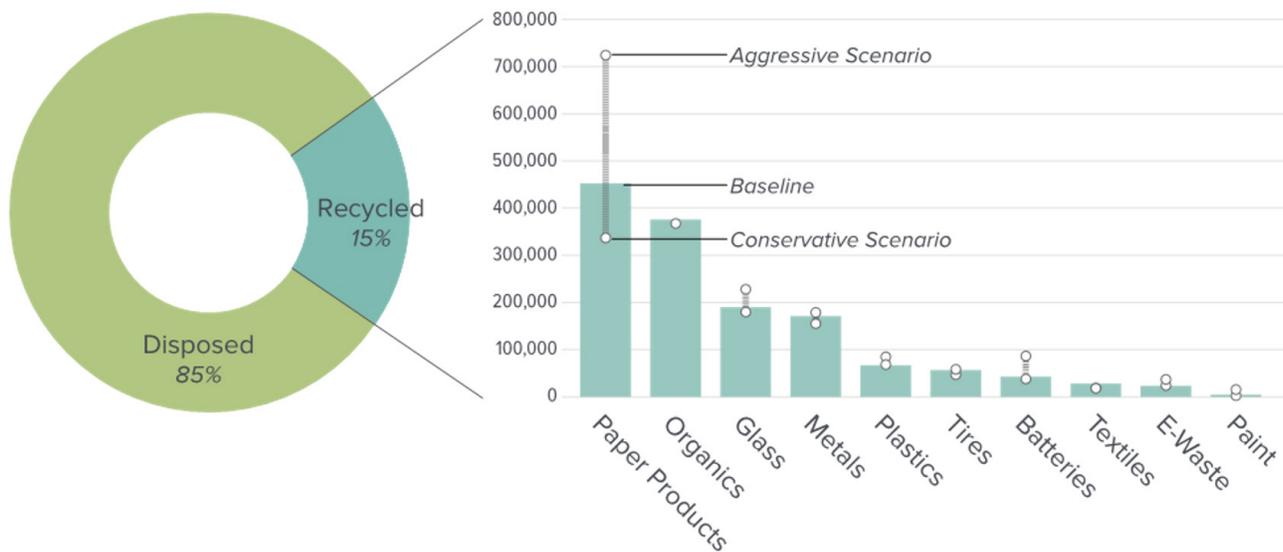
Community-specific and facility data was submitted to the MRI project team, then directly applied to the specific communities which it represented. Due to the voluntary nature of information sharing for all stakeholders, a sophisticated model was built to leverage the data that was provided and enable extrapolations to be made to account for data gaps. In addition to a base recycling rate calculation, conservative and aggressive scenarios were examined for each material category to reflect levels of certainty, and is expressed as a range. The study found Michigan to have an estimated recycling rate of 15% in 2013, with a possible range of 12.9-18.7%.

$$\frac{\text{TONS RECYCLED}}{\text{TONS RECYCLED} + \text{TONS DISPOSED}} = \text{RECYCLING RATE}$$

$$\frac{1,414,029 \text{ TONS}}{1,414,029 \text{ TONS} + 8,026,443 \text{ TONS}} = 15\%$$

Traditional household recyclables collected from commercial and residential sources comprise 44% of the recycling stream, while 26% of the total is composed of organics including yard waste. The container deposit program accounts for 11%, and other materials that are collected through a variety of take-back programs such as lead-acid batteries, appliances, tires, e-waste, and textiles comprise the remaining 19% of the recycling stream.

### MATERIALS RECYCLED IN 2013



## II. BACKGROUND AND PURPOSE

### ABOUT THE MICHIGAN RECYCLING INDEX

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Through a grant provided by the MDEQ Community Pollution Prevention Grant Program, the Michigan Recycling Index was created as a data collection process for a statewide assessment of recycling activities and recycled materials in Michigan. The goal was to develop a clear understanding of Michigan's recycling rate, identify convenient access to residential recycling, and project statewide curbside and drop-off recycling participation rates. Through a voluntary, broad-focused survey process, the MRI worked with the Michigan Recycling Coalition, as well as Michigan communities, material recovery facilities, yard waste facilities and take-back program operators. The use of this data is intended to provide a better understanding of the state of Michigan's recycling systems and can be used for information to assist in justifying state leadership and funding in this arena, attract public and private sector investments, increase the availability of low cost, environmentally beneficial feedstock to manufacturers, and improve program performance at all levels.

In April 2014, Gov. Snyder released Michigan's Residential Recycling Plan expressing the administration's determination to improve recycling, as well as the path forward to providing access to recycling for residents across the state. The governor's plan set a clear course of actionable steps to make timely improvements, beginning with efforts to benchmark and measure progress, followed by education and technical assistance for communities, provision of widespread and convenient access to recycling, development of markets for commodities, innovation, and a sustained commitment to success. The Michigan Recycling Index represented an early data gathering effort to serve as a benchmark for the states recycling status and to determine the current recycling rate. Additionally, the Governor's Recycling Council, composed of business leaders representing different aspects of the recycling system, identified improving data as the first step in increasing investment in recovery.

It has been estimated that increasing Michigan's recycling rate from current levels to 50% would result in the addition of \$435 million worth of valued recycled commodities to Michigan's economy annually. Guiding public and private investment to serve the public and private sector and maximize the value of material successfully diverted to recycling and composting is important to achieving goals that improve both Michigan's economy and environment.

## PROJECT LEADERSHIP

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The Michigan Recycling Index was a project of the Michigan Recycling Coalition, which received a Pollution prevention Grant (P2) from the Michigan Department of Environmental Quality. Supporting the MRC was an advisory group comprised of RRS, Cascade Cart Solutions, Clean Tech Inc., Emterra Environmental USA, Emmet County Recycling, Public Sector Consultants (PSC), the Michigan Association of Regions and Recycle Ann Arbor. The recycling survey administration, data collection and analysis were performed by RRS.

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*The Michigan Recycling Coalition (MRC) represents recycling and composting interests statewide. The Coalition is a recognized authority on waste reduction, beneficial utilization, recycling, and composting through the experience of its Staff and Committees. The MRC was started over 30 years ago by a group of passionate individuals who shared a vision to advance resource conservation issues in our great state.*



*The Michigan Department of Environmental Quality promotes wise management of Michigan's air, land, and water resources to support a sustainable environment, healthy communities, and vibrant economy.*



*For nearly three decades, Resource Recycling Systems (RRS) has been a leader in solid waste management systems across the country. Through the years, RRS has worked within many Michigan communities pushing boundaries with progressive solid waste plans, designed multiple material processing systems, developed compost management site plans and conducted compost site operator training courses in conjunction with the MRC. The RRS project team is comprised of experts in waste reduction and recovery, biomass energy, organics management, and corporate sustainability that generate projects with business case justification, actionable solutions and meaningful impact. RRS delivers what clients need to manage change in a resource-constrained world.*



*The Michigan Association of Regions (MAR) is the state association of the 14 state-designated planning and development regions in Michigan. Also known as regional councils, the planning and development regions are multi-service entities with state-defined boundaries that deliver an array of federal, state, and local programs while serving as region-level planning organizations, technical assistance providers, and region-wide “visionaries” to member counties’ local governments. As such, they are accountable to local units of government and effective partners for state and federal governments.*

## ADVISORY GROUP INVOLVEMENT

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The MRI Advisory Group met in early October 2014 to launch the project in person and to discuss and review the initial data gathering strategy and plans for outreach. Following that meeting, a more detailed and comprehensive data gathering plan was assembled that further featured the survey targets and the types of questioning within the surveys.

In October as the surveys were developed, the Advisory Group reviewed and provided comments on each survey and outgoing message. Most of this communication was important to request action from each target and shaping survey questions to best reflect the data needed. A second meeting took place in late November to review the methodology, evaluate progress and response rates, and discuss strategies to encourage responses. Following this meeting, the Advisory Group and MDEQ worked more closely with the project team to conduct outreach and solicit participation.

## DATA CONFIDENTIALITY

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Data was collected from public entities such as municipal and county recycling programs that are less concerned with the privacy of information being shared. At the same time, many of the processing facilities, material recovery facilities and collectors/transporters of recycled material are privately held and have reservations about disclosing information that may be considered proprietary or sensitive to business operations. For this reason, the MRI made a commitment to the safe handling of sensitive data that was submitted through the survey process. This commitment was posted on the MRI website at [www.michiganrecyclingindex.com](http://www.michiganrecyclingindex.com), and project participants were informed of this practice through survey distributions, reminder follow-ups and phone outreach. The MRI Data Security Commitment can be seen in Appendix II: Data Collection Materials.

## IV. PROJECT METHODOLOGY

To meet the state's objectives of determining the diversion rate for municipal solid waste (MSW) and profiling access to recycling opportunities throughout Michigan, the MRI collected data from a variety of Michigan organizations, businesses, and programs that recycle or compost material from the municipal waste stream. The MRI survey process followed the recommended survey guidelines established by the US EPA for measuring recycling rates, and submitted data was applied directly to the respondent communities. Additionally, data received was used as the basis for an extrapolation of recycling activity to gap communities which have analogous and relevant demographic characteristics that are likely to be reflected through recycling performance. The types of data collected and the data collection methods are described below.

### MATERIAL FLOWS

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The MRI considered MSW in Michigan to be divided into three primary streams: disposal, recycling, and compost, as described below:

#### DISPOSED MATERIAL

Disposed material from Michigan is either sent to a Michigan landfill, sent to a Michigan incinerator, or shipped out of state. The first two categories are quantified through the DEQ's reports of solid waste landfilled in Michigan as well as and public reports on the quantity of solid waste disposed at Michigan incinerators. Michigan is believed to be a net importer of solid waste so the third category is relatively small. In determining the total quantity of disposed material, incinerator ash was excluded from the total landfilled volume, as this waste was accounted for pre-incineration via the data from Michigan incinerators.

#### RECYCLED MATERIAL

Recycled material from Michigan is processed in three ways: it may be sorted at a Michigan MRF, sorted at an out-of-state MRF, or sold to brokers and/or end users without further sorting. The study measured material collected by communities, counties, and take-back programs, as well as material sorted at Michigan MRFs through a MRF survey. These MRFs included single, dual and multi-stream MRFs and operations that are baling source separated materials. The MRI assessed material that may have been sorted at out-of-state MRFs through survey questions for communities, counties, and haulers. For material sold to brokers and/or end users, MRI identified the most prominent market players and surveyed these organizations directly.

#### COMPOSTED MATERIAL

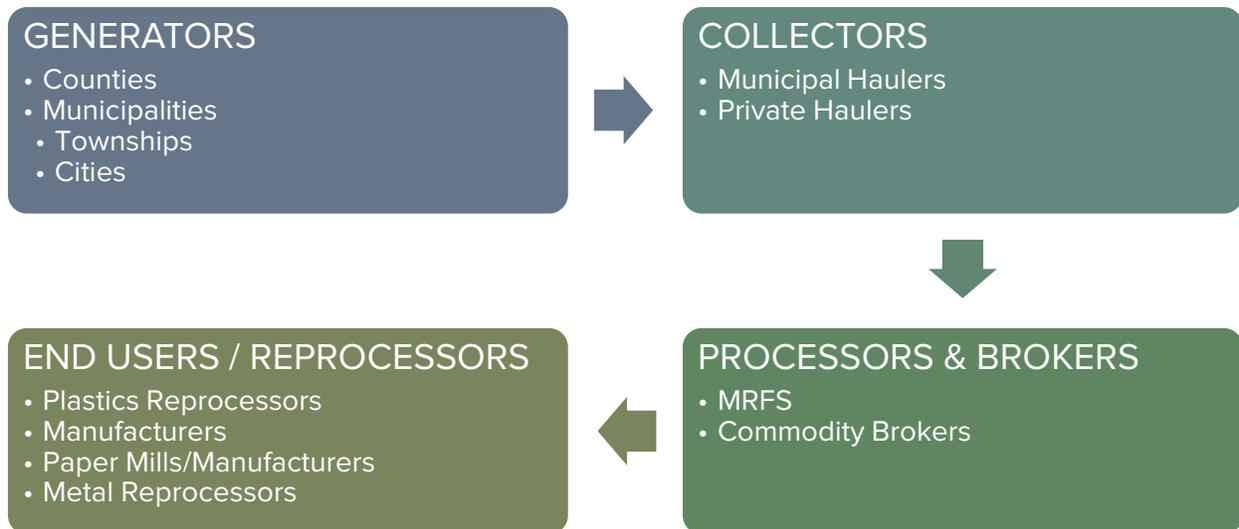
Composted material from Michigan is processed into finished mulch and compost either at Michigan compost facilities or out-of-state compost facilities. MRI collected data on the first category via surveys of counties and compost facilities; and via data from the DEQ's annual report required for licensed compost facilities. The MRI survey detected and accounted for material through the county surveys and through annual reports to the DEQ. Only large scale commercial composters were considered for MSW diversion; onsite, backyard composting was not part of the study as it is excluded from the EPA's definition of MSW.

## SUPPLY CHAIN FOR RECYCLED MATERIAL: STAGES OF DIVERSION

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Material diverted from disposal moves through a number of stages before being reprocessed into new items. The MRI study considered four primary stages, while noting intermediate steps between them. These stages of the diversion process are:

FIGURE 1: SIMPLIFIED MATERIAL FLOW DIAGRAM



### GENERATION

Material that has reached the end of its useful life is discarded into the recycling or compost stream by households and businesses.

### COLLECTION

Diverted materials are transported from the home or workplace to a central location.

### SORTING OR PROCESSING

Diverted materials are sorted by type and prepared for future reuse, usually baled for shipment.

### RE-PROCESSING OR REMANUFACTURING

Sorted materials are broken down into feedstock for the production of new products.

## MATERIAL DEFINITIONS

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### MUNICIPAL SOLID WASTE

Municipal Solid Waste is defined by the US EPA as “discards from residential and commercial sources that does not contain regulated hazardous wastes.” (EPA, State Measurement Program Template, 2013) The EPA has provided a detailed description of materials that are considered MSW and those that are not, and the full table is appended to this document. Key considerations in the definition of MSW include:

- MSW excludes waste from industrial operations, manufacturing, construction and demolition, and transportation equipment (automobiles).
- MSW excludes sludges and combustion ash.

### RECYCLING

Recycling is defined by the US EPA as “the series of activities by which discarded materials are collected, sorted, processed, and converted into raw material and returned to the economic mainstream by being used in the production of new products. It does not include the use of these materials as a fuel substitute or for energy production.” (EPA, State Measurement Program Template, 2013) Similar detail by material identifying the activities that are and are not considered recycling is excerpted from “Measuring Recycling: A Guide for State and Local Governments” and appended to this document. Key activities that are not considered recycling are:

- Combustion of material for energy recovery;
- Backyard (onsite) composting of food scraps and yard trimmings;
- Reuse (e.g. of refillable packaging, textiles, pallets, plastic products, etc.);
- Recycling of non-MSW such as waste from industrial processes; and
- Recycling of wood waste or yard trimmings from C&D debris.

Effectively, the EPA definition of MSW was used in this methodology, and is based on the historical management of municipal solid waste. Although it is common practice to landfill materials such as municipal sludge, nonhazardous industrial process wastes, and construction and demolition (C&D) debris along with MSW, these materials are not included in the standard scope of MSW or a recycling rate.

## DATA GATHERING

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The survey questionnaires that were administered aimed to collect data on the quantity of material recycled in the most recent complete calendar year (2013), as well as the availability of and participation in diversion programs statewide. The MRI’s surveys requested that respondents provide data for the 2013 calendar year (January 1 through December 31). In the event that data for this reporting period was not available from a particular facility, respondents were encouraged to provide data for an appropriate year-long period that aligns with their data collection & reporting cycle. For instance, composters report their annual throughput on a fiscal basis from October through September of the following year.

### DATA TARGETS

Based on EPA guidelines, the MRI survey was aimed at different types of organizations at all stages in the recovery process in order to understand the movement of waste materials in Michigan, as well as to enable estimates to be made for any missing data. The groups surveyed include counties, municipalities (with emphasis on larger municipalities), Material Recovery Facilities (MRFs), haulers, take-back collection program operators and end market buyers of recycled materials, including plastics reprocessors and paper mills.

### DATA COLLECTION CHALLENGES

Despite assurances of data confidentiality, the voluntary nature of the MRI survey presented challenges in collecting data from the private sector, especially from haulers and end market buyers, who were reticent to share sensitive information. Detailed information on responses for each respondent set can be found in Section IX of this report. Recommendations for improving future data collection efforts can be found in Section X.

## COMMUNICATION

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At the project outset, a suite of educational materials were developed to support the MRI, including an informational website that would provide project details and tools for targeted respondents, and give enough project context to non-targeted communities or stakeholders that would like to participate. Collecting data from this complex network required a multipronged effort from the project team, the Advisory Group and the MDEQ. Project details and goals were communicated directly by email but also through a dedicated project website. The website provided context and answered Frequently Asked Questions. Detailed information was provided through the survey distribution process and many survey targets were contacted personally through phone calls and direct emails, offering to provide additional information or clarifications, or simply verifying appropriate contact details.

# V. ACCESS TO RECYCLING IN MICHIGAN

## OVERVIEW AND DEFINITIONS

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Waste diversion begins when residents are given the opportunity to send their waste products, packaging, and other materials to a recycling or compost facility, rather than a landfill. These opportunities can come in the form of curbside collection or drop-off facilities available to residents. Access to recycling and composting are defined in terms of the availability of these services in a local area, as described below:

### CURBSIDE ACCESS

Curbside access to composting or recycling means that residents of a given community either have curbside collection services provided to them by municipal employees or a private hauler under contract with their municipality, or they have the opportunity to subscribe to curbside collection services made available by private haulers in their area. While municipally-collected or contracted services typically have higher participation rates than subscription services, both are counted as curbside access because residents under both systems have the opportunity to participate if they choose to do so.

Curbside collection is typically available to residents living in single-family homes and small multi-family buildings (four units or fewer). Residents in larger multi-family buildings and complexes may have access to curbside recycling or similar services through the commercial waste hauler contracted by the apartment owner. Studies quantifying access to recycling in the US have noted that access to recycling for multi-family residents is notoriously difficult to measure. For the purposes of this study, unless a community provided or mandated recycling services to all multi-family residents, it was assumed that only residents living in buildings of four units or smaller have access to the curbside recycling programs in a community. Residents of larger multi-family complexes were assumed to have access only to the drop-off recycling programs available to the general public.

As a further note on subscription curbside services, over the course of this study, the MRI team observed a wide variation in how subscription curbside recycling is offered in Michigan. In some regions it is common for haulers offering subscription waste collection services to provide recycling collection at no additional cost, while in other areas recycling is typically available only for an additional fee. In addition, some haulers may provide free recycle bins, while others charge the subscriber for the bin. Recycling carts are available through subscription in some areas, typically for a monthly fee, but some haulers provide them at no additional cost. The variation in fee structure and service availability in subscription areas has implications for resident participation in recycling programs and is worthy of further study.

### DROP-OFF ACCESS

Drop-off access to composting or recycling refers to the availability of a collection facility for these materials open to residents in a local area, either free of charge or for a nominal fee. Drop-off access, rather than being a simple “yes or no” metric, is evaluated on a variable scale based on a drop-off location’s proximity to residents, size, hours, materials accepted, etc. For the purpose of this study the MRI evaluated Michigan communities based on two levels of access to drop-offs.

- A **minimal** level of drop-off access is defined as having at least one drop-off facility in a given county that is open to the public.
- A **convenient** level of drop-off access is defined as having at least one drop-off location for every 10,000 persons in a given county.

### COMBINATION ACCESS

A combination of curbside and drop-off access provides many advantages to residents of a municipality, allowing residents to divert waste on a day-to-day basis through convenient curbside services, while maintaining the availability of drop-offs for larger volumes of material, special events, missed pick-ups, etc. Drop-off recycling opportunities are also important for residents in multi-family housing that is not served by a municipal curbside program, as noted above. Therefore, the MRI also evaluated the availability of a combination of both types of access in Michigan counties.

## ACCESS METHODOLOGY

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Data on access to recycling and composting via several sources, as described below:

### DATA FROM MRI SURVEYS

The survey of **communities** asked each respondent to indicate the availability of curbside recycling and compost collection in their community, and whether the community offered staffed and/or non-staffed drop-offs for recyclables and compostables. Communities were asked to list all drop-off locations.

The survey of **counties** asked for the number and location of all drop-offs offered by the county. It also asked counties to indicate whether the county itself operates or contracts for curbside collection services. Finally, county respondents were asked to identify haulers in the county who collect recyclables or compostables.

### DATA FROM MDEQ

The results from MDEQ's 2013 study of residential recycling in Michigan communities with a population of over 10,000 were used to identify the availability of curbside recycling in communities that did not respond to the MRI survey. This study provided information on the availability of municipally provided or contracted curbside recycling services and subscription curbside recycling services. It did not provide data on access to compost services or drop-off recycling.

### DIRECT RESEARCH

At the close of the data collection period, access information was still lacking from some Michigan counties and communities. To fill in these data gaps, project team members conducted web and phone research to determine the availability of recycling and compost services in these areas.

### ANALYSIS

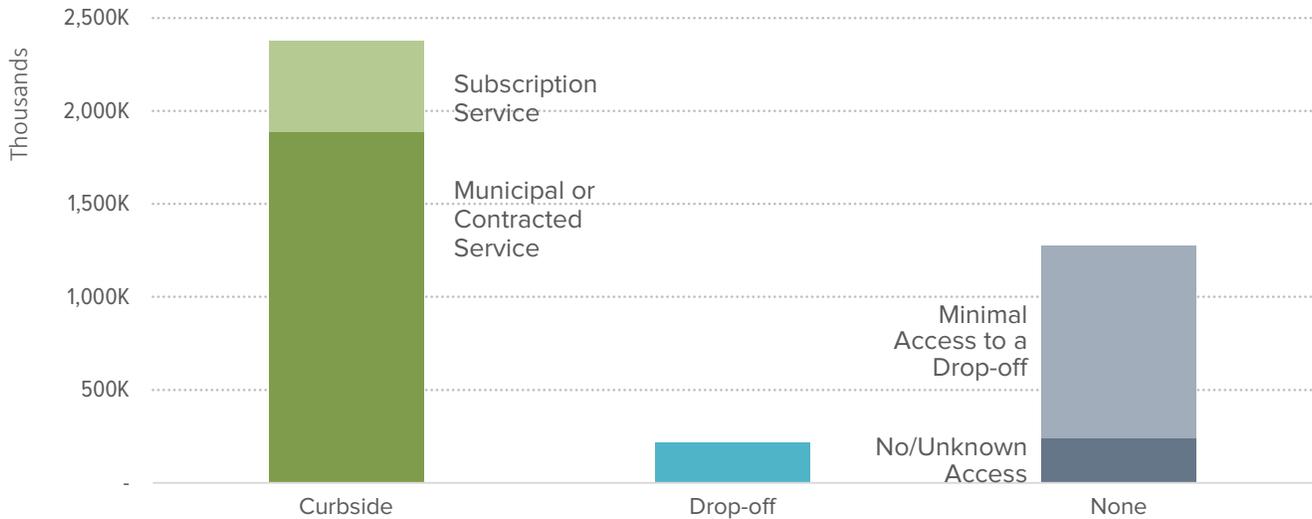
The data obtained on access was analyzed at the community level, first by aggregating community survey responses with county and hauler responses to note any county programs offering curbside or drop-off access to one or more communities in a given area. All drop-off locations were recorded in the community where they were located, regardless of whether they were reported on a county or community survey. This allowed the MRI team to avoid double-counting drop-off locations reported by both a county and a community in the final tally of the number of drop-offs in a county.

Data from MDEQ's 2013 study was then merged with the MRI dataset. Where any responses conflicted between the two datasets, the more recent MRI survey responses were used. The resulting data was aggregated at the county level to identify information gaps. The MRI team used the resulting list to prioritize the largest counties without data to conduct further research. In addition, the MRI Advisory Group reviewed the preliminary results of the study and identified areas where the survey may have produced incomplete results; the MRI team followed up by conducting additional research on the availability of services in those regions.

After all three data sources were aggregated, the number of households with and without curbside service availability were totaled to determine the percent of households with curbside access in the county. A metric of households per identified drop-off location was calculated as well to identify which counties met the criteria for minimal and convenient drop-off access. Finally, these metrics were combined to determine which counties have a combination of high curbside access and at least some drop-off access.

## ACCESS RESULTS

FIGURE 2: HOUSEHOLD ACCESS TO RECYCLING IN MICHIGAN



A sizeable majority (61%) of Michigan households have access to curbside recycling, either through municipal employees, municipal contractors, or subscription services. As mentioned above, residents of larger multi-family dwellings may have recycling services in their complex, but are not considered to have access to curbside recycling unless their municipality specifically provides or requires this service. Adding in access to convenient drop-offs – defined as at least one drop-off location for each 10,000 residents – brings the total percentage of Michigan households with recycling access to 67%. An additional 25% of Michigan households have at least one drop-off location for recyclables in their county, but with a ratio greater than 10,000 residents per drop-off.

Composting services, primarily for the collection of leaves and yard waste, are also available throughout Michigan, but the MRI study found lower rates of access to composting compared to recycling. 34% of Michigan households were found to have curbside compost services, while an estimated 43% of households statewide have access to curbside or drop-off compost services. Less data was available on compost compared to recycling services, due to lower response rates for compost-related questions as well as the fact that a key data source for recycling access, MDEQ’s 2013 survey of all communities with over 10,000 residents, did not cover compost services. As a result, the level of access to composting found in our study is likely a lower bound estimate.

Access to recycling and composting services varies across Michigan’s regions. The MRI study found that curbside services tended to be more accessible in the denser and more urbanized regions such as Southeast Michigan. However, several more rural areas excelled at providing extensive convenient drop-off networks, bringing their overall access rate up among the highest state-wide. Table 1, below, summarizes access in each of Michigan’s 14 economic development regions. Access to recycling and composting by county is shown in Figures 3 through 5 below.

TABLE 1: ACCESS BY MICHIGAN REGION

# HOUSEHOLDS (%)					
	Access to Curbside Recycling	Access to Curbside Composting	Access to Curbside or Convenient Drop-Off Recycling	Access to Curbside or Drop-off Composting	Total Households
Region 1: SEMCOG	79%	51%	79%	59%	1,844,758
Region 2: R2PC	35%	6%	35%	7%	116,077
Region 3: SCMPC	44%	10%	55%	39%	216,840
Region 4: SWMPC	23%	0%	23%	0%	112,586
Region 5: GLSPDC	73%	25%	73%	25%	229,459
Region 6: TCRPC	59%	31%	72%	53%	183,422
Region 7: EMCOG	50%	31%	59%	40%	313,452
Region 8: WMRPC	54%	20%	59%	25%	433,931
Region 9: NEMCOG	8%	8%	81%	8%	58,955
Region 10: Networks NW	22%	13%	67%	43%	122,388
Region 11: EUPRPDC	25%	0%	66%	0%	21,765
Region 12: CUPPAD	17%	7%	27%	19%	73,020
Region 13: WUPPDR	0%	0%	16%	9%	34,561
Region 14: WMSRDC	35%	20%	35%	22%	111,294
<b>TOTAL</b>	<b>61%</b>	<b>34%</b>	<b>67%</b>	<b>43%</b>	<b>3,872,508</b>

FIGURE 3: ACCESS TO CURBSIDE RECYCLING BY COUNTY

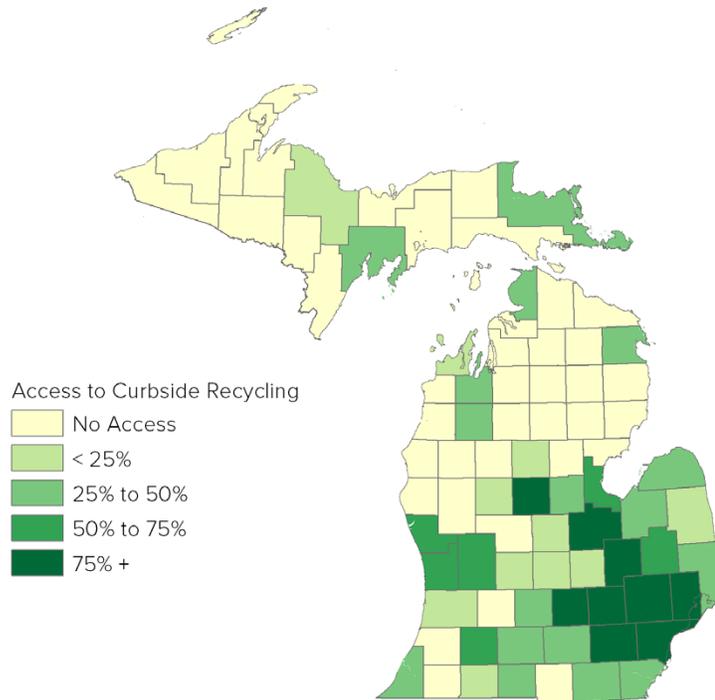


FIGURE 4: ACCESS TO DROP-OFF RECYCLING BY COUNTY

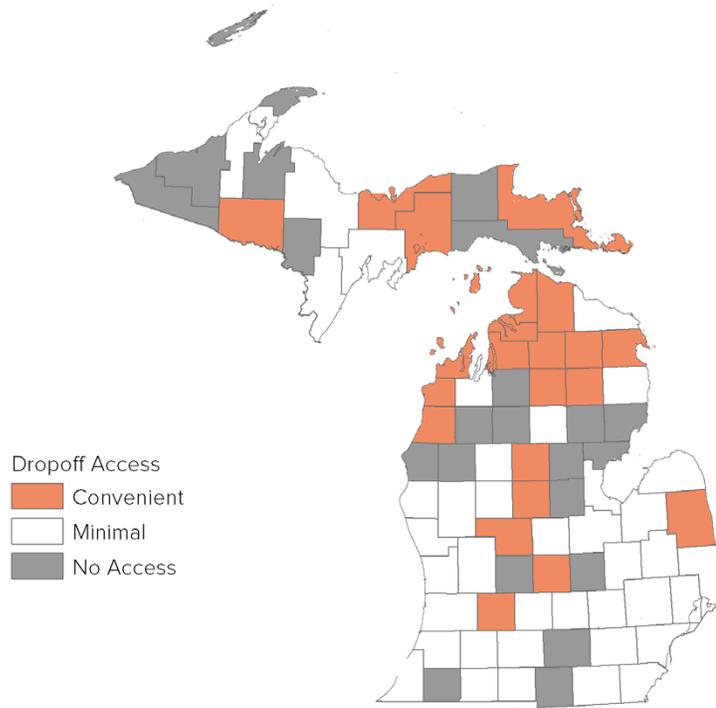
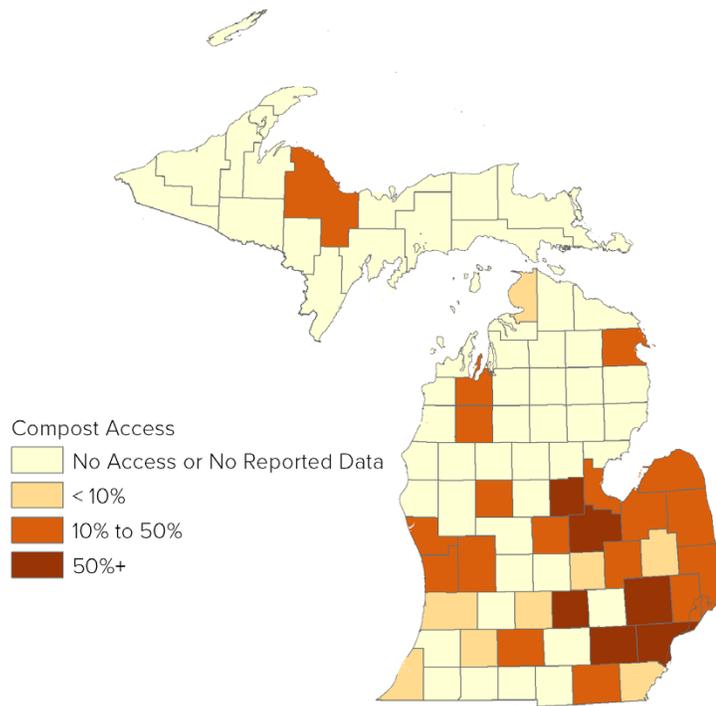


FIGURE 5: ACCESS TO CURBSIDE COMPOST COLLECTION BY COUNTY



# VI. PARTICIPATION IN RECYCLING PROGRAMS

## OVERVIEW AND DEFINITIONS

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Participation in recycling programs is the key component that links access to recycling opportunities with the ultimate goal of diversion. However, recycling programs typically have very limited data on participation as it can be costly and time-consuming to track. In this study, data was collected on the following measurements of program participation:

*The **curbside participation** rate is defined in this study as the percent of households with curbside services who set out their materials for collection over the course of the year. To measure curbside participation, communities may have haulers note how many stops they make on each collection route; use data from RFID-enabled carts, or conduct periodic set-out studies or spot checks. The MRI surveys asked communities to either provide any data they had on curbside participation, or provide an estimate based on their knowledge of the program.*

***Drop-off participation** can be measured in two ways, first by the number of households who made at least one visit to a drop-off location over the course of the year, and second by the number of visits made to drop-off locations. MRI asked for both measurements in the surveys of community and county programs, and asked respondents to provide actual data or an estimate if data was unavailable. Note that in many cases, drop-offs are not staffed so there was no feasible way for the number of visits to be measured.*

An additional dimension of participation in recycling programs refers to the quantity of material that participants recycle. A recycling program may improve their performance either by increasing the proportion of residents who recycle at all, or by increasing the quantity set out by existing recyclers. To assess the quantity recycled per participating household, this study collected data on the annual volume of material collected through recycling programs offered by counties, communities, and haulers.

## PARTICIPATION METHODOLOGY

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A limited number of survey respondents provided data and estimates on program participation. The project team reviewed these data and estimates and converted each estimate to the standard metrics described above. More respondents were able to provide estimates on curbside participation than drop-off. Of the two drop-off metrics, many more respondents provided estimates or counts of the number of households who used the drop-off than the total number of visits to the drop-off. This is likely due to the drop-off locations not being staffed or having the capacity to track the number of visits made.

A small group of respondents provided both participation data or estimates and annual volumes collected through their program. This data was analyzed to calculate annual pounds recycled per participating household, using the following formula:

$$\text{Pounds per participating household} = \frac{\text{total tons recycled} \times 2000 \frac{\text{lbs}}{\text{ton}}}{\text{Total eligible households} \times \text{Participation rate}}$$

Finally, a statewide participation rate was estimated based on the average participation rates reported by different types of recycling programs, weighted by the prevalence of access to each program type in Michigan.

## PARTICIPATION RESULTS

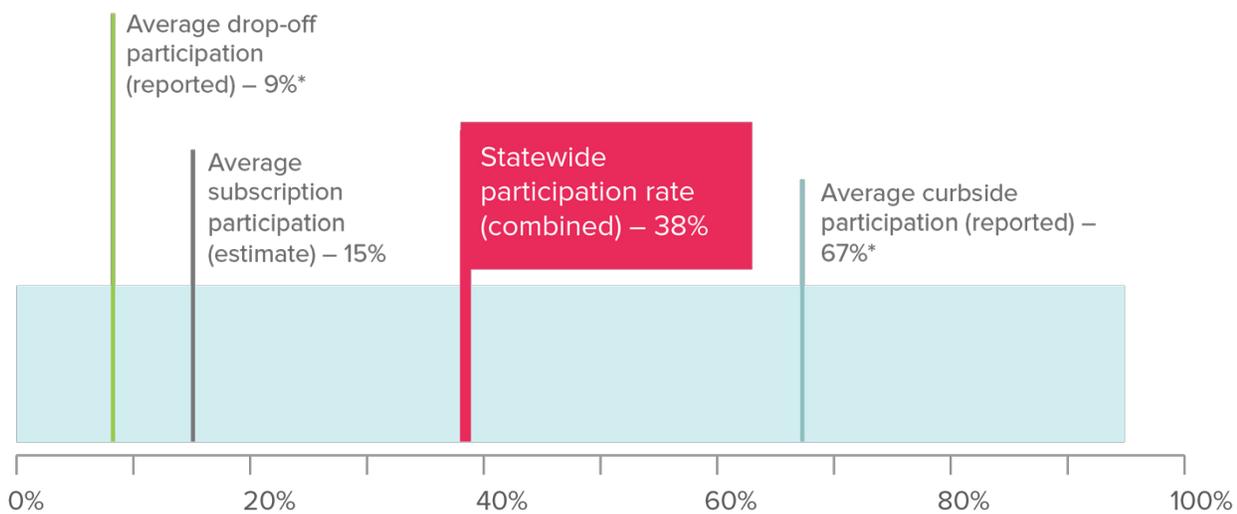
The MRI study obtained data from 36 communities on participation in curbside recycling programs and 20 communities on drop-off participation. The participation rates provided by these respondents ranged from close to zero to over 90%. While low and high participation rates were reported for both program types, drop-off participation rates tended to be lower than curbside participation. The average participation rate for drop-off, weighted by program size, was 9%, compared to 67% for curbside. The response range, median, and average weighted by program size are shown Table 2, below.

**TABLE 2: DATA COLLECTED ON RECYCLING PROGRAM PARTICIPATION**

	Range of Responses	Median Response	Average Rate Weighted by Number of Households in Community
Curbside Participation Rate	3%-95%	75%	67%
Drop-Off Participation: % of Households making at least one visit to Drop-offs	0.3%-90%	3%	9%

It is important to note that the participation rate averages for curbside and drop-off programs are based on a small number of community responses. However, the MRI analyzed the variety of curbside participation levels identified through the survey and cross-tabulated programs where the survey respondents estimated high, medium, and low participation rates with size of the community and the type of recycling program offered. This information can be found in Tables 18 and 19 in the appendix. Based on this review, the MRI team found that a wide array of participation rates were reported for small, medium, and large communities, and that the communities reporting participation data included some of the largest programs in the state, as well as a sample of smaller programs. A statewide participation rate was then estimated by combining the prevalence of each type of recycling access – municipal/contracted curbside, drop-off, and subscription curbside – with the corresponding average participation rate for that access type. Due to a lack of reported data on subscription curbside participation, a rate of 15% was estimated through the participation of the MRI Advisory Group. The combined participation rate estimated for the State of Michigan is 38.5%, as shown in Figure 6 below.

**FIGURE 6: RANGE OF PROGRAM PARTICIPATION RATES IN MICHIGAN**



The MRI team also looked at participation in curbside recycling programs through the metric of pounds per participating household, which was calculated for communities that reported both a participation rate and the tons recovered through their recycling program. As shown in the table below, between 300 and 840 pounds per participating household in the state were collected in curbside programs. The median volume was 571 lbs/participating household.

*TABLE 3: PARTICIPATING HOUSEHOLD PERFORMANCE*

	Range of Values (Lbs.)	Median Lbs. per Participating Household	Average Lbs. Weighted by Number of Households in Community
Pounds collected in curbside recycling program, per participating household	304-840	571	444

## VII. RECYCLING RATE FOR 2013

Recycled MSW is discarded material that is returned to the economic mainstream through the production of new products, excluding material that is used for energy production (EPA 2013). Diverted quantities were captured through a survey administered to MRFs seeking tonnages of material recycled by communities or facilities. Tonnage was obtained from survey respondents including 53 communities, 15 counties, and 6 MRFs. Additional tonnage data was received from Michigan-based paper mills, plastics processors and take-back programs, discussed in more detail below.

### TAKE-BACK PROGRAMS

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A variety of materials which are diverted from a destination as MSW are collected through take-back programs. Examples include electronic waste, textiles and beverage containers that are included in the state's 10-cent bottle deposit system. MRI members gathered information from a variety of these take-back program operators on an individual basis.

#### E-WASTE

The MDEQ directly provided a report on the total tonnage of electronic waste that was reported recycled by the recyclers that are registered with the state's electronics program in the 2013 program year, covering October 2012 through September 2013.

#### TEXTILES

Approximately fifteen textile collectors are operating in the state of Michigan through a variety of take-back channels including nearly 7,000 bins, store drop-offs and free household collection services. The state's most prominent non-profit and for-profit textile collectors were contacted with a request to provide information concerning the amount recycled in Michigan and collected information on the market and supply chain for these materials. Additionally, generation and supply chain information was collected directly from the national association which tracks these textile statistics, Secondary Materials and Recycled Textiles (SMART). Quantities for specific take-back programs were obtained, and total aggregate quantities of material were projected.

#### HAZARDOUS HOUSEHOLD WASTE

Data on hazardous household waste was obtained directly from MRFs that responded to the MRF questionnaire. Additionally, data was provided by ePaint Recycling ([epaintrecycling.com](http://epaintrecycling.com)), representing the total amount of paint that was collected from Michigan communities in 2013 through the ePaint program.

#### CONTAINER DEPOSITS

Michigan container deposit data is recorded in unredeemed deposit revenue, and must be converted to material tonnage accordingly. MRI received data on the volume of 2013 container deposit returns from the Michigan Department of Treasury. Using data provided by the Treasury, the MRI team determined the number and material composition of total deposits redeemed, then projected the total tonnage with average container weights for each material (metal, glass and plastic) commonly used. See methodology section of the report for details.

#### TIRES

Tire recycling data was obtained from the MDEQ, representing data that was voluntarily reported to the MDEQ Office of Waste Management and Radiological Protection, as many end users are not mandated to report commodity usage. Data considered for incorporation into the recycling rate includes 2013 tonnage that went into septic, sidewall rings and other products such as playground equipment, rubber rock chips, and crumb. Since Tire Derived Fuel (TDF) is not considered recycling, the tonnage reported by each processor making TDF was divided evenly by the number of product types they reported, though it is unknown exactly what fraction of that material is used for each end product.

## BATTERIES

The Project Team collected information from the Association of Battery Recyclers for an industry-leading calculation methodology for measuring lead acid battery recycling. The resultant extrapolation provided what was determined to be an aggressive scenario, especially when benchmarked against an alternative approach following a US EPA protocol. The MRI team utilized a blended approach for the baseline calculation, and utilized these reference approaches for aggressive and conservative scenarios in the sensitivity analysis. Data obtained on recycled batteries was from Call2Recycle, the primary take-back program for rechargeable batteries and mobile phones operated by US manufacturers of rechargeable batteries. Call2Recycle provided a total volume of batteries collected in Michigan in 2013.

## END USERS & REPROCESSORS

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MRI conducted phone and email surveys to measure the amount of material demanded by major commodity end users and calculate the size of the end markets for these materials in Michigan. The Michigan Business Recycling Directory was cross-referenced against proprietary databases to identify the most prominent material end users and reprocessors in the state. Outreach recipients included businesses that buy material processed at MRFs, or material that may travel from generators to end markets through brokers or other sources. For paper this included paper mills, and for plastics this included plastics reprocessors. The project team was not aware of glass reprocessors in the state so did not include that material in its calculations. Additionally, the metal scrap yards were not included in the scope of the research, as the majority of the material would not be counted as MSW. Data on White Goods (i.e. recycled home appliances) were requested through the municipal, county and MRF surveys.

## PAPER MILLS

The MRI team reached out by phone and email to all major paper mills located in the state of Michigan, requesting data on the amount of post-consumer recycled material purchases or processed in 2013. A significant fraction of these mills provided data on tonnage purchased from brokers or MRF sources.

## PLASTICS & FILM REPROCESSORS

For take-back programs and end users, MRI built a database of the state's larger material purchasers and conducted individual outreach to each program rather than requesting it be entered in a standard survey format. Some large reprocessors provided tonnage data for material recovered. The MRI team reached out directly to recyclers of plastic film, including 'closed-loop' recyclers of residential material in the form of plastic bags and reprocessors of high-quality low density polyethylene film that feeds into alternative products. Tonnage and market data was received from some of the most prominent handlers of plastic film in the state, providing a high level of confidence for this category.

## QUANTITY DISPOSED

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Disposal tonnage was retrieved from annual fiscal report of solid waste landfilled in Michigan, as well as from reported data from two incinerators in the state including Kent and the Greater Detroit Resource Recovery Authority. Landfill disposal quantities were adjusted to avoid double-counting incinerator ash, then added to the total incoming quantities of incinerated materials less the recovered metal quantities, yielding a total disposed tonnage of 8,026,443 tons.

Disposed MSW is reported to the MDEQ in cubic yards, and reported material quantities are converted to tons using both generic and material-specific conversion factors. These conversions may have a significant impact on disposal data accuracy. For this calculation, reported MSW volumes were converted using the MDEQ's methodology of 3 cy/ton of waste. It is worth noting that the EPA calculates with 3.3 cy/ton; if Michigan were to use that conversion factor, disposal tonnages would be decreased and the calculated recycling rate would increase by over 1 percent. Additionally, there is reason to believe that reported landfill tonnages may include substantial fractions of materials that fall outside of the classification of MSW, in effect inflating reported quantities of disposed MSW and lowering the calculated recycling rate.

## THE RECYCLING RATE

In 2013, the State of Michigan achieved a total statewide MSW recycling rate of 15% in 2013. Of the total amount of material recycled, only 44% is composed of 'traditional' recyclable materials collected from commercial and residential sources. 26% of the total is composted organics, mostly yard waste. The container deposit program accounts for 11%, and other source separated streams (such as lead-acid batteries, white goods, tires, e-waste, and textiles) make up the remaining 19%.

$$\frac{\text{TONS RECYCLED}}{\text{TONS RECYCLED} + \text{TONS DISPOSED}} = \text{RECYCLING} \quad \frac{1,414,029 \text{ TONS}}{1,414,029 \text{ TONS} + 8,026,444 \text{ TONS}} = 15\%$$

FIGURE 7: MATERIALS RECYCLED IN 2013

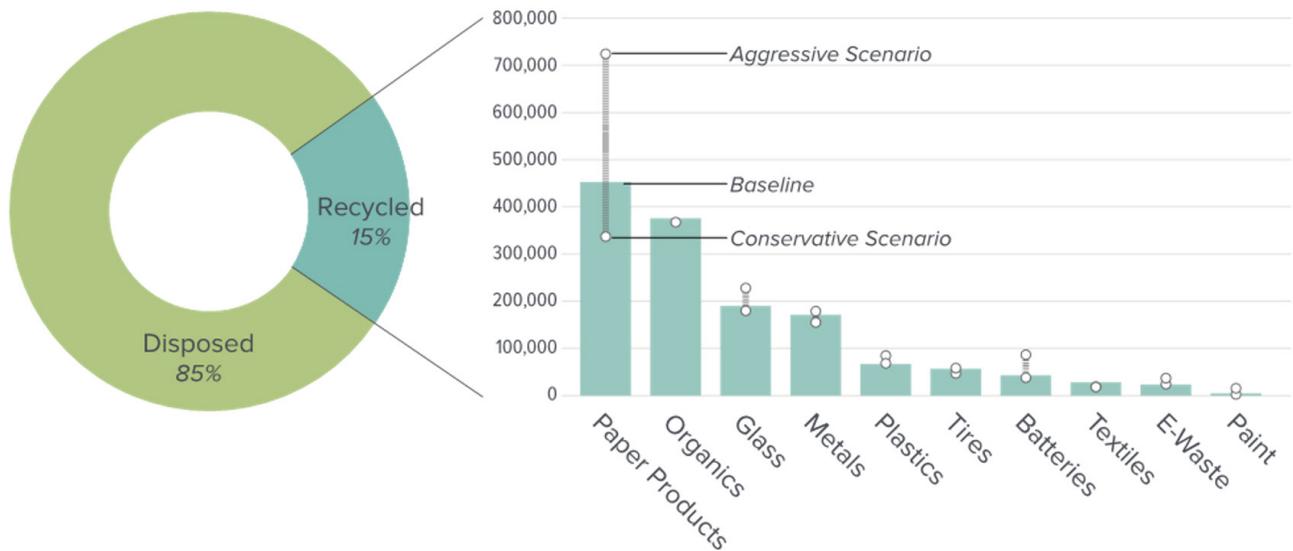


FIGURE 8: TONNAGE RECOVERED BY REGION

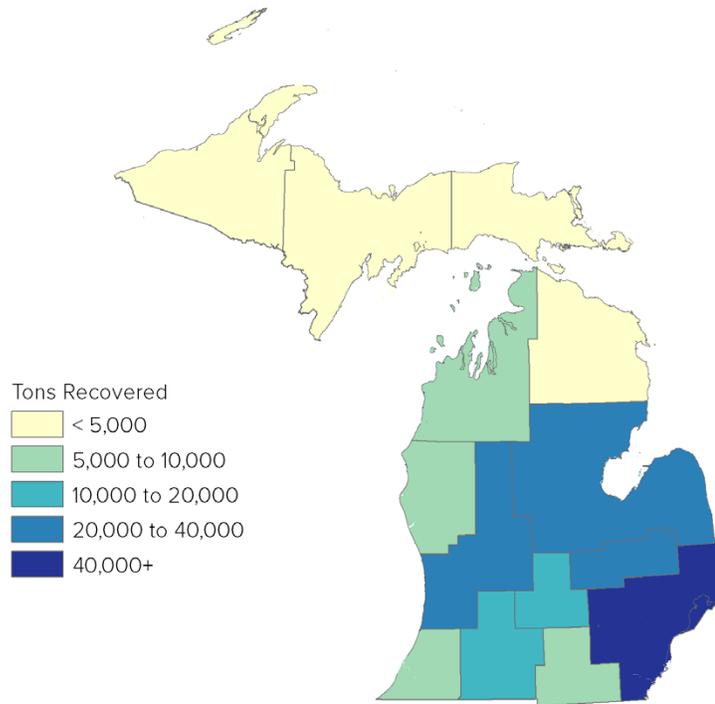


TABLE 4: RECOVERY BY REGION

Region	Tons Recovered	Average Lbs per Household Recovered	Total Households
Region 1: SEMCOG	239,109	259	1,844,758
Region 2: R2PC	5,043	87	116,077
Region 3: SCMPC	19,157	177	216,840
Region 4: SWMPC	6,261	111	112,586
Region 5: GLSPDC	33,864	295	229,459
Region 6: TCRPC	13,236	144	183,422
Region 7: EMCOG	36,540	233	313,452
Region 8: WMRPC	35,932	166	433,931
Region 9: NEMCOG	4,218	143	58,955
Region 10: Networks NW	9,332	153	122,388
Region 11: EUPRPDC	1,891	174	21,765
Region 12: CUPPAD	4,169	114	73,020
Region 13: WUPPDR	1,120	65	34,561
Region 14: WMSRDC	8,071	145	111,294

## VIII. RECYCLING RATE: CONFIDENCE AND SENSITIVITY

The recycling rate of 15% is based on the best available data sourced through the MRI survey, as well as data provided by DEQ, Department of Treasury, US EPA, and industry groups. Recovery may be higher in some material categories, especially with respect to recovery of commercial cardboard; for this reason, conservative and aggressive scenarios were modeled for each material category and fundamental assumption, providing a confidence interval, or range of potential rates. Under the low recovery scenario, where residential recovery rates are reduced to the lower end of observed rates, along with the most conservative assumptions from each material category (such as the amount of tires assumed to come from commercial vs. industrial sources), the rate could be as low as 12.9%. Conversely, if the most aggressive set of assumptions for each extrapolation were realized, the statewide recycling rate could be as high as 18.7%. A detailed explanation of modeling methodology can be found in Appendix II: Extrapolation Methodology.

The MRI team leveraged the model to explore ways to increase recycling and their effect on the recycling rate. If access and participation are increased in residential recycling:

- If all single family households in the state recycled at the average rate of the reported curbside programs (i.e. 433 lbs/household) the recycling rate would increase to 17.7%.
- If all households in the state (including single family and multifamily) recycled at the average rate of the reported curbside programs (i.e. 433 lbs/household) the recycling rate would increase to 18.2%.
- If all households in the state (including single family and multifamily) recycled at the aggressive rate (i.e. 561 lbs/household) the recycling rate would increase to 20.4%.

Data on amount of commercial material currently recycled still has a large amount of uncertainty and likely significant areas for growth. Some increases in the recycling rate may be accomplished through additional data gathering, while others will require new policy and focus:

- Increasing commercial recycling to the high scenario (46% of residentially recycled material) increases the rate to 16.6%
- Increasing the corrugated cardboard recycling rate to be similar to data reported by South Carolina and Delaware, would increase the recycling rate to 18.6%.

There is some concern that the state landfill reports include some industrial and construction and demolition material in the MSW totals. This can have a significant effect on the recycling rate calculated here:

- If the amount of material reported landfill material is reduced by 10%, meaning that some industrial or construction and demolition material were being counted as MSW disposed, the baseline recycling rate jumps to 16.4%.
- If the landfilled material were reduced by 20%, the baseline recycling rate would be 18.1%.

As can be seen in the above data, there is no single solution that can be implemented to achieve the state goal of 30% recovery. In order to achieve it, a multi-pronged approach will need to be undertaken.

- Improve data gathering on the amount of material recycled (See Section XI.)
- Evaluate data collection for amount of material disposed
- Expand access to convenient curbside and/or comprehensive drop-off for all single family and multifamily homes
- Expand access to commercial recycling
- Expand access to public area recycling

## IX. DATA SOURCES

For communities, haulers, counties, MRFs, and composters, individual surveys were designed and administered online. A PDF version of each survey was available to each respondent through on the Michigan Recycling Index website at <http://www.michiganrecyclingindex.com>; these versions could be used as reference for completing the survey online, or printed and mailed directly to RRS.

### SURVEYS

#### COMMUNITIES

Communities in Michigan may collect diverted materials directly from their residents or businesses, or contract with a private company to do so. In other communities, residents and businesses contract with collectors on an individual basis. The MRI community survey aimed to determine the types of recycling and compost programs offered by the relevant community, how many residents participate in the programs, how much material is diverted through these programs, and where the material is sorted and processed. It principally addresses the generation and collection phases of diversion.

This survey was distributed to all Michigan communities with a population over 10,000 and was also made available for smaller Michigan communities to fill out via the Michigan Recycling Index website.

TABLE 5: COMMUNITY SURVEY RESPONSE

COMMUNITY SURVEY	
Total Targeted Population	5,985,128
Total MI Population	9,896,000
Target Responded Population	3,880,555
Unsolicited Responded Population	111,727
# Of Target Responses	98
# Of Unsolicited Responses	36
Average Target Response Population	41,283
Average Unsolicited Response Population	3,020
Percent of MI Population Targeted	60%
Percent of Target Population Responded	67%
Percent of MI Population Responded	40%

#### COUNTIES

Counties in Michigan frequently operate or contract for a variety of diversion-related services, from operating a recycling facility to providing technical assistance to communities within the county. The MRI county survey aimed to determine which services each county offers to residents, how many residents participate in these programs, what other services are available within the county, and how much material was diverted via county-provided services. Counties that operate a MRF or compost facility were also directed to fill out a more detailed survey for those operations. This survey was distributed to all 83 Michigan counties.

TABLE 6: COUNTY SURVEY RESPONSE

COUNTY SURVEY OVERVIEW	
# of Counties Surveyed	83
# of Counties Responded	56
% of Counties Responded	67%
% of Mi Population Represented	84%
Response Rate	67%

### MRFS

The survey of MRFs gathered data on incoming recyclables by county of origin (or out-of-state source) and outgoing recycled materials by material type for 2013. Also collected was data on the types of material processed at the MRF, e.g. single-stream, dual-stream, residential, or commercial. Finally, surveys addressed the destinations for each type of material shipped by the MRF, whether sold directly to an end user or to a broker who then resells the material.

This survey was distributed to 51 MRFs that were known to process material from Michigan, including all MRFs that are members of the Michigan Recycling Coalition, all publicly operated MRFs in Michigan, and all MRFs operated by the three companies that operate a majority of MRFs nationwide. The MRF survey was designed to capture data not only on commingled streams, but also the many source-separated commercial streams that are collected including cardboard and shredded paper. Of the 51 MRF facilities directly surveyed, 20% of facilities surveyed responded to the survey. Of those, 45% of facilities shared tonnage data.

TABLE 7: MATERIAL RECOVERY FACILITY SURVEY RESPONSE

MRF SURVEY OVERVIEW	
# of MRFs Surveyed	51
# of MRFs Responded	21*

\*21 MRFs responded, and 11 provided tonnage data

### COMPOSTERS

Our survey of composters gathers data on the quantity of material received from Michigan counties, as well as out-of-state sources, during 2013; and the quantity of outgoing finished compost and mulch sold or used onsite. It additionally asks for information on the sources of material, e.g. residential, agricultural, or commercial.

This survey was distributed to 120 Michigan composters who are registered with MDEQ. Approximately 20% of targeted composters supplied information through the survey. In addition to the data that resulted from direct responses supplied by the target group, annually reported information was gathered from the MDEQ to provide an estimate of the total amount composted by registered facilities in the 2013 program year, covering October 2012 through September 2013.

TABLE 8: COMPOSTER SURVEY RESPONSE

COMPOSTER SURVEY OVERVIEW	
# of Composters Surveyed	117
# of Composters Responded	22

## HAULERS

Haulers collect MSW directly from the point of generation and possess data on recyclable material sources and generation rates. The hauler survey was designed to collect high-level information about recyclables hauling from private companies throughout the state. The information request was seeking data on the broad (county-level) sources of recyclable and compostable material collected, types of residential curbside recycling services offered by the company, the number of residential, commercial and drop-off sources, and a breakdown of material collected by county. A survey directed specifically to haulers was distributed directly to nearly 320 individuals representing 108 companies at 125 different office locations in Michigan. Multiple email requests were sent to the targets, accompanied by an early December letter from the Director of the MDEQ. Haulers largely chose not to provide this information, with only 2% of the target audience responding.

## X. RECOMMENDATIONS FOR FUTURE DATA EFFORTS

Several learnings from the Michigan Recycling Index project can provide guidance that will strengthen the ability to measure access and recycling in Michigan in the future. These recommendations pertain to implementation of reporting best practices, specific calculation methodologies and data collection.

### STANDARDIZE REPORTING PROTOCOLS

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In order to achieve the aggressive goal of dramatically increasing the recycling rate, it is necessary to implement a variety of best practices that can achieve that goal. This should begin with instituting measures that will bring greater clarity around material data and enable the state to benchmark and measure progress. A primary recommendation is that MDEQ design and establish systematic and consistent reporting protocols for recyclers in Michigan in order to accurately track flows as material moves from one entity to the next. The low survey participation rates in the MRI illustrated the limitations of a voluntary reporting.

House Bill No. 5740 was introduced in 2014 and would amend the Natural Resources and Environmental Protection Act to mandate reporting for material flows in the state. Under this type of arrangement, collectors and material recovery facilities can establish convenient record-keeping mechanisms that will enable them to provide consistent data on an annual or semi-annual basis, while brokers and end users can report tonnages that they buy and sell. Since the same material moves from one entity to another, it is important to understand sources and destinations of materials to remove the risk of material double counting. Submissions for recyclers should include complete reports of all recycling activities conducted during the preceding fiscal period. To simplify and streamline the process, data should be submitted separately for each establishment owned by a recycler through an electronic reporting system provided by MDEQ. In addition to the mandatory requirements for major recyclers, voluntary reporting should be included for all other entities.

### FUTURE APPROACH TO CALCULATING RECYCLING IN MICHIGAN

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The recycling industry in Michigan is a complex network of large and small commercial and residential points of generation, public and private collection operators, public and private material processing facilities (MRFs) that may handle few source-separated material types or a heterogeneous stream of commingled material. The US EPA has provided a set of guidelines for measuring recycling rates, and the MRI team used this framework for data collection and methodology in measuring recycling through the MRI.

Going forward, it is recommended that a few adjustments be made to the rubric, including the addition of construction and demolition (C&D) materials for inclusion in the diversion rate calculations. At 15% of the overall waste stream, C&D represents a critical source of material generation and with such substantial geographic point sources of urban demolition, every effort should be made to recover these materials. C&D can have a drastic impact on the recycling stream, as can be seen by the inclusion of C&D in recycling rate calculations in other states.

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## REFINING THE DATA COLLECTION METHODOLOGY

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The next data collection efforts should focus heavily on MRFs as well as the end markets for these materials such as paper mills and plastics reprocessors and metal recyclers, both in-state and out-of-state markets. It will be essential that facilities document commercial vs industrial material. A successful methodology should build on the collaborative approach that was initiated with the MRI, and extend its reach by effectively leveraging trade associations and industry networks to serve as a liaison to recyclers and end markets, facilitating collection and/or aggregation of responses on behalf of association constituents. This will ensure these players are engaged early in the process and/or through reporting protocols as described above. A methodology that focuses on receiving complete and accurate data from MRFs and end markets will narrow the confidence interval for the recycling rate.

In addition, equally important to the recycling rate is determining the actionable steps necessary to improve the recycling rate. To understand areas that are high performing and those that are low performing, data from haulers and communities should also be collected, but less frequently such as once every two to three years. This data can be used to target localized increases in recycling with attention to recycling access status such as multi-family recycling access and commercial recycling. One way to accomplish this is to survey counties on a biannual basis and use the data collected to target surveys to local programs and haulers. This should be done with the cooperation of the local government and industry trade associations to gain buy-in and cooperation.

## XI. APPENDIX I: EXTRAPOLATION METHODOLOGY

### MODEL METHODOLOGY

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The MRI project was successful in gathering participation from a sizable range of communities across the state, with data collection efforts weighted toward higher population areas. While response rates were high, not all participating communities were able to provide tonnage data. Data provided by communities was used directly, and calculation of total recycling in the residual communities was achieved through modeling the generation for these communities. The modeling approach focused primarily on projecting tons of recyclable material collected through traditional curbside and drop-off programs, as described here.

1. Based on the high degree of access data collected through the MRI survey, data from the previously administered PSC survey, as well as research conducted by the MRI team, the small number of households residing in communities with unknown access levels were assigned an access classification. For communities that didn't respond to the survey or did not provide tonnage data, an expected average recovery factor was used (see Table 8) in conventional standards of annual pounds per household sent to a MRF or other processing facility.
2. In order to determine the average pounds per household, a weighted average of all communities and counties that provided tonnage data within that access classification was calculated using reported tonnages and 2012 US Household Census data. The resulting generation factors are summarized in Table 8. These extrapolations are believed to be closely in line with similar generation rates seen across the country, and the sensitivity analysis was performed to assess the impacts of varying the generation rates by +/-30% for the high and low scenarios.
3. Data from the US Census was used to determine the percentage of households in a given community that lived in multi-family housing (defined as five or more units in a structure), as very few multi-family buildings receive curbside collection. These households were removed from the total number of households in the community, and were then classified as having either convenient or minimal drop-off access as appropriate. The remaining communities which could not be verified as having access to a recycling drop-off center in their county were assumed to not generate any recyclable material.
4. For communities with subscription curbside recycling access, or large communities where only a small subset of the population has access to municipal or contracted curbside collection, household counts were appropriately prorated and assigned curbside and drop-off access separately. For the purpose of segmenting the subscription communities into those that participate and those that do not, the assumption was made that 15% of households actually sign up for and receive curbside collection, while the remaining households were assigned the recovery of a household with drop-off access

5. Commercial data was modeled by analyzing data provided by six MRFs who were able to report on commercial and residential tonnage separately. On average, commercial material accounted for 33% of the recycling stream in these MRFs, which is slightly lower than rates seen in California and Pennsylvania where commercial recycling has been shown to be 40% of the recycling stream. The MRI analysis evaluates the commercial recyclables stream as constituting 33%, 216,000 tons, as a baseline proportion of the recycling stream.
6. Data provided by five paper mills operating in the state can account for over 165,000 tons of non-MRF paper and cardboard sourced from within Michigan, and this does not include some prominent mills and commercial paper handlers who did not provide tonnage information. Other research into recycling rates for commercial sources of old corrugated containers in states who have reported this data explicitly (such as Delaware and South Carolina) indicates that Michigan could be generating as much as 473,000 tons of commercial OCC annually. If this were the case, the baseline recycling rate would be 17.1%.

**TABLE 9: HOUSEHOLD EXTRAPOLATION FACTORS BY ACCESS CLASSIFICATION**

COMMUNITY ACCESS CLASSIFICATION	ANNUAL LBS PER HOUSEHOLD EXTRAPOLATION (LB/HH)
Curbside & Drop-off	433
Convenient Drop-off	163
Minimal Drop-off	88
None	0
Unknown	0

**TABLE 10. MODEL ASSUMPTIONS IN SENSITIVITY ANALYSIS**

MATERIAL	ASSUMED SCENARIO	CONSERVATIVE SCENARIO	AGGRESSIVE SCENARIO
Municipal/Contracted Curbside & Dropoff lb/hh	433 lb/hh	-30%	+30%
Enhanced Dropoff lb/hh	163 lb/hh	-30%	+30%
Minimal Dropoff lb/hh	88 lb/hh	-30%	+30%
% Commercial Material	33%	33%	46%
% Subscribers in areas where available	15%	11%	20%
E-waste (reported)	24,548 tons	24,548 tons	36,823
% of tires recycled vs. TDF	85%	70%	90%
Textiles - tons	29,730	5,541	32,703
Batteries*	45,121	40,609	110,000
Paint	225	203	450
Average MRF Residue Rate	9%	11%	6%
White Goods	75,096	53,009	79,513

\*EPA methodology was applied in baseline scenario, while industry-provided assumptions were applied in the aggressive scenario

## CONTAINER DEPOSITS

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The number of containers recovered through the container deposit program was calculated using the total value of redeemed deposits and percentage composition by material provided by the Michigan Department of Treasury. Total tonnage was then calculated using average container weights calculated by Franklin Associates for the California BEAR Report.

TABLE 11. CONTAINER DEPOSIT MEASUREMENT

MATERIAL	CONTAINER WEIGHT (LBS)	% OF STREAM	# OF CONTAINERS	WEIGHT (LBS)	WEIGHT (TONS)
Glass	0.4366	13%	452,464,779	197,546,122	98,773
PET	0.0749	23%	800,514,609	59,958,544	29,979
Aluminum	0.0302	64%	2,227,518,911	67,253,151	33,627

## REPORTING UNITS

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Respondents were asked to provide material quantities in tons if possible, but were given the option to provide alternative units such as pounds or cubic yards. Most reported data was in tons or pounds, with only a few very small quantities of material being reported in cubic yards.

## DATA QUALITY

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### CHALLENGES TO DATA COLLECTION

The surveys received response rates varying from relatively high including the County (60%), Municipality (44%), and MRF (41%) to lower rates among the composters (13%) and haulers (2%), though multiple targets were from the same hauling company so response rates were slightly higher at the company level, though not informative overall. For the purposes of calculating tonnage recycled, respondents were asked to share the total tonnage that was recycled in their community or facility. Among the subset of survey targets that participated in the MRI survey, tonnage data was reported by 21% of these respondent communities, 28% of respondent counties, and 52% of respondent MRFs. As a result, the limited data received through voluntary disclosure led the project team to place greater emphasis on modeling approaches to measure diversion at the community level.

Data measuring the diversion of material collected through the container deposit program, e-waste collection, composting, tire recycling, and textile recycling was obtained directly from published reports and industry sources. Container Deposits Michigan's Bottle Deposit System successfully captures material from the MSW stream and sends clean material to be processed for recycling. These recycling activities must be reflected in the total materials to develop an accurate recycling rate, and appropriate data was gathered from the state for this purpose.

### DOUBLE-COUNTING

When gathering data from multiple segments of the recycling value chain, it is necessary to take measures that will avoid double-counting of material. For instance, if collected material is reported by a municipality or county, and is also reported by a MRF that received that data, the possibility for double-counting exists. To reduce the likelihood of this scenario, the MRI requested as much information as possible on the sources and destinations of all reported material, an approach required to gain a clearer picture of the recycled material flow in the state. As previously described, material that flows around MRFs must be included in the accounting, such as commercial fiber that is transported directly from businesses to mills for processing.

### INCOMPLETE DATA

A fraction of survey respondents provided a response to the survey, but were unable or unwilling to provide complete information. One example would be a MRF that provided inconsistent material breakouts for material data, such as total paper but not broken out by paper types. Alternatively a MRF might be able to provide tonnage but not the source of that material. Some community respondents provided information on program access but did not provide tonnages.

## XII. ADDITIONAL DATA

### ACCESS DATA

TABLE 12: MICHIGAN HOUSEHOLDS BY LEVEL OF ACCESS TO CURBSIDE RECYCLING

ACCESS TO CURBSIDE RECYCLING		
	Number of Michigan Households	% of Michigan Households
Municipal or Contracted Curbside	1,890,018	48.8%
Subscription Curbside	488,280	12.6%
No Access to Curbside Recycling Collection	1,494,210	38.6%
<b>TOTAL HOUSEHOLDS</b>	<b>3,872,508</b>	<b>100%</b>

TABLE 13: MICHIGAN HOUSEHOLDS BY LEVEL OF ACCESS TO DROP-OFF RECYCLING

ACCESS TO DROP-OFF RECYCLING		
	Number of Michigan Households	% of Michigan Households
Convenient Drop-Off Recycling (At least one location per 10,000 residents)	267,114	6.9%
Minimal Drop-Off Recycling (One or more locations in county)	3,308,200	85.4%
No Drop-Off Recycling	297,194	7.8%
<b>TOTAL HOUSEHOLDS</b>	<b>3,872,508</b>	<b>100%</b>

TABLE 14: MICHIGAN HOUSEHOLDS BY LEVEL OF ACCESS TO CURBSIDE COMPOSTING

ACCESS TO CURBSIDE COMPOSTING		
	Number of Michigan Households	% of Michigan Households
Municipal or Contracted Curbside	1,273,042	32.9%
Subscription Curbside	73,601	1.9%
No Access to Curbside Compost Collection	2,525,866	65.2%
<b>TOTAL HOUSEHOLDS</b>	<b>3,872,508</b>	<b>100%</b>

**TABLE 15: MICHIGAN HOUSEHOLDS BY LEVEL OF ACCESS TO DROP-OFF COMPOSTING**

ACCESS TO DROP-OFF COMPOSTING		
	Number of Michigan Households	% of Michigan Households
Convenient Drop-Off Composting (At least one location per 10,000 residents)	1,046,689	27.0%
Minimal Drop-Off Composting (One or more locations in county)	1,686,931	43.6%
No Drop-Off Composting	1,138,888	29.4%
<b>TOTAL HOUSEHOLDS</b>	<b>3,872,508</b>	<b>100%</b>

**TABLE 16: DATA COLLECTED FOR ACCESS TO RECYCLING AND COMPOSTING**

	DATA ON ACCESS TO RECYCLING		DATA ON ACCESS TO COMPOSTING	
	Data Points	% of MI Households Represented	Data Points	% of MI Households Represented
MRI Community Survey	137	36.6%	130	35.8%
MRI County Survey	1,222	37.0%	202	9.7%
2013 MDEQ Recycling Study	59	14.7%	--	--
MRI Research	338	7.3%	40	2.9%
<b>TOTAL</b>	<b>1,756</b>	<b>95.6%</b>	<b>372</b>	<b>48.3%</b>

## RECYCLING DATA

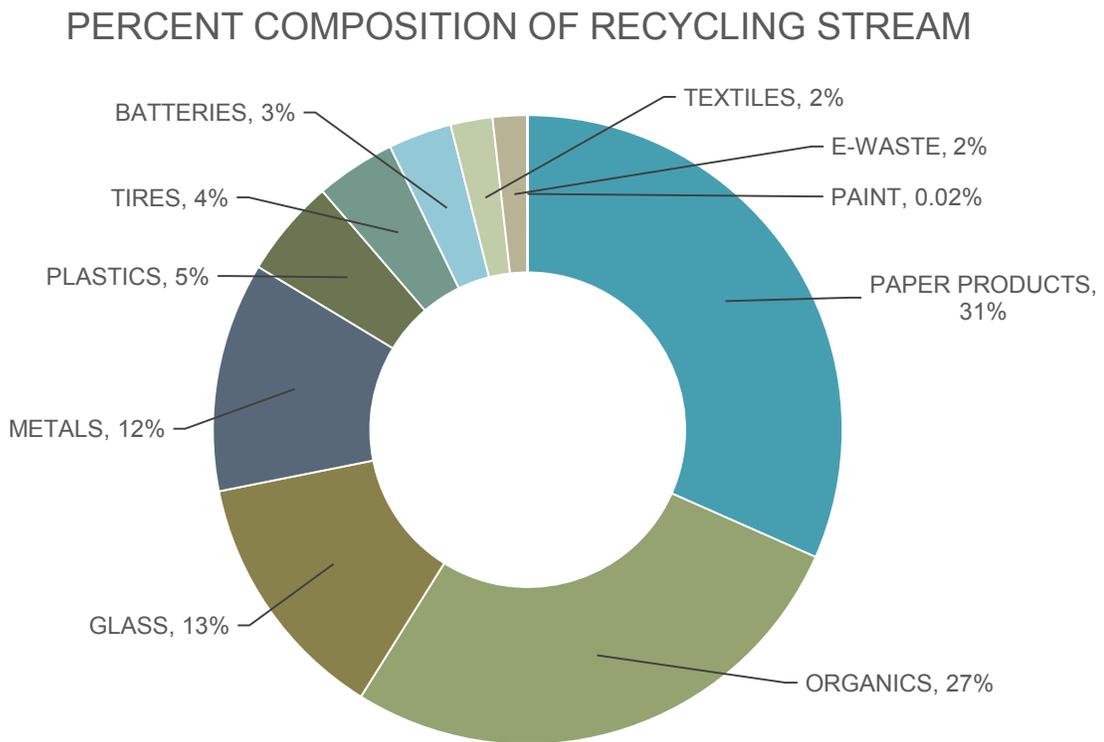
TABLE 17: MICHIGAN DISPOSAL OF MSW

	CUBIC YDS	TONS
Total Landfilled Less Incinerator Ash	21,581,275	7,193,758
Total Incinerated Less Recovered Metals	2,519,637	839,879
Total Disposal	24,079,444	8,026,443

TABLE 18: RECOVERY BY MATERIAL CATEGORY

	TONS COLLECTED (TONS)	LEVEL OF CONFIDENCE
Paper	444,338	Moderate
Glass	188,148	High
Metals	172,058	High
Plastics	73,890	Moderate
Organics	378,097	Moderate
Electronics	24,548	Moderate
Textiles	29,850	High
Tires	56,960	High
Batteries	45,187	High
Paint	225	High

FIGURE 9: RECYCLED MATERIAL BY PERCENTAGE



## PARTICIPATION DATA

TABLE 19: PARTICIPATION RATES

CURBSIDE PARTICIPATION RATE	NUMBER OF RESPONSES	TOTAL HOUSEHOLDS REPRESENTED BY RESPONSES
<50%	8	392,283
50-75%	13	139,482
>75%	15	207,854
Drop-Off Participation: % of Households making at least one visit to Drop-offs		
<25%	9	196,514
25-50%	7	53,875
>50%	3	5,621
Drop-Off Participation: Ratio of Total Annual Visits to Number of Households in Municipality		
<0.5	3	34,062
0.5-1.0	0	0
>1.0	1	668

TABLE 20: PARTICIPATION BY COMMUNITY SIZE

	<50% PARTICIPATION	50-75% PARTICIPATION	>75% PARTICIPATION
Municipal Services	1 Response 5,235 Households	4 Responses 2,396 Households	8 Responses 94,793 Households
Contracted Services	4 Responses 67,664 Households	10 Responses 123,562 Households	7 Responses 123,651 Households
Subscription Services	No Responses		
Small Community (Population <10,000)	1 Response 488 Households	4 Responses 5,662 Households	6 Responses 8,655 Households
Mid-Sized Community (Population 10-50,000)	3 Responses 23,482 Households	7 Responses 71,908 Households	5 Responses 49,051 Households
Large Community (Population >50,000)	2 Responses 49,417 Households	2 Responses 61,912 Households	3 Responses 146,726 Households

## XIV. APPENDIX II: DATA COLLECTION MATERIALS

### DATA SECURITY AGREEMENT

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The following commitment to handling and security of data was provided to survey targets:

*Dear Respondent,*

*The Michigan Recycling Index (MRI) is a Michigan Department of Environmental Quality effort to better understand recycling in Michigan. Project implementation is being led by the Michigan Recycling Coalition (MRC) which has contracted with Ann Arbor-based Resource Recycling Systems (RRS) (recycle.com) to collect data and calculate a state recycling rate.*

*To accomplish this goal, we are collecting data from a broad range of public and private stakeholders, including county and municipal recycling programs, as well as processors and end users of recyclable materials. We understand that some of the information we are requesting, such as facility or operational information related to amounts of recyclable materials or solid wastes processed, managed, or directed, may be proprietary and confidential to your organization. We wish to assure you that all Michigan Recycling Index partners including DEQ, MRC, RRS and the Advisory Group, are fully committed to providing a high level of security and ensuring that confidential information remains protected throughout our process.*

*The Michigan Recycling Index team is making a data security commitment to respondents regarding the way confidential data will be collected, managed and protected. RRS, who will collect and maintain the raw data, has decades of experience in the handling and protection of proprietary business information, and maintains a firm dedication to managing the sensitive information we receive in this way.*

*The following are the core principles of the data confidentiality commitment we make to respondents:*

*RRS will protect all proprietary, company-specific sensitive information collected through the Michigan Recycling Index project, and will not release company-specific confidential information to the MRC, DEQ, public, MRI Advisory Board or other 3rd parties.*

*Company specific information will not be shared, sold, used in marketing material, or otherwise used in any manner not directly related to this project. All collected data will remain under the exclusive control of RRS.*

*All respondent data will be aggregated by state and Council of Government (COG) planning region for presentation to the MRC, public, Client, or the Steering Committee. Data will only be released at the COG level if there are three or more data points in the region.*

*RRS will not infringe upon the intellectual property rights of respondents.*

## EPA SCOPE OF MATERIALS INCLUDED IN STANDARD RECYCLING RATE

<b>MATERIAL<sup>1</sup></b>	<b>WHAT IS MSW</b>	<b>WHAT IS NOT MSW<sup>2</sup></b>
Food Scraps	Uneaten food and food preparation wastes from residences and commercial establishments (restaurants, supermarkets, and produce stands), institutional sources (school cafeterias), and industrial sources (employee lunchrooms).	Food processing waste from agricultural and industrial operations.
Glass Containers	Containers; packaging; and glass found in appliances, furniture, and consumer electronics.	Glass from transportation equipment (automobiles) and construction and demolition (C&D) debris (windows).
Lead-Acid Batteries	Batteries from automobiles, trucks, and motorcycles.	Batteries from aircraft, military vehicles, boats, and heavy-duty trucks and tractors.
Tin/Steel Cans and Other Ferrous Metals	Tin-coated steel cans; strapping; and ferrous metals from appliances (refrigerators), consumer electronics, and furniture.	Ferrous metals from C&D debris and transportation equipment.
Aluminum Cans and Other Nonferrous Metals	Aluminum cans; nonferrous metals from appliances, furniture, and consumer electronics; and other aluminum items (foil and lids from bimetal cans).	Nonferrous metals from industrial applications and C&D debris (aluminum siding, wiring, and piping).
Paper	Old corrugated containers; old magazines; old newspapers; office papers; telephone directories; and other paper products including books, third-class mail, commercial printing, paper towels, and paper plates and cups.	Paper manufacturing waste (mill broke) and converting scrap not recovered for recycling.
Plastic	Containers; packaging; bags and wraps; and plastics found in appliances, furniture, and sporting and recreational equipment.	Plastics from transportation equipment.
Textiles	Fiber from apparel, furniture, linens (sheets and towels), carpets <sup>3</sup> and rugs, and footwear.	Textile waste generated during manufacturing processes (mill scrap) and C&D projects.
Tires	Tires from automobiles and trucks.	Tires from motorcycles <sup>4</sup> , buses, and heavy farm and construction equipment.
Wood	Pallets; crates; barrels; and wood found in furniture and consumer electronics.	Wood from C&D debris (lumber and tree stumps <sup>5</sup> ) and industrial process waste (shavings and sawdust).
Yard Trimmings	Grass, leaves, brush and branches, and tree stumps. <sup>5</sup>	Yard trimmings from C&D debris.
Other	Household hazardous waste (HHW) <sup>6</sup> , oil filters, fluorescent tubes <sup>7</sup> , mattresses, and consumer electronics.	Abatement debris, agricultural waste, combustion ash, C&D debris, industrial process waste, medical waste, mining waste, municipal sewage and industrial sludges, natural disaster debris <sup>8</sup> , used motor oil, oil and gas waste, and preconsumer waste.

FIGURE 10 WEBSITE - HOME PAGE



The screenshot shows the home page of the Michigan Recycling Index website. At the top left is a circular logo composed of several colored segments (green, blue, yellow, grey) arranged around a central white dot. To the right of the logo is the title "Michigan Recycling Index" in a large, dark serif font. Below the title is a horizontal navigation menu with the following items: "Home", "About", "Why Participate in the MRI?", "Data Confidentiality", "Survey & Resources", "FAQs", and "Contact Us".

Below the navigation menu is a large image of a green recycling bin. The bin is partially filled with a dark green tarp. A "WARNING NO PARKING" sign is visible on the right side of the bin. To the right of the image is a paragraph of text:

Through a grant provided by the Michigan Department of Environmental Quality Community Pollution Prevention Grant, the Michigan Recycling Index was created to guide a data collection process for a statewide assessment of recycling activities and recycled materials in Michigan.

At the bottom of the page are four colored buttons: "About the Index" (brown), "Frequently Asked Questions" (green), "MRI Surveys & Resources" (teal), and "Contact Us" (teal).

FIGURE 11 WEBSITE - WHY PARTICIPATE?



# Michigan Recycling Index

Home | About | Why Participate in the MRI? | Data Confidentiality | Survey & Resources | FAQs | Contact Us



## Recycling Is Moving Ahead in Michigan

Michigan currently lags behind many other states in both the data that is collected on recycling and composting and also the investment in recovery. This is changing. The state is investing in this initial data collection to determine the current recycling rate. Additionally, the Governor's Recycling Council, composed of business leaders dealing with recycling, has identified improving data as the first step in increasing investment in recovery. It is estimated that increasing Michigan's recycling rate from current levels to 50% would result in the addition of \$435 million worth of valued recycled commodities to Michigan's economy annually. Guiding public and private investment to serve the public and private sector and maximize the value of material successfully diverted to recycling and composting is important to achieving goals that improve both Michigan's economy and environment.

### Why Do We Need You To Participate?

The data you provide will be used to inform decision-making that could: 1) justify State leadership and funding in this arena; 2) improve program performance at all levels; 3) divert more material for private sector processors and manufacturers; 4) attract public and private sector investment to provide needed services and infrastructure; 5) provide readily available, low cost feedstock for Michigan manufacturers.

Let's work together to increase investment in a sector that is critical to our state's economic growth.

- MRC, Michigan DEQ, RRS and the Michigan Recycling Index Team

FIGURE 12 WEBSITE - SURVEY & RESOURCES



# Michigan Recycling Index

[Home](#) | [About](#) | [Why Participate in the MRI?](#) | [Data Confidentiality](#) | [Survey & Resources](#) | [FAQs](#) | [Contact Us](#)

## Michigan Recycling Index Surveys

To complete the Michigan Recycling Index Survey, click the link next to the appropriate user type. If you would prefer to complete by hand and submit, or to have a reference copy to assist in preparation, you may download the appropriate PDF version.

<b>Community or Authority</b>	<a href="#">Take Online Survey</a>	<a href="#">PDF</a>
<b>Hauler</b>	<a href="#">Take Online Survey</a>	<a href="#">PDF</a>
<b>County</b>	<a href="#">Take Online Survey</a>	<a href="#">PDF</a>
<b>MRF</b>	<a href="#">Take Online Survey</a>	<a href="#">PDF</a>
<b>Composter</b>	<a href="#">Take Online Survey</a>	<a href="#">PDF</a>
<b>Other Company/Org</b>	<a href="#">Coming Soon!</a>	<a href="#">PDF</a>

### Additional Resources

**ReTRAC Connect**

Environmental Protection Agency's Best Practices for Data Collection

**MRC's Previous Michigan Recycling Measurement Project Report**

Economic Impact of Recycling - *November 2001*  
Annual Collection and Diversion of Municipal Solid Waste - *December 2001*

**Michigan DEQ Landfill Reports (1996-2013)**

Annual Reports of Solid Waste Landfilled in Michigan

## Model State Data Collection & Results

Below are several example states have already made significant efforts to understand the status of recycling in their states. Follow the links for more information.

[Oregon](#)

[2012 Oregon Material Recovery and Waste Generation Rates Report](#)



Michigan Recycling Index Community Survey

Programs Offered

We would like to know about the types of recycling and composting services your community provides, either directly or by contracting with a service provider. Please complete the sections below to tell us about your programs.

If you have questions or any information that doesn't seem to fit, we're still interested! Please **contact us** by calling RRS at (734) 386-0674 or email [info@MichiganRecyclingIndex.com](mailto:info@MichiganRecyclingIndex.com).

Curbside Services

Does your community offer **curbside recycling** services? Please check the box that applies.

- Yes - we operate a curbside recycling program with our own employees
- Yes - we offer a curbside recycling program via contract with a hauler. (Please provide contracted hauler name: \_\_\_\_\_)
- Residents may subscribe to curbside recycling services with a preferred hauler. (Please provide preferred hauler name: \_\_\_\_\_)
- Residents may subscribe to curbside recycling services with the licensed hauler of their choice
- Residents may subscribe to curbside recycling services with any hauler
- No - curbside recycling is not available in our area (Please skip the next question.)

What type of curbside recycling services are offered in your community? Please check any that apply.

- | Type  | Collection Method                                       |
|---|---|
| <input type="checkbox"/> Single-stream                  | <input type="checkbox"/> Bins                           |
| <input type="checkbox"/> Dual-stream                    | <input type="checkbox"/> Carts                          |
| <input type="checkbox"/> Source-separated               | <input type="checkbox"/> Bags                           |
| <input type="checkbox"/> Other (please describe): _____ | <input type="checkbox"/> Other (please describe): _____ |

Does your community offer **curbside compost/yard waste collection**? Please check the box that applies.

- Yes - we operate a curbside compost collection program with our own employees
- Yes - we offer a curbside compost collection program via contract with a hauler. (Please provide contracted hauler name: \_\_\_\_\_)
- Residents may subscribe to curbside compost collection with a preferred hauler. (Please provide preferred hauler name: \_\_\_\_\_)
- Residents may subscribe to curbside compost collection with the licensed hauler of their choice
- Residents may subscribe to curbside compost collection with any hauler
- No - curbside compost collection is not available in our area (Please skip the next question.)

What type of materials are accepted for composting in your community? Please check all that apply.

- Leaves
- Lawn Clippings
- Other Yard Debris
- Food Waste
- Other (please describe: \_\_\_\_\_)

Please add any additional information or comments regarding curbside services in your community.

Michigan Recycling Index Community Survey

Dropoff Services

What type of dropoff recycling and composting programs does your community provide? Check the appropriate column below for programs operated by the community's own staff or operated under contract.

	Our own staff operates	Operated via contract with service provider	Name of service provider	We do not offer this service
Staffed drop-off center(s) for recyclables How many? _____	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
Non-staffed drop-off(s) for recyclables How many? _____	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
Drop-off(s) for compostables/yard waste How many? _____	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
Household hazardous waste (HHW) collection program	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
Special recycling events (shred day, electronics recycling day, etc.)	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
Other services (Please describe):				

Please list all drop-off locations operated or contracted by your community:

(name)	(street address)	(city)
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Michigan Recycling Index Community Survey

Processing Services

Does your community operate a Material Recovery Facility (MRF) or compost processing facility? Please check the items that apply.

- Yes – MRF
- Yes – Compost Facility
- Yes – Both (MRF & Compost Facility)
- No

*If your community operates a MRF or compost processing facility, the Michigan Recycling Index will follow up with a second form regarding the materials you process.*

If you checked “Yes” above, please tell us who operates your community's Material Recovery Facility (MRF) or compost processing facility.

	Our own staff operates	Operated via contract with service provider	Name of service provider	We do not offer this service
Recycling sorting and processing (Material recovery facility/MRF)	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
Compost processing	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>

## Michigan Recycling Index Community Survey

### Community Diversion Data

Please use the forms below to indicate the total quantity of **recyclable and compostable materials** collected through your **community's** programs, for the most recent complete calendar year, Jan-Dec 2013.

- Please provide quantities for material from commercial and residential sources only, excluding industrial material. For each category, please indicate if single-family, multi-family, and/or commercial materials are included.
- If you have any information on your program that doesn't fit into the categories below, we're still interested! Please contact us by calling RRS at (734) 386-0674 or email [info@MichiganRecyclingIndex.com](mailto:info@MichiganRecyclingIndex.com).

#### Section 1 – Commingled Recyclables

If recyclables are collected via a **single-stream, dual-stream or commingled** system and no further information on the materials is available, please enter the total volume of commingled recyclables in **Section 1** below. *For any items that are collected separately from your main commingled recycling program (e.g. tires, electronics, batteries, etc.), or if you have a material-by-material breakdown of the items collected in your main recycling program, please enter those volumes in Section 2. (Please don't include material here that you have broken out in Section 2 below).*

Material Category	2013 Quantity Collected	Unit of Measure (Tons or CY)	Composition (Loose, compacted, etc.)
Commingled Material 1 - please describe:			
Commingled Material 2 - please describe:			

#### Section 2: Recyclables by Material

If you have **more detail** on the materials collected, or volumes for materials collected outside of the main recycling program, please enter the volume of each material in the appropriate category in **Section 2** below. (If you do have a breakdown of commingled material, please enter it here and leave Section 1 blank.) *If you don't have this detail, please skip to Section 3.*

Metal	2013 Quantity Collected	Unit of Measure (Tons or CY)	Composition (Loose, compacted, etc.)
Metals:			
• Aluminum Cans			
• Tin/Steel Cans			
• Other Metal – please describe:			

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<b>Paper</b>	<b>2013 Quantity Collected</b>	<b>Unit of Measure (Tons or CY)</b>	<b>Composition (Loose, compacted, etc.)</b>
Paper:			
• Newspaper and Magazines			
• Corrugated Containers			
• Office Paper			
• Other Paper			
<b>Plastic</b>	<b>2013 Quantity Collected</b>	<b>Unit of Measure (Tons or CY)</b>	<b>Composition (Loose, compacted, etc.)</b>
Plastic:			
• Plastic bottles and rigid containers			
• Plastic Bags/Film			
• Other Plastic			
<b>Other Recyclables</b>	<b>2013 Quantity Collected</b>	<b>Unit of Measure (Tons or CY)</b>	<b>Composition (Loose, compacted, etc.)</b>
Glass			
Food and Beverage Cartons (Milk, Juice, Soy Milk, etc.)			
Wood			
Textiles			
Batteries			
Electronics (E-waste)			
Oil			
Tires			
Additional recyclables (Please describe)			

Please add any comments or explanation on the recyclables reported above:

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**Section 3: Compostables**

Please enter the amount of **compostables** by type or as a commingled total in **Section 3** below.

Section 6 Compostables	2013 Quantity Collected	Unit of Measure (Tons or CY)	Composition (Loose, compacted, etc.)
Leaves			
Other yard debris			
Food Waste			
Additional materials or commingled compostables (please describe)			

Please add any comments or explanation on the compostables reported above:

**Resident Participation**

The next questions will ask about **resident participation** in your recycling and compost programs. Please provide any data you have available or make estimates where asked. At the end of the page, please indicate any comments or additional explanation of your data and estimates.

How many residents participated in your community's **curbside** programs in 2013? Please provide any information you have on resident participation, or provide an estimate.

Curbside Services	Please provide any data or estimates you have available on curbside service participation		Please indicate if this data is estimated.	
	Number of households who set out materials	Percent of households	Actual Count	Estimate
2013 Curbside recycling participation			<input type="checkbox"/>	<input type="checkbox"/>
2013 Curbside compost participation			<input type="checkbox"/>	<input type="checkbox"/>

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How many residents participated in your community's **dropoff programs** for recycling and compost in 2013? Please provide any information you have on resident participation, or provide an estimate of the number or percent of residents participating.

Dropoff Services	Please provide any data or estimates you have available on dropoff service participation		Please indicate if this data is estimated.	
	Number of households who visited dropoff location(s) at least once	Number of visits made to dropoff locations	Actual Count	Estimate
2013 Dropoff recycling participation			<input type="checkbox"/>	<input type="checkbox"/>
2013 Dropoff compost participation			<input type="checkbox"/>	<input type="checkbox"/>

Household Hazardous Waste (HHW) Services	Please provide any data or estimates you have available on HHW service participation		Please indicate if this data is estimated.	
			Actual Count	Estimate
How many visits were made to your HHW program in 2013?			<input type="checkbox"/>	<input type="checkbox"/>
How many residents used the HHW program at least once?			<input type="checkbox"/>	<input type="checkbox"/>

Special Recycling Events (electronics recycling, shred days, etc.)	Please provide any data or estimates you have available on special event participation		Please indicate if this data is estimated.	
			Actual Count	Estimate
How many visits were made to your recycling events in 2013?			<input type="checkbox"/>	<input type="checkbox"/>
How many residents made at least one trip to a recycling event?			<input type="checkbox"/>	<input type="checkbox"/>

Please add any additional information or comments about resident participation in your programs.

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Local Recycling Infrastructure

We would like to learn more about the recycling and composting infrastructure in your area. In the following questions, please provide the names of any companies or public organizations that **collect/haul, process, compost, and otherwise handle or buy** recyclable and compostable materials from your community.

If you have any questions about these categories or other types of items to add, please feel free to call RRS at (734) 386-0674 or email [info@MichiganRecyclingIndex.com](mailto:info@MichiganRecyclingIndex.com).

**Haulers:** Please list any **haulers** or **collectors** of recyclables and/or compostables operating in your community:

**MRFs:** Please list any **recyclables processors/ material recovery facilities (MRFs)** that receive materials from your community.

**Composters:** Please list any **compost facilities** that receive materials from your community.

**Others:** Please list any other facilities that handle recyclables in your community, including **scrap brokers, recyclables transfer stations, reprocessors** or **end users** for recycled materials.

Please provide any additional comments or information below.

Data Certification

Thank you for your time and effort in collecting this important data. Please sign below to submit your survey. By signing, you certify that you are a representative of the organization you identified in the survey. You also certify that you have provided accurate responses to the best of your ability.

\_\_\_\_\_ (signature) \_\_\_\_\_ (date)

## XV. APPENDIX III: REFERENCES

- Battery Council International, comp. National Recycling Rate Study. Rep. Chicago: SmithBucklin Statistics Group, 2014. Print.
- Incinerator Data was provided by the MDEQ through Kent County DPW Financial Report on All Operations (2013) and through the Greater Detroit RRF Renewable Energy Case Study, CleanEnergy Action Project
- Michigan Department of Environmental Quality. Residential Recycling in Michigan Communities with More than 10,000 People. N.p.: n.p., November 19, 2013. Print. Curbside recycling access information was used for municipalities which did not participate in the MRI survey.
- Michigan Department of Environmental Quality, Steve Sliver, Chief Solid Waste Section. Scrap Tire End-Use; Estimated Usage and Capacity. Lansing: MDEQ, 2014. Print.
- Michigan. Michigan Department of Environmental Quality. Office of Waste Management and Radiological Protection Solid Waste Section. Report of Solid Waste Landfilled in Michigan. N.p.: n.p., 2014. Print.
- Pennsylvania. Department of Environmental Protection. Pennsylvania Recovered Material Composition Study. By RW Beck. N.p.: n.p., 2005. Print.
- Reported eWaste Data was provided to the MRI by the Michigan Dept of Environmental Quality
- Secondary Materials and Recycled Textiles Association. Textile Recycling Fact Sheet. Rep. N.p.: n.p., n.d. Web. 28 Nov. 2014.
- Business and Environmentalists Allied for Recycling. Understanding Beverage Container Recycling. N.p.:n.p., January 16, 2002
- United States. Environmental Protection Agency. Solid Waste and Emergency Response. Measuring Recycling: A Guide for State and Local Governments. N.p.: n.p., 1997. Print.
- U.S. Environmental Protection Agency. "Municipal Solid Waste Generation, Recycling, and Disposal in the United States." US EPA Website. N.p., Feb. 2014. Web. 30 Jan. 2015.